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RESIDENT FELLOW VIGNETTE PODIUM PRESENTATIONS
Loperamide Induced Cardiac Dysrhythmias – An Emerging Toxicological Phenomenon

First Author: Irbaz Bin Riaz, MD MM, Evbu Enakpene, M.D., Mazda Shirazi M.D. Yuval Raz, M.D. Julia H. Indik, MD, PhD

Introduction: Loperamide (poor man’s methadone) is an easily available over-the-counter anti-diarrhea drug. We present a case of 25-year-old female with recurrent hospitalizations secondary to unidentified loperamide cardio-toxicity.

Case Presentation: A 25-year-old female with no known medical problems initially presented with abdominal discomfort for 2 weeks. Routine work up for abdominal pain was unrevealing and she was discharged with pantoprazole script. She was re-admitted 2 weeks later after a syncopal episode. Based on history and cardiac work-up, she was diagnosed with long QT syndrome and a dual chamber ICD was implanted. After 6 weeks of ICD placement, she again presented with nausea, vomiting, bradycardia and hypotensive shock. Initial blood work showed arterial pH of 7.2, hyperkalemia (K: 6 meq/L), BUN 29mg/dl, creatinine 2.8 mg/dl, and magnesium of 2 mg/dl. Despite correction of potassium and administration of atropine, she remained bradycardic. Transcutaneous pacing failed to capture. ICD Interrogation revealed markedly elevated pacing thresholds and normal lead position was confirmed on chest X-ray. She was intubated for airway protection and required multiple pressors due to hemodynamic instability. Serial electrocardiograms revealed persistently widened and bizarre paced QRS complexes. She also had multiple episodes of polymorphic ventricular tachycardia. Drug toxicity was suspected due to markedly widened paced QRS complex. Initial toxicological screening was negative. Detailed questioning of her partner then revealed that there were empty bottles of loperamide in her apartment. Subsequent testing then confirmed the presence of loperamide metabolites. She recovered completely with Intralipid and supportive therapy in the intensive care unit. She admitted to chronic abuse of loperamide as a substitute to opioids. She was re-admitted 2 months later in cardiogenic shock after resuming loperamide abuse and died 18 hours after admission despite placement on Extracorporeal Membrane Oxygenation (ECMO).

Discussion: This case illustrates that loperamide can cause life-threatening heart rhythm disturbances which can be difficult to diagnose, as the presentation is not unique, can mimic other arrhythmia disorders such as long QT syndrome and history is often unavailable or unreliable. Thorough toxicological evaluation should be strongly considered before pacemaker placement in young and otherwise healthy patients with syncope and an abnormal baseline ECG. Loperamide should be clearly recognized and labelled as a drug of abuse because it is known to be taken in massive dosages to substitute for opioids. Currently, it is easily available in large quantities over the counter without any government regulation. The combination of easy availability at low cost, unregulated websites increasing awareness about the abuse, lack of awareness about potential fatal rhythm disturbances, both by patients and physician and complex management requiring multidisciplinary teams deserves immediate attention of drug regulation authorities and physicians to prevent similar fatal events.
Hypertensive Encephalopathy or more? Posterior Reversible Encephalopathy Syndrome and a novel treatment.

First Author: Candice Crichlow, MD Co-Author: Gabriela Molina, MD

Hypertensive emergency is elevated blood pressure resulting in acute end-organ damage which can include hypertensive encephalopathy. Modern day advances in radiology have established a new syndrome called Posterior Reversible Encephalopathy Syndrome (PRES). Although this clinicoradiological diagnosis is not always associated with hypertension, the neurological and radiographical changes are potentially reversible. Without withdrawing the inciting factors however, irreversible neurological damage can occur. This case describes one man who presented with a headache and received a novel treatment for PRES.

A 40 year old African American male with a history of hypertension, non-compliant with medications, presented to the emergency department with a three day history of headache, malaise, generalized body aches, nausea, vomiting and blurry vision. His vital signs revealed a blood pressure of 264/169 but otherwise within normal limits. His neurological exam showed no papilledema, no nystagmus, normal motor, sensory systems, negative Babinski signs bilaterally and although lethargic, he was completely oriented to all spheres. The rest of his physical exam was benign.

A CT scan of his head done in the emergency room showed confluent hypodensity of bilateral cerebellar hemispheres with edema and compression of the fourth ventricle. There was marked enlargement of the third and fourth ventricles compared to previous imaging, which is consistent with hydrocephalus. The appearance raised suspicion for PRES.

Given the severity of the changes, the patient’s blood pressure was controlled with Nicardipine and as suggested by the consulting neurologist, Mannitol was given to decrease the edema. Seven hours later on the day of admission, his blood pressure was 170/110 and an MRI was performed which showed resolution of the hydrocephalus and edema. His headache was improved.

PRES is characterized by altered mentation in the form of loss of orientation, headaches, decreased level of consciousness, nausea, visual disturbances and even focal neurological signs along with radiographical evidence of cerebral imaging abnormalities predominantly in the posterior white matter. The causes are vast, including cytotoxic agents, hypertension, sepsis, autoimmune diseases and pre-eclampsia. The pathophysiology is controversial but vasogenic edema is the end result regardless of the mechanism. Treatment is the removal of the offending agent or treatment of the underlying condition. In this case, mannitol was used since there was evidence of increased intracranial pressure. Mannitol has been compared to Magnesium Sulfate for the treatment of PRES in eclampsia but its use was never described in the setting of hypertensive emergency. This case of quick reversal of radiographic findings is an indication that mannitol may be used to augment the treatment of PRES.
MASSACHUSETTS PODIUM PRESENTATION - CLINICAL VIGNETTE Fadi Alkhatib, DO

Too little can make you bleed, too much can give you a heart attack!

First Author: Fadi Alkhatib, DO Second Author: Sami Ibrahimi MD Third Author: Khawar Maqsood MD

CASE: A 42-year-old female with systemic lupus erythematosus, immune thrombocytopenic purpura (ITP) and refractory thrombocytopenia requiring splenectomy, presented with persistent substernal chest pain and found to have new left bundle branch block on electrocardiogram. She had normal vital signs. She takes Eltrombopag, a thrombopoietin agonist, for ITP and her platelet counts have been known to fluctuate between 1k/mm$^3$ and more than 1500k/mm$^3$ within the preceding 1 year. Her past medical history was also significant for a recent Non- ST segment elevation myocardial infarction (NSTEMI) in the setting of thrombocytosis and multiple admissions for menorrhagia and epistaxis in the setting of thrombocytopenia. Laboratory work up showed a platelet count of 996k/mm$^3$, troponin of 1.83 ng/ml which peaked at 3.89 ng/ml. Antiplatelet and anticoagulation therapy were initiated. A bedside echocardiogram showed normal ejection fraction and no regional wall motion abnormalities. Subsequently, coronary angiography suggested no epicardial coronary obstruction and CT angiogram of the chest was negative for pulmonary embolism. She was diagnosed with NSTEMI presumptively related to microvascular thrombosis in the setting of profound thrombocytosis. Eltrombopag was held and her dose was reduced from 50 mg to 12.5 mg before discharge. Decision was made to start patient on prophylactic enoxaprin during any future episodes of profound thrombocytosis and to stop low dose aspirin if platelet counts drop below 50K.

DISCUSSION: Eltrombopag, a Thrombopoietin receptor (TPOr) agonist, is an FDA approved treatment for refractory immune thrombocytopenic purpura. Common side effects include; headache, anemia, and fatigue. Hepatotoxicity is a relative contraindication for use and thromboembolic events have been reported as a complication. A recent metanalysis showed a trend towards increased risk of thromboembolism with the use TOPr agonists but this was not statistically significant. Moreover, Eltrombopag use in patients with chronic liver disease was associated with an increased incidence of portal-vein thrombosis, as compared with placebo. To our knowledge, this is the first reported case of recurrent myocardial infarctions with the use of this medication.

CONCLUSION: Eltrombopag related thrombocytosis can precipitate myocardial infarction through a speculated microvascular thrombosis. This complicates the treatment of ITP patients.
Chicken Pox, as the initial presentation of hairy cell leukemia.

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Objective: Recognize adult onset chicken pox as the initial manifestation of underlying lymphoproliferative disorder.

Introduction: Varicella Zoster Virus (VZV) is one of the herpes viruses. It is known to cause chicken pox in children and young adults; and shingles (herpes zoster) in adults and very rarely in children. It has been reported that patients with Lympho-proliferative disorders experience higher rates of VZV infection.

We are reporting a case of adult Chicken Pox as the first manifestation of hairy cell leukemia. To our knowledge, this is the first reported case.

Case presentation: A 61 year-old previously healthy male, with no prior history of chicken pox infection, or vaccination. Came in to the hospital complaining of diffuse skin rash of five-day duration. The rash started as papular on the lower back, then it spread to the rest of his body sparing the palms and soles. The rash progressed from papular into vesiculular that crusted few days later. No splenomegaly could be identified on physical exam. His blood work revealed WBC count of 1800 cells/mcl, platelet count of 100,000 cells/mcl, and hemoglobin of 12 grams/dl. Patient was started on intravenous acyclovir with daily follow up on his complete blood count. Over the next few days, the rash started to crust and resolved gradually, but the WBC count decreased to 1400 cells/mcl, and then to 1200 cells/mcl.

The decision was made to proceed with bone marrow biopsy. The flow cytometric immunophenotyping identified a monoclonal B-cell population expressing CD20, CD25, CD103, CD11c and negative for CD5 and CD10. and positive Tartrate-resistant acid phosphatase. Which confirmed Hairy cell leukemia diagnosis.

Discussion: Hairy cell leukemia is an uncommon chronic lymphoproliferative disorder. It accounts for 2% of all leukemia. The classic manifestations of HCL are abdominal fullness or discomfort due to splenomegaly, systemic complaints, such as fatigue, weight loss, bruising, bleeding secondary to thrombocytopenia, or recurrent infections. One quarter of patients are generally asymptomatic and come to the clinician's attention because of incidentally found splenomegaly or pancytopenia. Literatures search described the occurrence of opportunistic infections (e.g. Candida, mycobacteria, and Cryptococcus), viral infections (e.g. herpes simplex, cytomegalovirus, and hepatitis virus) and various bacterial infections in HCL. Varicella zoster infection as the first manifestation of HCL was not reported before according to our literature search. Our goal for reporting this case is to increase awareness of potential underlying lymphoproliferative disorder, specifically, hairy cell leukemia for Adult Patients presented with disseminated varicella zoster.
Serotonin Syndrome in Single Agent Bupropion Overdose

First Author: Jennifer Chang Chieh Yui, MD Ana Zamora Martinez, MD

**Introduction:** Serotonin syndrome is a potentially life-threatening condition resulting from the overstimulation of serotonin receptors in the central nervous system. Presentation features mental status changes, autonomic hyperactivity, and neuromuscular abnormalities.

Bupropion is a dopamine and norepinephrine reuptake inhibitor, without any direct serotonin action. Thus, its ability to precipitate serotonin syndrome has been challenged. Below, we present a case of single agent bupropion overdose, with resultant serotonin syndrome.

**Case Presentation:** A 17 year-old female with poorly controlled depression was being treated with bupropion monotherapy. The day of admission, she got into a heated argument with family and ingested 23 tablets of bupropion 300 mg. After having a seizure at a local ED, she was brought to our medical ICU. After admission, she had two further myoclonic seizures and a witnessed aspiration event. She was emergently sedated and intubated. Ampicillin-sulbactam was initiated to treat aspiration pneumonia.

Per her family’s report, there were no other co-ingestions, and urine drug screen was positive only for THC. She was started on levetiracetam for seizure prophylaxis, and intravenous propofol was required to control her severe agitation. Her myoclonus persisted despite levetiracetam treatment, and EEG showed diffuse slowing but no correlating epileptiform discharges. She was intermittently febrile, with highest temperature 38.8 C. The following morning, she was noted to have ocular myoclonus and axial rigidity.

She was diagnosed with serotonin syndrome and initiated on cyproheptadine therapy. Within 24 hours of initiating treatment, physical signs of serotonin syndrome had resolved. Her agitation also resolved, and she was extubated. She was transferred out of the ICU and weaned off cyproheptadine over the next three days. Once medically stable, she was admitted to an inpatient psychiatry unit.

**Discussion:** Bupropion has often been implicated as a contributing cause in multi-agent overdoses causing serotonin syndrome. However, the serotonergic action of bupropion has been debated and generally felt to be nonsignificant based on animal trials and very small in vivo trials.

In this case, the clinical presentation and resolution of symptoms after treatment with cyproheptadine certainly point toward serotonin syndrome. The Hunter criteria for diagnosis of serotonin syndrome feature the initial qualifier of the presence of a serotonergic agent. While bupropion is not a direct serotonergic agent, perhaps this agent’s mechanism and its interaction with serotonin in vivo needs to be further elucidated to clarify it as a potential cause of serotonin syndrome in single agent overdose.
NEW YORK PODIUM PRESENTATION - CLINICAL VIGNETTE Dilasha Katwal, MD

West Nile Virus Induced Opsoclonus-Myoclonus Syndrome

First Author: Dilasha Katwal, MD 1 Eric Sklar MD2, Rashmi Banjade MD1 , Stephen Jesmajian MD1 1 Montefiore New Rochelle Hospital and Albert Einstein College of Medicine, New Rochelle, New York. 2 Inova Fairfax Hospital, Falls Church, Virginia

Opsoclonus–Myoclonus–Syndrome (OMS) is a rare neurological disorder consisting of involuntary, chaotic, multidirectional saccades without inter-saccadic intervals known as opsoclonus and arrhythmic-action myoclonus predominantly involving the trunk and the neck. It may be associated with a paraneoplastic syndrome or may occur due to toxins, autoimmune diseases, infections, or idiopathic in origin. We present a case of West Nile Virus infection presenting with OMS.

A 51 year old female presented with diffuse headache of two days associated with abnormal movement of her eyes and difficulty in focusing on objects. She also had difficulty ambulating due to dizziness and worsening right upper extremity tremor. On the day her symptoms started, she had noticed pink, non-pruritic rash on her chest, abdomen, and arms that resolved spontaneously. She had intermittent chills but no fever. She denied any recent travel, insect bites, sick contacts, new medication or drug use. She had a family history of lung cancer in both her parents and thyroid and renal cancer in a brother. She was a non-smoker. On admission, she was afebrile and her vitals were stable. She was alert and oriented. Meningeal signs were absent. She had small-amplitude rapid, involuntary, horizontal and vertical eye movements, which was slightly suppressible with her forced gaze. Tremor was noted with postural extension of right arm. Gait was deferred. Other neurological and systemic exams were unremarkable. Her complete blood counts, complete metabolic panels, erythrocyte sedimentation rate, thyroid-stimulating hormone, chest x-ray, and collagen vascular disease antibody panel were normal or negative. CT scan head, CT angiogram head and neck, MRI head, CT scan chest, abdomen and pelvis with contrast, transvaginal ultrasound pelvis, bilateral digital mammogram and paraneoplastic antibodies were all negative. HIV, Lyme disease, group A streptococcus, influenza tests were negative. Lumbar puncture revealed CSF with WBC of 11 with 37% neutrophil, 33% lymphocytes and 30% monocytes, glucose 54mg/dl and protein 56mg/dl. CSF HSV PCR, CMV, EBV, bacterial cultures were all negative. Serum West Nile Virus IgM antibodies were positive and IgG antibodies were negative. Patient was symptomatically managed with Clonazepam and Topiramate, which improved her opsoclonus and myoclonus gradually, and she was eventually discharged to a rehabilitation facility. During one month follow up, she had occasional opsoclonus and myoclonus and mild postural tremor.

OMS is a rare autoimmune condition characterized by cerebellar degeneration seen in patients secondary to various etiologies like cancers, toxins, autoimmune diseases, and viral infections. It is important to rule out malignancy on adult patients with OMS especially presenting with encephalitis. Therefore, our initial investigations were focused to rule out different types of tumors associated with OMS like breast cancer, small cell lung cancer and gynecological cancers. Our extensive investigation eventually diagnosed WNV encephalitis, which is an unusual cause of OMS with only a few reported cases so far.
Classic Hypertensive Emergency? An Unusual Case of Labile Hypertension

Case Presentation: A 65 year-old man presented with 1 day of headaches and dizziness. He denied vision changes, chest pain, or weakness. His past medical history was significant for hypertension, chronic kidney disease stage III, and type 2 diabetes mellitus. His blood pressure was noted to be 216/122 with otherwise normal vital signs. His physical exam demonstrated no neurologic abnormalities and his optic disc showed no papilledema. His serum creatinine was 3.7 mg/dL with a baseline serum creatinine of 1.6 mg/dL. A computed tomographic scan of his head was normal. He was started on a nicardipine drip for aggressive blood pressure control. His blood pressure was labile and corrected quickly over 1 hour to 140/80, and thus the drip was stopped. His blood pressure remained labile throughout the subsequent days. On his third hospital day, he developed altered mental status with hypercapnea that required intubation. It was then noted that he could not move his extremities but did open and close his eyes on command. His physical exam at that time showed areflexia. A magnetic resonance image of the brain showed a small acute lacunar infarct involving the left lateral thalamus, which did not explain his neurologic deficits. Lumbar puncture was performed due to a concern for Guillain Barre Syndrome (GBS). Cerebrospinal fluid studies showed a protein level of 144 mg/dL (elevated), no white blood cells, and a negative infectious workup. Electromyography (EMG) and nerve conduction studies were performed that showed evidence of primarily axonal sensory/motor peripheral polyneuropathy. His autoimmune workup was significant for a positive antibody to ganglioside GM1. These results were consistent with a diagnosis of acute motor and sensory axonal neuropathy (AMSAN), a variant of GBS. He was treated with IVIG therapy with remarkable improvement and eventual full motor recovery.

Discussion: Dysautonomia is a common feature of GBS (reported as high as 70% of cases). Typical cardiovascular findings of dysautonomia in GBS include tachycardia, persistent hypertension, labile blood pressure, or arrhythmias. Although his labile blood pressure was a clue of dysautonomia, he wasn’t experiencing neurologic symptoms yet, so a disease like GBS was not on our differential diagnosis. AMSAN is a variant of GBS typically seen in non-US countries. This variant of GBS is typically differentiated via EMG and antibody tests anti-gangliosides and is associated with higher rates of respiratory failure. Our case highlights a very unusual clinical presentation to an atypical variant of GBS. Hypertensive crises that are overly labile should raise the suspicion to a general internist of the possibility of dysautonomia playing a pathophysiological role and thereby adjusting their differential diagnoses accordingly.
Pay Heed to Weed: It’s a diagnostic lead and a public health need!

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**Introduction:** Synthetic cannabinoids (SCs) are blends of plant material with varying concentrations of synthetic analogues of cannabinoids sold as incense or potpourri, labeled “Not for human use”. However, the magnitude of SC abuse is rapidly increasing, especially among the young adults. These products can be easily ordered on the internet. Renal failure is a rare complication associated with SC abuse. We describe a case of acute kidney injury (AKI) associated with use of SCs and their impact on public health.

**Case Description:** A 26 year-old male was brought to the emergency department (ED) after a seizure-like activity. He was intubated on arrival. His family reported that he had been in his usual health until the symptom onset, and had been smoking “synthetic weed” for the previous 2 days including the night prior to admission. Physical examination revealed a well nourished male on mechanical ventilation with normal vital signs and the remainder of physical examination.

The laboratory studies showed a creatinine of 2.3 mg/dl, BUN of 25 mg/dl and a CPK of 2337 units/liter. A urinalysis showed 5 RBC/HPF, normal myoglobin levels, 1+ proteinuria, and no white blood cells or casts were seen. The fractional excretion of sodium was 5.09. Renal ultrasound revealed a normal echotexture and size. No other hemodynamic, infectious, pharmacologic or autoimmune etiology of renal failure was found. His creatinine peaked at 8.1 mg/dl on day 4 and then began to improve with supportive treatment. It was 2 mg/dl upon discharge with complete resolution of electrolyte abnormalities. His urine output remained above 0.5 ml/kg/hour throughout his hospitalization.

**Discussion:** Renal toxicity of SCs has been reported in 21 cases, prompting a CDC alert. All patients had improvement in renal function over a variable time course. The pathogenesis of renal involvement remains unclear, but may involve the toxic metabolites - XLR11 or UR144. The serum and urine assays to detect SCs and their metabolites are expensive and not easily available. Fifty-one new SC compounds were identified in 2012, compared to just two in 2009. SCs were implicated in 11,400 ED visits in 2010, 75% of which were in the age group of 12-29 years. One in nine 12th graders in the USA reported using SCs in the past year. However, many ED physicians feel unprepared to treat these patients.

**Conclusion:**

1. SC abuse is a significant public health hazard, and a new differential diagnosis of AKI in young adults.
2. If a clear history of SC abuse preceding the AKI is available, invasive diagnostic studies may be deferred.
3. It is potentially reversible with supportive treatment, although the long term effects are unknown.
Arterial Thrombus and Myocardial Infarction after Discontinuation of a Novel Oral Anticoagulant in a Patient with Protein C Deficiency

First Author: John C. Hunninghake, MD Second Author: Hugh M. Coke, MD Third Author: Gilberto Patino, MD Fourth Author: Jamil A. Malik, MD

Introduction: Protein C deficiency is a disorder of the coagulation cascade resulting in a hypercoagulable state that puts a carrier at risk for venous thromboembolism. Certain studies have suggested a correlation of this disorder with arterial thrombosis, especially within the coronary vasculature. Multiple case reports have described acute myocardial infarction in young patients as the presenting syndrome for protein C deficiency; however, no case reports describe a patient who had been treated with a novel oral anticoagulant (NOAC) for secondary DVT prevention.

Case Report: The patient is a 23 year old male with a history of a pulmonary embolus (PE). After completion of a 6-month course of coumadin as treatment for the PE, his hypercoagulability workup was positive for protein C deficiency. He was subsequently started on rivaroxaban with instructions to continue lifelong as secondary prevention for recurrent DVTs. Three months later, he stopped his rivaroxaban due to initiation of an exercise regimen shortly after arriving to San Antonio from a cross-country road trip. Three weeks later, he presented to the ED with a 2 day history of pleuritic chest pain and dyspnea on exertion. CT angiogram was negative for acute pulmonary embolus, but his initial troponin-T was elevated (0.19 ng/mL) with T-wave inversions on EKG. Due to concern for ACS, he was taken to the cardiac catheterization lab for angiography of both his pulmonary and coronary arteries. A massive thrombus was discovered in the proximal-to-mid LAD with no significant atherosclerosis. He underwent aspiration and mechanical thrombectomy. Post-procedure, he was started on yearlong dual antiplatelet therapy for secondary MI prevention for NSTEMI due to the uncertainty of plaque rupture contribution. For the hypercoagulable state attributed to protein C deficiency, systemic anticoagulation was restarted with lifelong coumadin and a short LMWH bridge due to his temporary hypercoagulable state. Other than mild mucosal bleeding and a small retroperitoneal hematoma, the patient remained hemodynamically stable for the remainder of the hospitalization with no recurrent angina symptoms.

Discussion: Certain NOACs have been approved for secondary DVT prevention; however, no literature was found that addresses their risk reduction for venous or arterial thromboembolism specifically in protein C deficiency. This case questions whether the discontinuation of a NOAC contributed to a hypercoagulable state that predisposed a high-risk individual to the development of a significant coronary arterial thrombosis. Further investigation is necessary to evaluate the safety of NOACs as secondary DVT prevention in protein C deficiency.
Look What the Cat Dragged In: An Unusual Case of LVAD-associated Endocarditis.

First Author: Nathaniel C Warner, MD

Mr. H is a 69-year-old Caucasian gentleman with history of severe ischemic cardiomyopathy status post aortic valve replacement and left ventricular assist device (LVAD) who developed vague symptoms of fatigue and malaise. Initially, his symptoms were attributed to worsening heart failure, so he underwent right heart catheterization, which showed unchanged post capillary pulmonary hypertension. His symptoms continued for two months, until he mentioned daily low-grade fevers without other localizing symptoms to his outpatient cardiologist. Computed tomography of the chest was obtained to evaluate for VAD malfunction or occult abscess but imaging was unrevealing.

Four months after initial symptom onset, the patient noted a fever to 100.8. Two days later, routine labs revealed acute renal failure (Cr 3.29 mg/dL) and the patient was admitted to the hospital for further workup. On admission, the patient was a well appearing middle-aged gentleman in no acute distress. He was afebrile and his vital signs were stable. Physical examination was unremarkable including LVAD hum and normal appearing driveline. There were no rashes. Laboratory data was significant for new pancytopenia and acute renal failure.

Blood cultures were drawn and TEE showed no obvious vegetation. Further detailed history revealed that the patient had two cats, including a new kitten, which frequently scratched him while playing. Given his exposure history, serologies were drawn for Bartonella henselae, Bartonella quintana and Coxiella burnetti in addition to blood cultures.

Five days later, B. henselae IgG returned strongly positive (1:2560) and the diagnosis of LVAD-associated B. henselae infective endocarditis was made. Due to the patient’s acute renal failure, an aminoglycoside sparing regimen was used consisting of ceftriaxone, doxycycline, and rifampin for six weeks followed by doxycycline through cardiac transplantation. The patient was relisted for heart transplant, and three months later, underwent successful cardiac transplantation. Over one year later, he remains well without complication or recurrence of infection.

Discussion: Bartonella henselae is a small, aerobic gram negative bacillus known to cause a spectrum of illness depending on risk factors and immune status of the host. Classically, it is known to cause focal, suppurative disease in the immunocompetent, and multifocal, disseminated disease in the immunodeficient. It is also a well known cause of blood culture negative endocarditis. Its prevalence varies by region from 1-15% and is associated with feline exposure and preexisting valvular disease. Aminoglycoside therapy is the treatment of choice in these patients, but was not possible in this patient due to acute renal failure. This appears to be the first case of LVAD-associated Bartonella henselae endocarditis described in the literature and emphasizes the importance of a detailed history when evaluating suspected infective endocarditis.
RESIDENT FELLOW VIGNETTE POSTER FINALISTS
ALABAMA POSTER FINALIST - CLINICAL VIGNETTE Ashley E Jackson, MD

Spontaneous native aortic valve thrombosis: a rare case teaches vital medical points

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INTRODUCTION: Even though spontaneous native aortic valve thrombosis is an extremely rare phenomenon, it can be suspected with simple yet thorough physical exam. We report an unusual presentation of this rare diagnosis.

CASE: A 32-year-old African American male presented ER with acute, severe right leg pain, numbness, and weakness while cutting grass. Physical exam demonstrated right lower extremity pallor, cool skin temperature, absent sensation, weak femoral pulse, and absent pedal pulses. Arterial Doppler and CTA confirmed right common iliac arterial occlusion and incidental splenic and renal infarcts. Labs at presentation showed Hb of 22.3 and Hct 63.8, WBC 19,660, and platelets 25,000. Record review showed patient had been diagnosed 6 years back with polycythemia rubra vera (PRV) JAK2 negative; however, he was lost to follow-up due to lack of insurance. Vascular surgeon performed urgent thrombectomy to reduce critical limb ischemia, successfully restored blood flow, performed therapeutic phlebotomy, and placed patient on aspirin and heparin. Hematology was consulted and found a crescendo-decrescendo systolic ejection and diastolic murmur in aortic area. Thus, 2-D ECHO and TEE were ordered, which revealed extensive thrombosis of aortic valve (AV) leaflets, severe aortic stenosis and insufficiency, and concentric left ventricular hypertrophy with preserved ejection fraction. Patient underwent AV replacement with mechanical valve. Gross examination showed organized clot in right and left cusps with thrombus extension above the valve to underneath the left main trunk, encircling the right coronary ostia, and over the anterior leaflet of mitral valve. Microbiology cultures were negative, and histology confirmed organized thrombus. Patient was discharged on warfarin with therapeutic INR. Two months after surgery, he is doing well, has insurance, and has continued follow-up.

DISCUSSION: This case displays a rare pathology, highlights a barrier to follow-up, and reiterates the importance of thorough clinical examination. Even though PVR frequently causes isolated acute arterial thrombosis, a systemic embolic phenomenon should also be considered. In this case, diligent physical exam and imaging review confirmed such an unusual presentation, which lead to prompt aortic valve surgical repair, thus avoiding additional catastrophic thromboembolism. Unfortunately, patient had been lost to follow-up since original PRV diagnosis because he was uninsured. That negated any potential opportunity to medically intervene sooner, and it remains to be a significant barrier to appropriate healthcare in the United States.
Dying for Moonshine: A rare case of copper toxicity

Sarah A. Kunin, MD and Eric Cornatzer

Moonshine has been increasing in popularity since the start of the economic recession in the U.S. There have been few reports on chronic copper toxicity from consuming moonshine. Most of the current literature looks at acute copper toxicity, but it has yet to evaluate chronic copper toxicity.

The patient we present is a 65-year-old white male who presented with a history of worsening shortness of breath, diffuse swelling, and newly diagnosed CHF. The patient had a history of drinking one-fifth of a gallon daily of moonshine that had toxic levels of copper in it. He developed AKI that rapidly progressed to ESRD. He had recurrent ascites from his newly diagnosed cirrhosis. He was found to have elevated levels of copper in his blood at the time of presentation, which was one month after he quit drinking moonshine. The patient’s cirrhosis and renal failure were due to his alcohol abuse and chronic copper toxicity from the moonshine.

As moonshine becomes more prevalent in popular culture, clinicians need to clarify whether their patients are consuming moonshine. In addition, clinicians need to think about screening their patients for heavy metal toxicity, especially if they have a variety of seemingly unrelated symptoms.
Intravenous Immunoglobulin induced pulmonary embolism: It’s time to act!

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INTRODUCTION: Pulmonary Embolism (PE) is a common clinical problem affecting 600,000 patients per year in United States. Although the diagnosis can be easily confirmed by imaging techniques such as Computed Tomographic Angiography (CTA) of the chest, the identification of underlying mechanism leading to PE is important for appropriate duration of anti-coagulation and prevention of subsequent episodes. The differential diagnosis of underlying mechanism is broad and must include careful review of medication history.

CASE PRESENTATION:A 57-year-old male with history of hypertension, hyperlipidemia, selective immunoglobulin G (IgG) deficiency, and treated Hodgkin’s Lymphoma presented with acute onset shortness of breath. He denied chest pain, palpitations, orthopnea, paroxysmal nocturnal dyspnea, fever, cough or hemoptysis. He had no history of recent surgery, travel, trauma, cancer, or immobilization. His medications included aspirin, amlodipine, lisinopril, atorvastatin and Intravenous venous Immunoglobulin (IVIG). On physical examination, temperature was 38.5 C, blood pressure 135/85 mmHg, pulse 106/min and respirations 25/min. Lungs were clear and there was no calf tenderness or swelling. His complete blood count and chemistries were normal. The troponins were elevated without any ischemic changes on EKG. Hypercoagulability work up including antithrombin III, protein C, protein S, heparin cofactor II, homocysteine, factor V Leiden mutation, and antiphospholipid antibodies was normal. CTA of the chest revealed bilateral pulmonary emboli involving upper, middle and lower lobe on the right side and upper and lower lobe on the left side. Lower extremity Doppler venous ultrasound revealed deep vein thrombosis in lower legs bilaterally. He received low-molecular-weight heparin and was transitioned to warfarin anticoagulation.

Discussion: Woodruff et al. first reported thrombotic complications of IVIG in 1986. In last two decades, the incidence and determinants of IVIG-related thrombotic complications were not well established. It is unclear if factors such as sex, race, indication, dose or duration of IVIG therapy independently increase the thromboembolic risk. It is thought that IVIG related thromboembolic disease occurs within 30 days of administration of IVIG. This patient developed pulmonary embolism 3 days after administration of 40 g of IVIG. The pathogenesis is poorly understood but increased blood viscosity, activation of platelets and clotting mechanisms, arterial vasospasm, disruption of atherosclerotic plaques, and in situ thrombosis have been implicated.

In patients receiving IVIG, the risk for thromboembolism should be emphasized. Steps should be taken for risk stratification and monitoring the risk of thromboembolic complications in these patients. This patient developed PE despite being on aspirin. The role of prophylactic anti-coagulation especially in patients at high risk of thromboembolism at least for the duration of therapy should be addressed. Risk and benefits of IVIG therapy should be carefully considered before initiation of therapy in patients with high risk of thromboembolism.
Adult foodborne botulism is a rare toxin-mediated illness characterized by bulbar paralysis and descending neuromuscular weakness. This case illustrates the necessity of prompt recognition and empiric administration of antitoxin to limit further progression of symptoms.

A 40-year-old man was admitted with a chief complaint of slurred speech, difficulty swallowing, and double vision. He awoke that morning able to eat with some difficulty swallowing. As the day progressed, he had difficulty speaking, and developed diplopia. By the time he arrived at the hospital, he was not able to speak or swallow. History was obtained by the patient’s fiancé, who noted that two days prior to presentation, the patient ate home-canned pickles that tasted foul.

On examination, his vital signs were normal. His neurological examination was remarkable for severe dysarthria with minimal tongue movement, and inability to protrude his tongue past his teeth. His pupils were equal, round, and sluggishly reactive to light, and his extraocular movements were minimal in all directions. He had bilateral ptosis and facial weakness. Shoulder shrug strength was normal. Palate elevated symmetrically. The remaining examination was unremarkable.

Differential diagnosis on admission included foodborne botulism, variant Guillain-Barre syndrome, and myasthenia gravis. Initial laboratory evaluation, including complete metabolic panel, complete blood count, urinalysis, and blood and urine cultures, was unremarkable. Cerebrospinal fluid analysis, including culture, was unremarkable. Ganglioside GQ1b and West Nile Virus antibodies were negative. Acetylcholine receptor antibody testing was negative. MRI of the brain was normal.

The patient was admitted to the ICU and intubated for airway protection. Given his clinical presentation and high suspicion for food-borne botulism, he was treated empirically with a single dose of equine heptavalent botulinum antitoxin. Stool and serum specimens, as well as the pickles implicated in the initial history, were collected and sent to the Centers for Disease Control and Prevention for analysis. Serum botulinum bioassay returned with a positive result for Botulinum type B. No further progression of his paralysis occurred, and he improved throughout his hospital course. Extubation occurred after eleven days and he was discharged to inpatient rehabilitation.

Adult foodborne botulism results from ingestion of preformed botulinum toxin, usually from improperly home-canned foods. The toxin inhibits acetylcholinesterase release from presynaptic receptors, resulting in acute bilateral cranial neuropathies, often with blurred vision, involvement of cranial nerves III, IV, or VI, and with symmetrical descending weakness. Respiratory failure occurs with upper airway dysfunction or diaphragmatic weakness. Diagnosis is achieved with a mouse bioassay, and requires confirmation of the presence of toxin in serum, gastric secretions, stool, or food samples. Treatment with botulinum antitoxin may reduce duration and severity by limiting further progression of symptoms, but does not reverse existing symptoms.
Large B Cell Lymphoma presenting as Bilateral Lower Extremity Pain, Asymptomatic Pericarditis and Pericardial Effusion

First Author: Kyle J Henry, MD Sandra L Till, DO Michael S Chesser, MD Clement U Singarajah, MBBS Felipe Gutierrez, MD Kristine Saunders, MD

We present the unexpected death of a 66 year old man from cardiac tamponade caused by a malignant effusion from B cell lymphoma. He presented to the hospital complaining of four months of progressively worsening and debilitating foot pain radiating to his legs.

Initial physical exam findings were mostly unremarkable. He was noted to be obese and had lower extremity edema to the knees bilaterally. Pericardial friction rub was barely audible on presentation, but easily discernable the day after. An ECG revealed diffuse concave ST-elevations concerning for pericarditis. Labs revealed negative cardiac biomarkers, but were significant for anemia, elevated inflammatory markers, and acute renal failure. Peripheral smear was unrevealing. The patient was admitted for further evaluation. His lower extremity pain completely resolved with pain medications and diuretics on hospital day 1. An echocardiogram confirmed a pericardial effusion with evidence of mild tamponade physiology. Given these findings, the patient was transferred to the Intensive Care Unit for closer monitoring. Later that day, he developed atrial fibrillation and was started on a heparin drip. The patient's acute renal failure progressed, requiring initiation of hemodialysis. Splenomegaly was incidentally noted on renal ultrasound, prompting further imaging with a CT Chest/Abdomen/Pelvis that demonstrated diffuse lymphadenopathy. Daily bedside echocardiograms and another official transthoracic echocardiogram repeatedly demonstrated stable pericardial effusion with mild tamponade physiology. CT-guided lymph node biopsy findings were nonspecific. Excision lymph node biopsy was scheduled.

On hospital day 12, the patient described malaise and nausea, and was noted to have decreased blood pressures. He later suffered cardiac arrest, and initial advanced cardiac life support resulted in return of spontaneous circulation. Bedside echocardiogram post-cardiac arrest revealed significant increase in pericardial fluid and tamponade physiology. An emergent ultrasound-guided bedside pericardiocentesis was performed revealing frank blood with removal of 60cc of pericardial fluid. While preparing the patient for cardiothoracic surgery he developed massive thoracic cavity bleeding and could not be resuscitated. Pathologic examination of the pericardiocentesis fluid finally diagnosed Large B Cell Lymphoma.

B Cell Lymphoma with cardiac involvement is a rare entity. This case is especially remarkable given the initial asymptomatic presentation of his pericarditis and demonstrates that a malignant effusion can quickly develop fatal tamponade with anticoagulation.
ARIZONA POSTER FINALIST - CLINICAL VIGNETTE Edward R Maharam, MD

Improving Sepsis & Worsening Hypoglycemia? A Case of Levofloxacin Associated Hypoglycemia.

Edward R Maharam, MD, Mark R Pedersen, MD, Adam Bosak, MD, Sathya G Jyothinagaram, MD, MRCP, FACE

Purpose: The quinolone class of antibiotics, including levofloxacin, is rarely associated with severe hypoglycemia (0.1-1%).

Case: A 62 year old male with a history of end stage renal disease on hemodialysis with limited vascular access and no history of diabetes who was hospitalized for management of pneumonia and a Pseudomonas line infection. His initial antibiotic regimen included levofloxacin 500 mg every 48 hours.

Within two hospital days, he had episodes of mild hypoglycemia. On day three, he was started on a D10 drip. Meanwhile, he was afebrile with decreasing leukocytosis from 10.4 to 6.8. At one week hospitalization, blood glucose (BS) nadir was 36, with frequently dropping into the 40s and 50s, requiring D10 at 40 ml/hour. He was transferred to our facility for endocrinology evaluation.

On presentation, he was confused with a blood glucose of 41. His confusion improved with intravenous dextrose. He remained persistently hypoglycemic. D10 was up titrated to 125 ml/hour then switched to D20. Overnight, 6 ampules of D50 were required. C Peptide was 15.2 ng/ml while blood sugar was 73. Labs included WBC of 7.0, Sodium of 114, Potassium of 4.8, Creatinine of 9.41, free T4 of 1.0. The only immediate intervention was discontinuing levofloxacin and a one-time dose of octreotide followed by dialysis. Then, the dextrose-containing fluid was stopped, and hypoglycemia did not recur.

Discussion: This patient’s hypoglycemia was multifactorial, likely related to malnutrition and sepsis (persistent Pseudomonas bacteremia), but also likely engendered by levofloxacin. He had multiple risk factors for developing hypoglycemia on levofloxacin, including the aforementioned causes, as well as his older age and end-stage renal disease. The mechanism of levofloxacin induced hypoglycemia is thought to be similar to that of a sulfonylurea, inhibiting ATP-sensitive K+ channels on ß-cells, and thereby releasing insulin, leading to hyperinsulinism. This is similar to what we observed—high C-peptide levels during a period of relative hypoglycemia. The problem resolved with the administration of octreotide (decrease insulin release), dialysis and discontinuation of levofloxacin.

Levofloxacin and the quinolones are commonly known for their effect of prolonging the QT interval, causing Clostridium difficile-associated diarrhea, and potential hepatotoxicity, but their effect on hypoglycemia is relatively less well known. A survey of 97 clinicians in the United Kingdom demonstrated that 79 (80.4%) were unaware that levofloxacin could cause hypoglycemia. This case demonstrates levofloxacin-induced hypoglycemia, a rare side effect associated with all quinolones. It should be considered in patients on these antibiotics who present with low blood sugars without other clear cause.
Post-gastric bypass hypoglycemia with bulimia nervosa: An even more frustrating disorder

Joseph Orme DO, MPH Vijayaratna Chockalingam MD Cheryl O'Malley MD Brenda Shinar MD, Richard Gerkin MD

Introduction: Post-gastric bypass hypoglycemia (PGBH) complicates approximately 0.1-0.36% of cases status post Roux-en-Y surgeries. It is a complicated and frustrating disease to manage, for health care providers, and patients. To further complicate the diagnosis and management of such a disease, this is the first documented case report of a patient with PGBH who also suffers from borderline personality disorder and severe bulimia nervosa.

Case presentation: A 33-year-old female, former ICU nurse, with a past medical history of obesity status post Roux-en-Y gastric bypass performed 11 years prior to presentation. She had a history of several previous hospitalizations requiring enteral tube feeding. She was transferred to our facility from an inpatient treatment center for evaluation of severe recurrent postprandial hypoglycemia. Although factitious hypoglycemia was suspected, laboratory results were suggestive of an endogenous hyperinsulinemic hypoglycemic etiology. At the time a serum blood glucose level was 26mg/dl, her serum insulin, C-peptide, and pro-insulin levels were 24µU/ml, 6.8ng/ml and 27.8?mol/l, respectively, along with negative serum insulin antibodies or plasma sulfonylurea. A CT scan of the abdomen was performed but did not reveal any pancreatic lesions. As the patient continued to have hypoglycemic events despite conservative dietary changes and medical therapy, an endoscopic ultrasound (EUS) was performed revealing two 1cm x 1cm lesions in the body and tail of the pancreas that were suggestive of neuroendocrine origin. Fine needle aspiration (FNA) of each lesion was performed. Pathology did not reveal any neuroendocrine cells suggestive of insulinoma.

To confirm our hypothesis that her beta-cells were hyperfunctioning, a selective arterial calcium-stimulation test was performed. Sampling from the gastroduodenal, mid and proximal splenic arteries disclosed diffusely elevated levels of insulin production throughout the pancreas. This finding proved diffuse beta-cell hyperfunctioning resulting in hyperinsulinemic hypoglycemia from beta cell hyperplasia. Medical management for this condition consists of dietary changes (small frequent meals) and either oral or subcutaneous medications. However, in refractory cases, a partial or total pancreatectomy may be warranted.

Unfortunately, the patient continued to fail conservative medical therapy in part due to her fear of gaining weight and of needles. The nursing staff had a suspicion that the patient was purposefully disposing of her oral medications. Furthermore, the patient expressed that she would rather risk undergoing complicated surgical resection of the pancreas than adhere to dietary changes including small, frequent meals because of her obsession of weight gain. Once nursing staff directly observed the patient taking her medications, she remained euglycemic with conservative management.

Conclusion: PGBH is a rare complication of bariatric surgery which results in recurrent postprandial hypoglycemia. Concern for factitious etiology of hypoglycemia in patients with mental illness is warranted, but tremendously complicates the diagnosis and therapy of this organic cause of hypoglycemia. A multidisciplinary approach including close observation by nursing staff and careful medical decision-making is paramount.
ARIZONA POSTER FINALIST - CLINICAL VIGNETTE Namit N Rohant, MD

The Ancient Disease Scurvy: A Medical Mystery in the Modern World Secondary to Celiac Disease

First Author: Namit N Rohant, MD

Scurvy, a manifestation of vitamin C (ascorbic acid) deficiency, is a collagen synthesis disease with numerous variable symptoms including bleeding disorders, malaise, arthralgias, weakness, and so on that tends to mimic copious other diseases. It was fairly common and well described in the ancient cultures of Egypt, Greece, and Rome. However, in the modern world, it has become increasingly rare due to vitamin C fortified foods and fresh fruits and vegetables available to today’s consumers, resulting in some difficult diagnostic dilemmas.

A 53-year-old gentleman with a medical history of an unknown vasculitis, abdominal aortic aneurysm repair, brain aneurysm with transient ischemic attack, peripheral neuropathy, transient atrio-ventricular block, pericarditis, hypertension, and psoriasis presented to the hospital with complaints of fatigue and weakness for 4 days prior to admission. These symptoms were associated with increasing bruising in his bilateral proximal lower extremities also occurring for the same time period. He denied any trauma and was not on any anticoagulation or anti-platelet medications. He also reported chronic myalgias in his lower extremities. Physical examination on admission was significant for large echhymoses, mild swelling, and diffuse tenderness in his bilateral lower extremities as well as petechiae over his lower extremities and left upper extremity. The initial lab work revealed a hemoglobin of 6.3 requiring blood transfusion. In the setting of his presenting complaints and initial lab findings, a detailed workup for vasculitis was done due to the patient’s past medical history. The workup included imaging studies, rheumatoid/hematology labs, infectious/malnutrition labs, as well as biopsies of the skin lesions and muscles. Multiple services were also consulted for their expert opinion. Lab work eventually revealed that he had a vitamin C deficiency with plasma levels <5 umol/L.

He was treated for scurvy with vitamin C 500mg IV Q12H for 5 days and was later switched to PO maintenance dose. His symptoms were noted to markedly improve with time. Upon further discussion with him, it was revealed that he had been eating a balanced diet with fresh food as well as packaged fortified foods, making dietary deficiency of vitamin C unlikely. Further investigation revealed that the patient was positive for celiac disease screen and tissue transglutaminase IgA antibodies, which is greater than 95% sensitive and specific for celiac disease.

This case is particularly unique as the patient presented with scurvy in the setting of celiac disease, an association that has rarely been described in the literature. Celiac disease is commonly seen today, but it can result in a multitude of other disorders due to malabsorption of essential vitamins and nutrients. Additionally, this case demonstrates the importance of having a high degree of clinical suspicion for near extinct diseases, like scurvy, which can easily be treated once recognized.
The Case of the Bound Insulin

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This case highlights a syndrome where determining the cause of hypoglycemia presents a diagnostic challenge. A 59 years old male presented to the endocrinology clinic for evaluation of hypoglycemic episodes characterized by diaphoresis 3 hours after eating. Review of his blood sugar diary revealed several readings in the 40 to 70 mg/dL range. He had tried snacking between meals without improvement. He had a history of IgG Kappa Multiple Myeloma and Bone Marrow transplant 9 years earlier. There was no history of diabetes mellitus. He was not taking any medications which cause hypoglycemia. Physical exam was unremarkable.

Laboratory evaluation revealed a substantial elevation in random insulin levels, increased C-peptide levels, and normal glucagon levels. Pancreatic imaging did not reveal any lesions. Concomitantly our patient had surveillance testing for Multiple Myeloma that revealed an elevation in M protein levels. Further testing revealed high titers of insulin antibodies, suggesting a diagnosis of autoimmune hypoglycemia. Our patient was started on a low carbohydrate diet and chemotherapy for Multiple Myeloma recurrence with Bortezomib and Dexamethasone. A parallel drop was noted in Multiple Myeloma markers (M protein) and levels of insulin binding antibodies with subsequent resolution of symptoms confirming the diagnosis.

Hypoglycemia in non-diabetic or non-critically ill patients is a rare event and should trigger further investigation. In our patient the pattern of hypoglycemia, occurring after meals in the context of a history of multiple myeloma lead us to suspect a diagnosis of autoimmune hypoglycemia due to increased insulin antibody production. Previous studies have shown that insulin antibodies have high capacity and low specificity, this triggers a swift binding of large amounts of insulin during post prandial peaks (High capacity). Once bound the antibody renders the insulin molecule biologically inactive as it cannot be absorbed by the tissues, effectively prolonging its half-life. 3 to 5 hours after a meal, due to its low affinity, the insulin – insulin antibody complex reaction shifts towards dissociation releasing large amounts of biologically active insulin and triggering episodes of post prandial hypoglycemia. Several treatments have been described including steroids, azathioprine, plasmapheresis and low carbohydrate diets. Efficacy has been variable among case reports but all of them have shown a good correlation between control of the underlying pathology, decrease in antibody titers and resolution of symptoms as occurred in our patient.

In conclusion insulin autoimmune syndrome (autoimmune hypoglycemia) whilst uncommon should be part of the differential diagnosis of patients unexplained hypoglycemia. In particular the presence of an insulin autoimmune syndrome should trigger a work up for paraproteinemias.
Leukemoid Reaction in Extraintestinal Amebiasis

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Introduction: A leukemoid reaction is a leukocyte count greater than 50,000 cells/microL. Generally, levels this high are related to a hematological malignancy or bacterial infections. This is a rare case where extra-intestinal amebiasis presented as sepsis and a leukemoid reaction.

Case Description: A 65-year-old man of Mexican origin and no known past medical history presented to the emergency room with confusion and general malaise. He had been complaining of left sided chest pain and fatigue for three days prior to presentation. A chest x-ray in the ED was concerning for severe pneumonia and patient was admitted to the ICU. A high-resolution chest CT was done at that point that did not show any lung consolidations or pulmonary embolisms, but showed an apparent hepatic abscess. An abdominal ultrasound confirmed the presence of 2 large hepatic abscesses. Antibiotics were broadened to cover abdominal flora. The patient’s WBC count continued to rise, peaking at 57,700 cells/microL on day 5 of his hospitalization. Concurrently, his AST rose to 2355 and ALT rose to 575. One abscess was drained and yielded anchovy paste like material, consistent with an extra-intestinal *E. histolytica* infection. 3 days later, the patient developed a rapidly growing R pleural effusion, which was drained alongside the 2nd abscess. The 2nd abscess also drained anchovy paste like material, while the effusion was found to be exudative. Once blood and fluid bacterial cultures returned negative, antibiotic coverage was narrowed to Metronidazole. *E. histolytica* serum antibody was positive. Patient improved significantly in his mentation, respiratory status, and hemodynamics during his hospitalization, receiving a total of 3 weeks of Metronidazole and then transitioned to Iodoquinol.

Discussion: Invasive amebiasis occurs worldwide, most often in communities where fecal matter contaminates drinking water. A host is infected by ingesting food with *E. histolytica* cysts. Excystation occurs in the intestinal lumen and amoebic trophozoites invade the colonic mucosa, spreading hematogenously to extra-intestinal locations, most commonly the liver. Abscesses are seen in <1% of patients with *E. histolytica* infections. A mild to moderate leukocytosis and a positive *E. histolytica* serum antibody are normally. However, in rare cases such as this one where the burden of disease is high, a WBC count above 50,000 may be present. This may be misleading as it is more commonly seen in pyogenic liver abscesses. Ameobic abscess material, though, classically appears anchovy paste like. Treatment of such an infection is with nitroimidazoles. Drainage of abscesses is not required and risks anaphylactic shock if abscess contents leak. However, drainage should be considered if there is concern for abscess rupture or if patient is symptomatic.
Catecholamine Induced Peripartum Cardiomyopathy: A Rare Reversible Cause

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Introduction: Catecholamine-induced cardiomyopathy is a rare but potentially life threatening presentation of pheochromocytoma. Pre-transplant evaluation of patients with dilated cardiomyopathy should include evaluation for pheochromocytoma.

Case: A 36-year-old G5A3P2 female was initially admitted to an outside hospital with acute onset of chest pain and palpitations. In the emergency department, she became hypotensive and hypoxic and was emergently intubated. An elevated beta-HCG led to the identification of an ectopic pregnancy, which was medically terminated with methotrexate. A bedside echocardiogram revealed a biventricular dilated cardiomyopathy (LVEF 25%). Her initial white blood cell count was 37.3 and troponin, 4.7. She was managed emergently with an intraaortic balloon support and dobutamine and transferred to our institution for possible heart transplant. Cardiac work-up included a normal coronary angiogram and endomyocardial biopsy was negative. Abdominal ultrasound showed a possible left adrenal mass, which was confirmed on abdominal CT as a 3.2 cm adrenal mass with peripheral enhancement. Twenty-four hour urine metanephrines and catecholamines were elevated to 1483 mcg/24 hr and 125 mcg/24 hr, respectively. We initiated phenoxybenzamine by gradually titrating up to 30 mg twice daily. Her hemodynamic parameters subsequently improved. She underwent laparoscopic adrenalectomy, and pathology was consistent with pheochromocytoma. Three months after her surgery, she remains asymptomatic off all cardiac medications.

DISCUSSION: Pheochromocytoma should be considered in patients with unexplained heart failure. Pheochromocytomas can present with cardiovascular complications in up to 19% of cases; apart from hypertensive crisis, these most commonly include tachyarrhythmias (54%), myocardial infarction (32%), and heart failure (18%). Cardiomyopathies can present with hypertrophic, dilated, or Takotsubo-type physiologies. Catecholamines exert a direct toxic effect on myocardial cells causing myocardial edema and myocardial and arterial wall fibrosis. Patients have undergone cardiac transplantation for presumed idiopathic cardiomyopathy that was actually due to undiagnosed pheochromocytoma. Hence, it is imperative to consider this diagnosis in patients with cardiomyopathy, especially if considering heart transplant. Our patient illustrates that with appropriate treatment, cardiomyopathic changes are reversible in over 90% of cases.

Our patient lacked pheochromocytoma’s classic triad of episodic headache, tachycardia, and diaphoresis. Her ectopic pregnancy likely triggered the unmasking of her pheochromocytoma with fulminant heart failure. Pheochromocytoma in pregnancy is rare, and limited experience with diagnosis and management among practitioners adds to its potential danger. However when considered, the diagnosis is straightforward because pregnancy does not alter diagnostic levels of catecholamines or metanephrines. Management with alpha and beta-adrenergic blockade prior to surgical resection resembles that in non-pregnant women. However, optimal outcomes require an individualized approach with collaboration among obstetricians, endocrinologists, cardiologists, and surgeons.
CALIFORNIA POSTER FINALIST - CLINICAL VIGNETTE Amy L Cummings, MD

Transplanted, pregnant and in pain: An imaging dilemma in a renal transplant patient with urosepsis and continued pyuria

First Author: Amy L Cummings, MD Second Author: J Paul Finn, MD

Introduction: Pregnancy poses unique challenges in diagnosing and treating many common medical conditions. Here we discuss the use of imaging in pregnancy and suggest ferumoxytol as an alternative to gadolinium in contrast-enhanced magnetic resonance imaging (MRI).

Case Description: Our patient is a 21 year-old female G1P0 at 16 weeks with a congenital single left kidney and end-stage renal disease from obstructive uropathy, since status-post deceased-donor renal transplant at age 13 with stable graft function. Her pregnancy had been complicated by recurrent urinary tract infections, and she had completed a third prescription of cephalexin one week prior to presentation. Her immunosuppressive agents included azathioprine 75mg po daily, prednisone 5mg daily and sirolimus 18mg po BID. Two days prior to admission, she noted insidious left-sided abdominal and back pain followed by fevers, nausea and vomiting. Her physical exam was significant for tachycardia and exquisite left flank tenderness. Her WBC count was 13.4 with gross pyuria on urinalysis; urine culture was positive for pansensitive Klebsiella pneumoniae. The patient was slow to respond to treatment, and after 96 hours of intravenous cefazolin, she continued to complain of exquisite left flank pain with continued pyuria on urinalysis. Ultrasound showed a viable intrauterine pregnancy, unremarkable renal transplant and severe hydronephrosis of the native left kidney with internal echoes. After extensive discussions with consulting services regarding the risks and benefits of imaging as opposed to definitive surgical intervention, time-resolved contrast-enhanced 3D magnetic resonance angiographic and venographic images of the abdominal and pelvic vasculature were obtained using ferumoxytol. The patient received 510mg of ferumoxytol (iron equivalent 240 mg) without adverse effect. These images showed no evidence of an inflammatory mass or abscess, and the suggestion of renal enhancement of the native kidney supported continuing antibiotic therapy. Ultimately, after eight days of treatment, the patient’s symptoms began to resolve, and she was discharged on suppressive antibiotics. Her graft maintained excellent function throughout her hospitalization, and her hemoglobin level rose from 8.5 to 10.2 prior to discharge without additional hematopoietic measures. At 36 weeks, the patient underwent pharmaceutical induction of labor for severe pre-eclampsia and delivered a healthy 7 pound 12 ounce baby girl. Both mother and baby continue to do well and have met all appropriate milestones.

Discussion: Ferumoxytol, a superparamagnetic iron oxide agent, has been approved as an iron replacement therapy for chronic kidney disease and more recently has been investigated as an intravenous MRI contrast agent for those with compromised renal function. Its unique advantages include an ability to delineate organ perfusion and vascularity at the time of injection and potentially define inflammatory changes due to uptake by the reticuloendothelial system 24-48 hours after injection. It may be used in those with glomerular filtration rates less than 30 and, because it does not contain gadolinium and does not cross the placenta, its use in pregnancy is likely safer than gadolinium based contrast agents with the added benefit of repleting iron in patients who may be deficient.
Malignant Solitary Fibrous Tumor of the Pleura

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INTRODUCTION: Solitary fibrous tumors are rare mesenchymal tumors originating from serosal surfaces. Usually benign, they carry an excellent prognosis after surgical resection. We report an aggressive and malignant case of this tumor that is not surgically resectable. Given the rare nature of the tumor, one must recognize the signs and symptoms that can facilitate a prompt diagnosis. We also review the pathologic features that suggest malignancy and describe treatment options when surgery is not feasible.

CASE REPORT: A 55-year-old Caucasian woman with no significant past medical history presented with a 1-week history of acute onset worsening shortness of breath (SOB) with exertion and at rest. She denied cough, fevers, chills, weight loss, or sick contacts. Physical examination revealed a confused, overweight female in significant respiratory distress and hypoxic to 83% on room air. She had absent breath sounds in the right lung field, with hearts sounds displaced to the left. The patient was intubated and underwent bronchoscopy, thoracentesis with pleural fluid analysis, and CT guided biopsy, all of which yielded non diagnostic results. She then underwent thoracotomy and biopsy, which revealed a malignant solitary fibrous tumor. The tumor was deemed to be non-resectable, and the patient was started on chemotherapy with temozolomide and bevacizumab. Currently, the patient is finishing her first round of chemotherapy and is responding to treatment having had her tracheostomy tube removed and with decreased SOB.

DISCUSSION: Solitary fibrous tumors of the pleura are very rare tumors with an incidence of 2.8 per 100,000 individuals. Only 800 cases have been reported between 1931 and 2002. They are usually benign in nature, but can be malignant and aggressive in 12-20% of cases. While working up a chest mass, differentials can include lung carcinoma, germ cell tumor, sarcoma, thymic neoplasm, teratoma, atelectasis, and neurogenic tumors. Unique to the tumor are paraneoplastic syndromes that may present in some patients; symptoms include hypoglycemia or hypertrophic pulmonary osteoarthropathy, none of which were seen in our patient. Malignant tumors have distinct pathology, with areas of necrosis and or hemorrhage, high mitotic counts, cellular pleomorphism, and high cellularity. Our patient’s tumor demonstrated necrosis and high cellularity. The mainstay of treatment is complete resection, which is key to preventing recurrence and is the most important prognostic factor. In cases in which surgery is not feasible, radiotherapy and/or chemotherapy may play a role in therapy. Given the vascular nature of these tumors, they may respond to anti-VEGF combination therapy. The regimen, consisting of bevacizumab and temozolomide or imatinib, may have some benefit in patients with nonresectable disease. However, more research still needs to be done on developing a standard treatment protocol.
Pulsatile Venous Doppler Waveform of the Lower Extremities with Visible Swirling; a Clue for Pulmonary Embolism

First Author: Masoud Ghaemmaghami

Introduction: We present a case of acute pulmonary embolism (PE) diagnosed by internal medicine (IM) residents with bedside ultrasonography (US) when computed tomography angiogram (CTA) chest could not be performed. Pulsatile venous doppler waveform of the lower extremities (LE) with visible swirling was a clue to seek more enhanced bedside cardiac US to capture D-sign and McConnell’s sign which are distinct cardiac ultrasonographic findings in acute PE.

Case: A 42 year-old male, otherwise healthy, presented with mid-sternal chest pain and worsening dyspnea for one week. His vitals were BP 147/108, HR 110, RR 18, O2sat 97% on Room Air. Physical exam showed no acute distress, no murmurs, and lungs were clear. Laboratory results were unremarkable. Chest X-ray was normal. EKG showed sinus tachycardia with T-wave inversion in lead III and V1-V4 which raised a suspicion for acute PE. However despite a detailed discussion, patient did not consent for CTA chest which prompted the IM residents to perform bedside LE US to evaluate for deep vein thrombosis (DVT). Pulsatile venous doppler waveform of the LE with visible swirling was noticed without any evidence of DVT. This finding was a clue for elevated right sided pressure that lead to a careful examination by bedside cardiac US which revealed D-sign and McConnell’s sign. The result of the bedside US done by the IM residents strongly supported the suspected diagnosis of acute PE. Later, he consented for CTA chest revealing large bilateral PE.

Discussion: Diagnosing acute PE can be challenging when CTA chest, the gold standard test, cannot be performed. It is even more challenging in rural hospitals with limited ultrasonography service. Trained IM residents on bedside US can make a difference for early detection and treatment of acute PE. D-sign and McConnell’s sign are established US findings of acute PE. However, in our case, pulsatile venous doppler waveform of the LE with visible swirling was detected as a clue for elevated right sided pressure. Normally venous doppler waveform of LE is continuous with mild respiratory variation. To our knowledge, there have been three studies that showed correlation between pulsatile doppler waveform and elevated right sided pressure. All studies showed high specificity of > 85%.

Conclusion: This case illustrates that bedside ultrasonography performed by trained residents can play a major role in making the early diagnosis and treatment for acute PE. Although more studies are needed to prove the relationship between pulsatile venous doppler waveform of the LE with visible swirling and elevated right sided pressure, it can raise the suspicion for acute PE in the right clinical setting.
An Atypical Road To Dialysis

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Atypical hemolytic uremic syndrome (aHUS) is characterized by a continuous complement mediated attack on vascular endothelial beds resulting in a thrombotic microangiopathy and multi-organ ischemia. Failure of protein regulators to suppress the activity of the alternative complement cascade manifests as thrombocytopenia, hemolysis, and uremia. Unlike typical HUS, which is triggered by Shiga-toxin, aHUS is a primary disorder of complement regulation either secondary to genetic mutations or due to a trigger event such as infection, pregnancy, or transplant.

A 59 year old male with history of HIV, well controlled on HAART therapy, presented to an outside hospital with chief complaint of abdominal pain. There was no history of fever, illicit medications or diarrhea. During his hospitalization, he developed pronounced expressive aphasia and lethargy but was able to follow simple commands. A CT scan of the head revealed a left lacunar infarct and he was transferred to our hospital for further care of a possible stroke. Shortly after arrival, he developed a fever to 100.9 degrees Fahrenheit. Physical exam was remarkable for somnolence, disorientation, and aphasia. Laboratory results demonstrated worsening thrombocytopenia, acute kidney injury, and hemolysis (schistocytes, low haptoglobin, elevated LDH). Abdominal CT scan revealed terminal ileitis and he was started on piperacillin-tazobactam. He was also empirically treated for presumed thrombotic thrombocytopenic purpura (TTP) with plasmapharesis and methylprednisolone. However, this approach was ineffective and he ultimately required hemodialysis. The addition of rituximab failed to improve his condition, as he went on to develop seizure activity and evidence of further brain infarcts on imaging. A normal ADAMTS13 activity level and negative Shiga-toxin assay led us to change our initial diagnosis of TTP to aHUS likely triggered by his terminal ileitis. The diagnosis of aHUS was supported by a low complement C3 level. Plasmapharesis was discontinued and treatment with eculizumab was initiated. Two weeks later, his platelet count normalized, renal function improved, hemolysis resolved and he regained full mental status. Seven weeks after initiating eculizumab, he no longer required dialysis.

While TTP and aHUS share a common clinical presentation, their pathophysiology and management differ. TTP is caused by a reduction in ADAMST13 activity ( $600, 000 per year) has presented worldwide ethical dilemmas regarding the need for continued therapy post renal and hematologic recovery and criteria for discontinuation.
Hepatocellular Carcinoma in a 25 year old man: Are steroids to blame?

First Author: Rachel J Klein, MD

Introduction: Long term use of androgenic-anabolic steroids (AAS) have been associated with liver tumors. The majority of these tumors are benign while only a few reported cases in the literature are malignant carcinomas as described in this case.

Case Presentation: Patient is a 25-year-old male with a 9 year history of anabolic and androgenic steroid abuse who presented to the Emergency Department with a 2 month history of abdominal pain and bloating, poor appetite and early satiety. He had lost approximately 35 pounds over the same timeframe. Physical exam revealed a large tender mass palpable across the entire upper half of the abdomen extending 6cm below the left and 4cm below the right costal margin. The remainder of his exam was unrevealing though he did have an extremely muscular build.

Abdominal ultrasound revealed a large heterogeneous mass arising from the left liver. MRI performed revealed a liver mass arising from the left lobe measuring 17.3 x 18.2 x 13.7cm with areas of hemorrhage, scar and necrosis. Liver biopsy revealed well differentiated hepatocellular carcinoma within the mass and normal parenchyma in surrounding liver without evidence of cirrhosis. Patient underwent resection and declined adjuvant chemotherapy. He was subsequently seen in follow up with resolution of abdominal pain, anorexia, and early satiety. He was followed by endocrinology to wean his current exogenous testosterone usage. The patient subsequently moved abroad and was lost to follow-up.

Discussion: This case highlights an atypical presentation of hepatocellular carcinoma. Though HCC is rare outside of cirrhotics and Hepatitis B, it must be considered in any patient presenting with a liver mass especially in the setting of exogenous anabolic and androgenic steroid abuse. This patient’s AAS abuse likely contributed to his development of HCC given known risk of development of liver tumors with use of androgens. This case highlights the importance of a good social history including medications received without a doctor’s prescription or recommendation. Screening for hepatic complications should be considered for any patient using or abusing AAS.
Rare Valvular Aneurysms Secondary to Infective Endocarditis

Introduction: Infective endocarditis (IE) and the spread of infection to the surrounding tissue can result in valvular aneurysms, paravalvular abscesses, and pseudoaneurysms. These rare complications can occur subacutely even after completion of intravenous antibiotics. Consequently having routine surveillance echocardiograms for patients with IE is important for the early detection and treatment of these rare complications.

Case1: A 44-year-old man was admitted for group B streptococcal bacteremia. His initial transesophageal echocardiogram (TEE) was normal with no evidence of valvular disease or vegetation. He was treated with six weeks of intravenous ceftriaxone for presumed group B streptococcal IE with negative surveillance blood cultures. After completion of antibiotic therapy a transthoracic echocardiogram (TTE) showed new severe aortic regurgitation and aneurysmal enlargement of the right sinus of Valsalva (SOV). A repeat TEE showed no valvular vegetations but demonstrated a pseudoaneurysm at the SOV with the aortic valve right coronary cusp prolapsing into the pseudoaneurysm resulting in severe aortic insufficiency. He underwent aortic valve repair and was found to have the pseudoaneurysm extending into the commissural area with partial detachment of the left coronary cusp that were repaired with a pericardial patch. The patient had an uneventful post-operative recovery.

Case2: A 20-year-old woman was admitted for group B streptococcal bacteremia. Her TTE showed a vegetation on the anterior mitral valve leaflet (AMVL) and completed six-weeks of intravenous penicillin with negative surveillance blood cultures. Two months later, a repeat TTE showed that the vegetation was smaller in size but was now mobile and protruding into the left atrium. A followup TEE showed complete resolution of the vegetation and minimal mitral regurgitation, but also the development of an aneurysm of the AMVL. Six months later, she developed progressive dyspnea on exertion and subsequent TEE showed ruptured chordae with severe mitral regurgitation and ballooning aneurysm of the AMVL, without involvement of the aortic valve. She underwent urgent surgery, with resection of the aneurysm, repair of the mitral valve and ruptured chordae, and reinforcement of the valve with an anuloplasty ring. The patient had an uneventful recovery.

Discussion: Valvular aneurysm and pseudoaneurysm are rare complications of IE. TEE is recommended for early detection of IE because of its high sensitivity and specificity. Both of these cases demonstrate the rare development of valvular aneurysms despite completing six weeks of intravenous antibiotics with negative surveillance blood cultures. This illustrates the importance of surveillance echocardiograms during the first year following completion of therapy. When valvular aneurysm is detected, it is difficult to predict its risk of progression. However, symptomatic patients should be evaluated for surgical correction.
Acute Cholangitis Secondary to Hepatic Hydatid Cyst Disease with Cyst Super-Infection

First Author: John Brandon Lough, MD Sarbjit Sandhu, MD Tanaya Bhowmick, MD

**Introduction:** Echinococcosis, or Hydatid disease (HD), is an infection caused by taeniid cestodes belonging to the genus *Echinococcus*. The following is a reporting of the management of a case of acute cholangitis secondary to hepatic hydatid cyst disease resulting in cyst super-infection.

**Case:** A 24-year-old male with no significant past medical history presented to the emergency department with a one week history of progressively worsening right upper quadrant (RUQ) discomfort, skin yellowing, and fevers to 102. Physical exam was notable for jaundice, scleral icterus, and tender hepatomegaly palpable to 4 cm below the costophrenic angle. Labs were significant for a leukocytosis to 17.4 (x10³ cells/mm³), AST 390 (units/L), ALT 557 (units/L), Alk phos 504 (units/L), T bili (mg/dL) 8.7 with D bili 6.3 (mg/dL). Computed tomography (CT) imaging of the abdomen showed two large cystic lesions within the left lobe of the liver that measured 7.7cm x 7.7cm and 5.2cm x 4.7cm, with the common bile duct running adjacent to the masses with secondary involvement. RUQ ultrasound showed a complex cystic mass located in the left lobe of the liver, another mass deep to the right lobe, and a dilated common bile duct to 14mm.

Given the obstructive cholestasis picture and concern for hepatobiliary infection, the patient was started on piperacillin-tazobactam and taken for endoscopic retrograde cholangiopancreatography (ERCP). Biliary stenting with sphincterotomy was performed which returned a gelatinous substance, as well as purulent drainage. Albendazole was started empirically given the ultrasound findings of the masses being complex and cystic, suggesting hydatid cyst disease. Broad-spectrum antibiotics were continued given the biliary drainage character and concern for super-infection of the cysts. Echinococcus Ab returned positive during the admission, confirming the diagnosis. Given the size of the cysts with extensive liver involvement, complete resection was not a feasible option. As the patient’s labs and clinical course improved with medical management, the patient was continued on albendazole and broad-spectrum antibiotics with planned reevaluation following a two-month course of antimicrobials.

**Discussion:** Management of uncomplicated cysts is primarily surgical resection with adjuvant use of an anthelmintic agent (eg, Albendazole, mebendazole). Percutaneous aspiration has historically been discouraged due to the risk of anaphylactic shock. Preoperative treatment with albendazole for 1-3 months is an option and has shown to reduce the number of viable cysts found on surgery. Percutaneous aspiration, injection, and re-aspiration (PAIR), where the cyst(s) is drained with a fine needle or catheter, followed by instillation of a protoscolicidal substance (eg, hypertonic saline or absolute alcohol) and reaspirated, has emerged as a potential first line treatment. Optimal treatment approach remains unclear, as there have been no clinical trials comparing all treatment modalities together.

The patient was not a candidate for resection given the extent of the disease, and was not a candidate for PAIR due to biliary involvement- a World Health Organization contraindication. Therefore, the most appropriate approach was to decrease the size of the cysts with medical management with the intention of complete resection of the cysts at a later date.
The Great Mimicker - Melioidosis

First Author: Mehwish Mahmood, MD, Dr. Mandeep Singh, MD

**Introduction:** Many US veterans returning from Vietnam War who presented with fever and other various symptoms were diagnosed with Melioidosis. Inhalation of contaminated dust raised from helicopter rotor blades in Vietnam was the possible source of inoculation. Although endemic in South East Asia and Northern Australia, melioidosis is rare in the USA. On average 0-5 cases are diagnosed annually. Therefore, a high suspicion in recent travelers to endemic areas and well-timed diagnosis is pivotal in preventing fatality.

**Case Description:** 60 year old Filipino male with past medical history of poorly controlled Diabetes Mellitus (HbA1c:12%), Hypertension and Dyslipidemia, was seen in medicine clinic three weeks after returning from Philippines. He complained of episodic fever, up to 101 degrees Fahrenheit and 17 pounds weight loss during past three weeks. While in Philippines, he also had an ear infection after swimming in fresh water, which was treated with oral amoxicillin with complete resolution. Primary workup during his clinic visit was significant for leukocytosis of 14,100 per microliter and positive blood cultures for Gram-negative rods. Despite treatment with two days of Ceftriaxone (intramuscular) and Ciprofloxacin (oral), patient remained febrile and was admitted to hospital for intravenous antibiotics and better glycemic control. Final blood cultures grew Burkholderia pseudomallei. Chest x-ray, HIV, and Urine culture were negative. Based on culture sensitivities, he was started on Trimethoprim-Sulfamethoxazole and Ceftazidime. Subsequently, leukocyte count normalized, patient remained afebrile and was discharged home after two days of hospitalization. He completed six weeks of oral Trimethoprim-Sulfamethoxazole and four weeks of continuous intravenous Ceftazidime with complete resolution of symptoms.

**Discussion:** Melioidosis is caused by bacterium Burkholderia pseudomallei. At risk are individuals with chronically immunosuppressed states such as, poorly controlled diabetes mellitus, alcoholism and chronic renal or liver disease. Typically seen in South East Asian countries, it is now an emerging infection in India, Africa, and Middle East. Contaminated soil or water exposure by contact, ingestion or inhalation causes infection. The spectrum of clinical manifestations may vary from a localized infection to raging widespread bacteremia. Though the most common presentation is pneumonia with symptoms similar to pulmonary tuberculosis, it can also present as encephalomyelitis, septic arthritis, osteomyelitis, skin and visceral organ abscesses, involving renal, splenic, prostatic and hepatic sites, hence making this disease a great mimicker. Therefore, vigilance in the suspicion of rare diseases like melioidosis, especially in travelers to endemic areas and obtaining targeted labs such as blood cultures are crucial in preventing adverse outcomes.
CALIFORNIA POSTER FINALIST - CLINICAL VIGNETTE Stephanie Mai, MD

Bedside Lung Ultrasound in the Diagnosis and Management of Pneumonia in the ICU Setting

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Introduction: Lung ultrasound (LUS) has been increasingly used as an effective tool in the assessment of pulmonary parenchyma of critically ill patients. It has reported to have high sensitivity and specificity in aiding in the diagnosis of pulmonary edema, effusion, infarcts, pneumonia, and interstitial lung disease. Advantages of LUS in critically ill patients include portable bedside assessment, real-time data acquisition and analysis, timely serial examinations without utilization of radiation and also the ability to guide management. We present a case where findings on LUS were used in conjunction with traditional chest x-rays (CXR) to aid in diagnosis and management of pulmonary-interstitial syndrome.

Case: A 27-year-old male with a history of widely metastatic mucoepidermoid carcinoma presented to the Emergency Department (ED) for acute on chronic worsening dyspnea and was admitted to the Medical Intensive Care Unit (MICU) for acute respiratory distress. The patient was on low-flow oxygen via nasal cannula at home but had increasing oxygen demand over the previous 2 days requiring 15 liters on non-rebreather mask in the ED. Initial single view CXR demonstrated a large right pleural effusion. Following chest tube placement 2000ml of sero-sanguinous fluid was expressed. Subsequent CXR showed resolution of the pleural effusion and non-specific parenchymal findings. The day after CXR showed an opacification of the right lung field which was read as reaccumulating pleural effusion. However, bedside LUS revealed hepatization and air bronchograms in the right middle lobe consistent with a right middle lobe pneumonia and a small pleural effusion. Based on the LUS and clinical exam, a diagnosis of combined pneumonia and pleural effusion was made and the patient was placed on antibiotics. During his admission, the patient became unable to tolerate supine positioning for imaging modalities such as CT due to his dyspnea and painful spinal metastases. Serial LUS studies demonstrated progressive resolution of B lines, and presence of prominent A lines, suggesting resolution of the underlying pneumonia.

Conclusion: While the application of ultrasound for initial evaluation of thoracic trauma is well-established, the employment of LUS to resolve non-traumatic diagnostic ambiguity on CXR and serial pulmonary exams to guide management in critically ill patients is recent. Prior studies have shown LUS has an excellent sensitivity and specificity comparable to two-view CXRs in diagnosing pneumonia. We demonstrate the utilization of LUS in evaluating lung parenchyma and in guiding our management for a patient with acute dyspnea found to have pleural effusion and pneumonia. CXR results alone may have delayed treatment of the underlying pneumonia. LUS is inexpensive, easily accessible and may assist in the diagnosis and management of critically ill patients with mixed or ambiguous findings on CXR. Additionally, LUS provides timely imaging and can assist in tracking responses to therapy.
Pre-workout Caffeine Supplement Induced Cardiac Arrhythmia Leading to Brain Death

First Author: Nareg Minaskeian, MD Additional Authors: Nikhil Shah, MD., Mark Bradburne, MD.

Introduction: Many young adults who exercise nowadays drink pre-workout supplements, most of which contain excessive amounts of caffeine, to augment their work-out regimen. These pre-workout supplements are not FDA approved, nor have there been any studies investigating the toxic effects of such supplements coupled with exercise. Caffeine, a methylxanthine, acutely causes a rise in (nor)epinephrine concentrations, blood pressure, systemic vascular resistance, and arterial stiffness. Although the median lethal dose of caffeine for humans is estimated to be about ten to fourteen grams, we present a case of acute arrhythmia leading to anoxic brain injury and death at a significantly lower dose.

Case Presentation: A previously healthy 24-year-old male was brought in by ambulance to the emergency department after being found down and unresponsive at the gym. Prior to arrival he was defibrillated and intubated. He was defibrillated again for ventricular fibrillation in the emergency department and transferred to the intensive care unit. Labs returned with markedly elevated cardiac enzymes, leukocytosis and an elevated creatinine. A urine drug screen was negative. Physical exam revealed a fit young adult with an unremarkable cardiac, pulmonary and abdominal exam. Neurologic exam revealed a Glasgow Coma Scale score of 2 [E1V(T)M1] but intact pupillary, gag, cough and corneal reflexes. Vital signs were within normal limits. A CT scan of the head showed mild diffuse cerebral edema and an echocardiogram was demonstrative of global hypokinesis with an ejection fraction of about 40%. A history taken from family revealed that the patient took a pre-workout supplement, Mr. Hyde, prior to exercising. According to the nutritional facts, one serving contains 419mg of caffeine. Throughout admission, the patient remained intubated and comatose with no changes in neurologic exam. However, on day four of admission, the patient's pupils became fixed and dilated, and he lost his gag, cough and corneal reflex. Repeat CT scan of the head now showed severe worsening of the cerebral edema without herniation. After a family discussion, care was withdrawn and the patient expired on day six of admission.

Discussion: The toxic effect of caffeine has been widely studied, though there has not been any research on the toxicity of pre-workout caffeine supplements. We conclude that an excessive amount of concentrated caffeine, coupled with a highly adrenergic response from intense exercise caused a significant diffuse coronary artery vasospasm in our patient that led to arrhythmia, severe anoxic brain injury and clinical brain death. Our case highlights the dangers involved with taking pre-workout supplements with caffeine, even at fractions of the median lethal dose, and the need for possible regulation of such substances.
Wilson Disease Disguised as Drug Induced Liver Injury from Nitrofurantoin

Sophia Mytrang Nguyen, Katelyn Gamson, Richard Garcia-Kennedy, Edward Holt

A 26-year-old Latina presented with one month of progressive fatigue, abdominal pain, and bilious emesis. She reported minimal alcohol intake, no use of complementary medicines, no new sexual partners and no intravenous drug use. She had recently completed a course of nitrofurantoin for acute cystitis. Physical exam revealed a moderately obese, jaundiced woman with scleral icterus. Her abdomen was non-distended with a soft liver edge, but was diffusely tender to palpation.

She had bilateral lower extremity edema and palmar erythema. There was no asterixis. Initial laboratory work-up included the following: WBC 19.9K/μL, hemoglobin 8.6g/dL, platelets 195K/μL, INR 2.8, albumin 1.3g/dL, total bilirubin 7.6mg/dL, indirect bilirubin 1.9mg/dL, ALT 82U/L, AST 129U/L, alkaline phosphatase 66U/L, iron 56ug/dL, transferrin saturation 45%, ferritin 1170ng/mL, 17.5% reticulocytes, haptoglobin 53mg/dL, LDH 294U/L, and a negative direct Coombs test. The G6PD, alpha-1-antitrypsin, ceruloplasmin and acetaminophen levels were normal. Serologic markers for autoimmune, inflammatory, and infectious hepatitis were negative.

Abdominal CT showed a patent hepatic portal venous system. Liver biopsy revealed minimal inflammation with a background of moderate patchy microvesicular steatosis and lobular collapse without regenerative nodules. Given the presence of hemolytic anemia with a normal haptoglobin and extensive hepatocellular injury in the context of recent antibiotic exposure, drug-induced liver injury from nitrofurantoin was suspected. During her hospitalization, she became more encephalopathic and developed worsening renal function, hyperbilirubinemia, and coagulopathy. Further work-up revealed 24-hour urine copper was elevated at 159mcg and repeat ceruloplasmin was 13.8mg/dL (normal 20-60mg/dL). An ophthalmic exam revealed Kayser-Fleischer rings. Liver biopsy showed a quantitative copper level of 752mcg/g dry-weight (normal <250mcg/g). She exhibited heterozygosity for the ATP7B mutation.

A diagnosis of fulminant hepatic failure secondary to Wilson disease was made. She underwent orthotopic liver transplantation 3 days later, and recovered well following surgery. Wilson disease (WD) is an autosomal recessive disorder of impaired copper excretion leading to multi-organ damage. WD is typically recognized by the presence of Kayser-Fleischer rings, neurologic symptoms, and a low serum ceruloplasmin level. However, the diagnosis of WD in the setting of ALF is challenging given the poor diagnostic performance of various measures of copper metabolism. In particular, reduced serum ceruloplasmin can be less reliable and specific in this setting. Diagnostic clues for WD in ALF include: female predominance, presentation before age 40, hemolytic anemia and a sub-normal serum alkaline phosphatase. Nitrofurantoin is a commonly prescribed oral antibiotic that can cause ALF weeks following intake and can surprisingly uncover underlying Wilson disease. Reevaluating our initial diagnosis of hepatic toxicity from nitrofurantoin and considering the diagnosis of WD proved to be an essential diagnostic step in this case.
CALIFORNIA POSTER FINALIST - CLINICAL VIGNETTE Quan M Nhu, MD, PhD

Breathless before the (Scorpion) King: Acute eosinophilic pneumonia following scorpion envenomation

First Author: Quan M Nhu, MD, PhD Carrie D. Chun, MD

Introduction: Scorpion envenomation can cause both local and systemic manifestations. While most cases are minor, scorpion envenomation can cause pulmonary edema, myocardial depression, hypotension, and multi-organ failure. We report herein a case of acute eosinophilic pneumonia presenting as acute hypoxemic respiratory failure following scorpion envenomation.

Case Description: A 41-year-old male with a two-week exposure to Bactrim for a recent onset of bursitis presented with worsening dyspnea 4 days after envenomation by a bark scorpion (Centruroides sculpturatus). Upon arrival, he had T 37.3 ºC, BP 122/65, HR 91, and RR 18. He initially had an oxygen saturation of 95% on room air; however, within 2 hours of arrival, he quickly desaturated to 88%. Physical exam demonstrated bilateral lung crackles. There was no swelling, erythema, or streaking in the vicinity of the scorpion sting. CBC, BMP, lipase, CK, CK-MB, and BNP were within normal limits. Chest CT showed extensive patchy infiltrates and was negative for pulmonary embolus. Transthoracic echocardiographic examination showed normal LVEF of 58.7%, without evidence of wall motion abnormalities or right ventricular dilation or strain. The patient was transferred to the ICU on hospital day two for acute hypoxemic respiratory failure. The patient was intubated and placed on lung protective ventilation per ARDSNet protocol. Extensive evaluation for infectious, vasculitic, and rheumatologic causes of respiratory failure, including a bronchoalveolar lavage, was all non-diagnostic. Video-assisted thorascopic surgery (VATS)-mediated lung biopsy demonstrated an acute eosinophilic pneumonia superimposed on subacute reparative changes, temporally consistent with lung injury associated with scorpion envenomation. The patient was treated successfully with systemic corticosteroids and discharged home on supplemental oxygen and a prolonged corticosteroid course.

Discussion: Bactrim is known to cause acute lung injury (ALI). However, ALI in the setting of scorpion envenomation is an under-recognized clinical presentation. To our knowledge, this is the first report of acute eosinophilic pneumonia associated with scorpion envenomation. Amaral et al. reported acute lung injury and increased alveolocapillary membrane permeability in scorpion sting, resulting in pulmonary edema and death of a 16-year-old boy with microscopic features of ARDS (Toxicon 1994). D’Suze proposed the term Scorpion Venom Respiratory Distress Syndrome using a rabbit model of envenomation-induced lung injury (Toxicon 1999). Coelho et al. showed that scorpion venom can drive chemokine production, neutrophil influx and edema formation in murine lungs (Toxicon 2007). In support of our observation, Shah et al. reported the association between pulmonary infiltrates with eosinophilia (PIE) syndrome and scorpion sting in a young adult male (Chest 1989). Taken together, scorpion venom has the capacity to induce direct and indirect lung damage and thus, can potentially contribute to the development of respiratory distress and failure. Scorpion envenomation, combined with Bactrim, likely contributed to the rapid clinical deterioration in this young patient on presentation.
Road Tripper Arrives at a Road Block: Managing Acute Submassive Pulmonary Emboli with Thrombolytic Therapy

Acute pulmonary embolism is a common, often fatal event. While thrombolysis is indicated with massive PE, management of submassive PE with fibrinolytics is under debate. Here we present a case of submassive PE managed with ultrasound-enhanced, catheter-directed tPA. A 68-year-old gentleman with urinary retention presented with recurrent syncope. The patient had embarked on a cross-country road trip and made pit-stops for intermittent foley catheterization, despite starting silodosin and tamsulosin. When he reached the Bay Area, he complained of “chest congestion,” left leg swelling, and episodes of slumping over unconscious.

Physical exam was notable for orthostatic hypotension, tachycardia, no murmurs, no elevated JVP, and enlarged left lower extremity. Initial labs revealed troponin elevation to 1.4, BUN 27, and creatinine of 2.16. Lower extremity Doppler showed acute left lower extremity deep vein thrombosis and CTA demonstrated bilateral pulmonary emboli with possible lower lobe hemorrhage. Bedside echocardiogram showed severe right ventricular systolic dysfunction, severely enlarged right atrium, large right atrial thrombus (about 2cm), and severe pulmonary hypertension. CT of the abdomen/pelvis revealed a bulky, lobular prostate highly concerning for prostate cancer.

Cardiothoracic Surgery, Interventional Radiology, and Vascular Surgery were consulted to address the submassive PE. While the patient was hemodynamically stable, the evidence of severe right ventricular dysfunction, extensive clot burden, and the right atrial thrombus signaled a high-risk situation. Thus, the decision was made to place the EkoSonic (EKOS) catheter in the pulmonary artery for ultrasound-enhanced and tPA-directed thrombolysis, rather than thrombus extraction or traditional systemic heparin anticoagulation. Subsequent evaluation showed that the pulmonary artery clot diminished, the RA thrombus dissolved, with interval improvement in RV function, and the patient was transitioned to systemic heparin therapy. Ultimately, his hospital course was complicated by cardiogenic shock, requiring pressors, intubation, and dialysis. Fortunately he improved and was successfully extubated and prostate cancer treatment was initiated.

The patient’s hypercoagulable state from his underlying prostate cancer along with the hemostasis during his road trip was a recipe for Virchow’s triad. While ultimately important to treat his underlying malignancy, there was a critical need to address our patient’s high-risk mortality in the acute setting. RA thrombus with acute PE is associated with higher mortality and risk of hemodynamic compromise. RV dysfunction is associated with a twofold increase in PE-related mortality. EKOS catheter is an FDA-approved treatment of PE and the ULTIMA trial showed improved outcomes with reversing RV dilatation at 24hrs, when compared to heparin anticoagulation alone. However risks include bradycardia, heart block, as well as hemorrhage. Risk stratification for our patient was high so we pursued therapy that might result in early hemodynamic improvement with EKOS. This is a rare case when submassive pulmonary emboli could illustrate the utility of ultrasound-enhanced, tPa-directed therapy in critically ill patients.
Carbapenem Neurotoxicity: A Case Report

Nicolas D Prionas MD, PhD

With the increasing prevalence of antibiotic-resistant organisms, Carbapenem use is widespread and relatively well tolerated. This case illustrates a very rare side effect of Ertapenem-induced neurotoxicity, the symptoms of which can be misleading.

Three months prior to case presentation, a 59 year old woman with a history of methamphetamine abuse and intravenous drug use presented septic with Methicillin-sensitive Staphylococcus Aureus (MSSA) bacteremia. MRI studies suggested right medial clavicular osteomyelitis, thoracic osteomyelitis (T4-T5), thoracic pre-vertebral abscesses (T4-T6), and spinal leptomeningeal enhancement. Her abscesses were drained and cultures were positive for MSSA. She was treated with broad spectrum antibiotics and discharged to a skilled nursing facility (SNF) with 6-8 weeks of IV Nafcillin. An SSRI was started for depression. The patient presented 2 weeks later with abdominal pain, nausea, vomiting, and urinary retention. Repeat MR imaging of the spine showed a lumbar anterior epidural abscess (T11-L2) and mild stenosis at T4-T5 in the presence of previously described abscesses. She underwent thoracic decompression laminectomy, partial facetectomy, partial T4 corpectomy, instrumented fusion of T4-T6, and non-instrumented fusion at C7. Blood cultures grew Lactobacillus, so antibiotic coverage was broadened to Ertapenem and Rifampin due to spinal hardware.

Two weeks later, the patient presented with altered mental status (AMS), agitation, and acute kidney injury (AKI) (serum creatinine 1.5 mg/dL, baseline 0.5-0.8 mg/dL). She had pressured rambling speech and was only oriented to self and place. She was tremulous and hyper-reflexic and required redirection, intermittent use of restraints and antipsychotic medications. Initially, there was concern for serotonin syndrome given recent initiation of an SSRI; however, she previously tolerated the SSRI well and did not improve with discontinuation. Ertapenem was changed to Meropenem for Pseudomonal coverage. The patient’s AKI improved after fluid rehydration with normal creatinine by hospital day 3. On hospital day 5, Carbapenems were discontinued out of concern for neurotoxicity. Cefazolin was started. The patient’s mental status dramatically improved by hospital day 6 with more coherent and linear speech and orientation to person, place, and situation. Over the next 5 days, she had waxing and waning agitation with minor delusions which improved with sleep hygiene, thiamine, and minimal antipsychotics. At discharge, the patient’s mental status was at baseline and she was transferred to SNF on Doxycycline (Lactobacillus coverage), Rifampin, and Nafcillin.

Ertapenem neurotoxicity, although rare, has been observed in patients with ESRD with poor dialysis compliance or with inappropriate dosing. It has rarely been seen in AKI. This case demonstrates the rare risk for Carbapenem neurotoxicity, especially in the elderly with AKI. The sudden decrease in GFR likely caused Ertapenem levels to suddenly increase inducing neurotoxicity. In the setting of persistent AMS while on Carbapenem antibiotics, neurotoxicity should be considered and alternative antibiotics administered when possible.
CALIFORNIA POSTER FINALIST - CLINICAL VIGNETTE Kristin E Schwab, MD

When Typical Provokes the Atypical: CMV Triggering an Unusual Presentation of Atypical Mycobacterium

Kristin Schwab, MD; Patrick Ahearn, MD; Edward Ha, MD

Although cytomegalovirus (CMV) and mycobacterium represent two of the most common infectious pathogens affecting transplant patients, general internists must be aware of the subtle and synergistic ways in which these pathogens can present in immunocompromised patients.

A 43-year-old male with end stage renal disease secondary to IgA nephropathy presented six years post renal transplant with five days of acute-on-chronic diarrhea. He had been suffering from one year of intermittent diarrhea with an associated 30 pound weight loss. In the emergency department, he was afebrile and hemodynamically stable with a normal abdominal examination. Stool was negative for bacteria, viruses, acid fast bacilli, and ova and parasites. He underwent a colonoscopy on hospital day four that revealed multiple red punched-out ulcers in the terminal ileum. Immunohistochemistry revealed CMV-positive cells. Given this, he was started on IV ganciclovir for CMV enteritis and had resolution of his diarrhea. On hospital day 10, he developed fevers to 39.2 ºC and night sweats. A computed tomography (CT) scan of the chest showed the new development of extensive perilymphatic nodules and prominent peribronchial thickening when compared with a CT scan from admission. A pulmonary biopsy specimen revealed multiple bronchial wall granulomas with positive acid fast bacillus (AFB) staining. Of note, four sputum AFB samples had been previously collected and found to be negative for mycobacterium. Ultimately, blood AFB cultures taken at the time of admission grew out mycobacterium avium complex (MAI).

He has since completed greater than six months of triple-antibiotic therapy for MAI with ethambutol, azithromycin, and a fluoroquinolone. A CT chest scan obtained three months post treatment initiation showed persistent mediastinal lymphadenopathy but improved peribronchial and interstitial disease with only minimal scarring. He has gained greater than 20 pounds and has remained disease-free without fevers, chills, cough, shortness of breath, or diarrhea. This case illustrates the unique manifestations of common infectious pathogens in immunosuppressed patients. Mycobacterial disease classically presents with slow and progressive symptoms, with MAI-infected patients often presenting after greater than thirty days of symptoms. Our patient’s abrupt clinical and radiographic presentation suggests a new perspective on pulmonary mycobacterial disease. In addition, our case suggests that acid-fast bacillus infections need to be strongly considered in immunocompromised hosts with pulmonary nodules even in the setting of negative AFB sputum cultures.

To our knowledge, only one other case of CMV gastrointestinal disease followed by pulmonary mycobacterial infection exists. In both of these cases, pulmonary mycobacterial disease began only after the initiation of ganciclovir for CMV enteritis. Therefore, our case also suggests that in the setting of CMV disease, immunomodulation from the virus or the antiviral medication can lead to recrudescence of other infectious diseases.
Battling Influenza: Extra-Corporeal Membrane Oxygenation and an Emerging Role in Influenza Associated Acute Lung Injury.

First Author: Sarthi R Shah, MD Second Author: Ragheb Assaly, MD

Introduction: The cumulative rate of hospitalization due to influenza, across all age groups, was 35.6 per 100,000 between October 2013 and April 2014. Among these cases of hospitalized patients there is an increased mortality rate in those presenting with superimposed bronchopneumonia, as well as those who develop acute respiratory distress syndrome (ARDS). We report one such case in which an initially false negative rapid influenza test potentially delayed appropriate therapy, and where extracorporeal membrane oxygenation was successfully used to treat our patient.

Case report: A 52 year-old female was transferred to our institution in vent-dependent respiratory failure. She was initially found unresponsive at home. Patient’s family was able to provide a history stating that she had been complaining of muscle aches, nausea and weakness prior to admission. She had not had any shortness of breath prior to arrival at the outlying institution. While there, she had rapid decline in respiratory function and was intubated. Rapid influenza swab done at the previous institution was negative.

On arrival to our institution, a chest x-ray showed diffuse bilateral infiltrates. Initial arterial blood gas on arrival to our institution showed a pH of 7.19, a PaCO2 of 55 mm Hg, PaO2 of 68 mm Hg and HCO3 of 21 mmol/L while being mechanically ventilated in assisted-control mode at a rate of 14 breaths per minute with an FiO2 of 100%, and a tidal volume of 600 cc. The patient was evaluated by the intensive care team as well as the cardiothoracic surgery and diagnosis of ARDS was made along with a decision to utilize ECMO. Rapid influenza swab at the previous facility had been negative, but due to the presentation and recent flu-like symptoms, oseltamvir was initiated along with broad-spectrum antibiotics. A bronchoscopy was performed emergently to obtain bronchial washings for definitive diagnosis. Patient was found to have influenza A with superimposed staphylococcus aureus. With continued antibiotic therapy and ECMO support, patient eventually recovered and was weaned from ECMO. Through a steady recovery over the course of 5 weeks, the patient was fully weaned from ECMO, mechanical ventilation, and was eventually discharged.

Conclusion: It remains important for clinicians to be aware that a rapid influenza test does not rule out influenza in those patients where influenza can be suspected. In patient’s presenting with ARDS and Influenza, the ECMO has an emerging role as a treatment, however retrospective studies do not show clear efficacy. Although several retrospective studies utilizing ECMO in influenza patients exist, few have shown a clear decrease in morality or hospital length of stay.
Vasculitic Neuropathy as Initial Presentation of Granulomatosis with Polyangitis (GPA)

Gautam Shah MD, Ana Nunes MD, Kamisah M. Barger MD, Tanya-Sue Winey MD

A previously healthy 66 year-old male was evaluated for pain and numbness of the bilateral plantar surfaces which started two days into a cross-country road trip. This progressed over one week into severe bilateral leg pain which left him unable to walk. Over the next four weeks, he experienced intermittent bilateral lower extremity edema which improved with furosemide. One week prior to presentation, he endorsed burning pain and numbness in his arms. He also reported a twenty five pound weight loss over six months, fatigue, and recent onset of jaw pain while eating. He presented for evaluation five weeks after the initial onset of his symptoms. At presentation, vital signs were within normal limits, and the physical examination was notable for mild lower extremity edema, 3/5 left arm abduction/extension strength, 3/5 hip flexion strength bilaterally, and 0/5 lower extremity strength distal to the knees bilaterally with impaired vibration/proprionception/pinprick sensation. Bilateral brachioradialis reflexes were intact; bilateral patellar and Achilles reflexes were absent.

Laboratory testing revealed elevated ESR, CRP, troponins, and CKMB. Lumbar puncture was within normal limits; brain MRI showed areas of ischemic infarct in the right cerebral hemisphere; and EMG demonstrated decreased amplitude in the bilateral upper and lower extremities as well as prolonged distal latency and slow nerve conduction velocity in the upper extremities. Additional diagnostic laboratories revealed positive c-ANCA and proteinase 3 (PR3) antibodies with negative HBV, HCV, and HIV; this was suggestive of GPA. Confirmatory testing with sural nerve biopsy demonstrated lymphocytic infiltration consistent with a vasculitic neuropathy. He was also felt to have cardiac involvement with his vasculitis, based on his elevated cardiac markers. Echocardiogram revealed septal wall hypokinesis with a normal angiogram. He was started on high-dose steroid therapy as well as induction therapy with rituximab, and was eventually transitioned to oral prednisone. At an outpatient clinic visit two weeks after discharge, his upper extremity strength and lower extremity sensation had improved, although he still had bilateral foot drop.

Antineutrophil cytoplasmic antibody (ANCA) associated vasculitides include granulomatosis with polyangitis (GPA), the Churg-Strauss syndrome, microscopic polyangitis, and pauci-immune glomerulonephritis. GPA leads to vasculitis and granulomatosis of small to medium-sized blood vessels and initial presentation typically involves ear-nose-throat complaints (90%) or respiratory complaints (75%). Less frequently does it present with primarily peripheral nerve impairment (20%)*. Although vasculitides were not high on our initial differential diagnosis, the negative lumbar puncture results and overall constellation of symptoms forced the team to broaden our differential. This interesting case serves as a reminder to always consider vasculitis in the differential diagnosis of a patient presenting with weakness.

CALIFORNIA POSTER FINALIST - CLINICAL VIGNETTE Bryant W Wilson, MD

Testicular Tuberculosis: A Rare Presentation of Extra-Pulmonary TB

First Author: Bryant W Wilson, MD

A 43 year old Hispanic male presented with a one month history of testicular pain with draining purulent lesions unresponsive to antibiotics. Further history revealed that he also had two weeks of a productive cough and ten pound weight loss.

CT chest showed a miliary pattern of nodular infiltrates throughout both lungs with cavitation. CT abdomen illustrated bilateral hydronephrosis with an infiltrative process involving the right renal collecting system and ureter, and a heterogeneous mass involving the left testicle. Sputum, urine and scrotal wound samples were all 4+AFB positive and cultures grew *Mycobacterium tuberculosis*. Subsequent Quantiferon gold was positive.

The patient required bilateral nephrostomy tubes for his hydronephrosis and extensive ureteral involvement. Standard anti-tuberculosis treatment was initiated, but had to be revised due to phenotypic drug resistance to isoniazid, pyrazinamide and streptomycin. His course was complicated by repeat episodes of urosepsis, although on follow up his left testicle has remained viable.

Genitourinary tuberculosis occurs in about 20% of extra-pulmonary disease, with the most common site being the kidney, and then the ureter, epididymis and testicle in descending order.

Dissemination of *Mycobacterium tuberculosis* bacilli after infection results in subsequent involvement of various organs. Testicular involvement is often a result of retrograde extension from the prostate and seminal vesicles as is illustrated in our case.

Due to the inflammation of the scrotum and testes, it can be difficult to differentiate between malignancy and inflammatory processes, such as a chronic infection. Physical exam may demonstrate nodular beading of the vas deferens, which is a characteristic finding. Ultrasound of the scrotum can help to differentiate an inflammatory process from malignancy or torsion.

The presence of scrotal pain, swelling, epididymal or prostate tenderness in the setting of TB should prompt investigation of genital tract involvement. The positive AFB stain in our patient rapidly alerted us to the presence of *M. tuberculosis*. Of note, acid fast microscopy can occasionally be positive due to nonpathogenic, non-tuberculous mycobacterium. A culture of the biopsy or drainage is thus required for the diagnosis. Culture has a sensitivity of 65% and a specificity of 100%.

Testicular tuberculosis is a rare condition, but should be kept on the differential when evaluating scrotal masses or infection. A thorough history, physical exam, and awareness of presentation can lead to the accurate diagnosis.
COLORADO POSTER FINALIST - CLINICAL VIGNETTE Nicole Barberis, MD

Fact or Factitious

First Author: Nicole Barberis, MD Second Author: Shagun Dhaliwal, MD Third Author: Tuan Tran, MS3

Necrotizing autoimmune myopathy (NAM) is a complex and rare disease under the umbrella of idiopathic inflammatory myopathies (IIM), which includes the more common diagnoses polymyositis, dermatomyositis, and inclusion body myositis. Patients typically present with sub-acute symmetrical weakness of the limb girdle muscles, elevated serum creatine kinase (CK) levels, and absent inflammatory cells on muscle biopsy. We present a patient with a persistent history of proximal muscle weakness and dysphagia who’s muscle biopsy revealed acute necrotic myopathy.

A 57 year old female with a history of obesity, fibromyalgia and intermittent muscle weakness presented with an acute worsening of her symptoms. Her first episode had been attributed to infectious myopathy versus factitious or psychosomatic disorder. The workup included a CK 897, negative acetyl-choline receptor antibodies, and a normal brain MRI. She had a sudden and complete recovery. Four months later her proximal muscle weakness returned, with episodes where her legs “gave out” resulting in her lying on her floor for two days. She was hospitalized and further evaluation revealed a CK of 218 but an otherwise negative workup that included ANA, ferritin, Scr, TSH, cortisol, hepatitis panel, and CT head. The consulting neurologist suggested she may have inclusion body myositis, but no biopsy was performed. She was discharged to rehab where she resided for 3 months with some improvement initially. However, she again had an acute worsening of her weakness and presented to our hospital with a CK 1953, CRP 27, AST>ALT (318 and 164, respectively). Her muscle biopsy was consistent with necrotizing myopathy.

For clinicoserologic classification, we sent anti-SRP and anti-HMGCR antibodies to evaluate necrotizing autoimmune myopathy (NAM), in addition to an autoimmune myositis panel; all of which were negative. She noted considerable improvement after treatment with prednisone 1mg/kg and a 5 day course of 400mg/kg IVIG. NAM is relatively rare and to date has only been described in few case reports since the antibody discovery in the 1980’s. The etiology of NAM has yet to be fully delineated but has been broadly divided into nonautoimmune (toxic, hypothyroidism, or heritable) and autoimmune myopathies (anti-HMGCR, anti-SRP antibodies, antisynthetase, scleroderma as well as paraneoplastic antibodies).

3-6% of patients with IIM have anti-SRP versus 16% in confirmed necrotizing myopathy while 6% have anti-HMGCR. Statin-induced NAM is commonly associated with positive anti-HMGCR and although our patient had a remote history of statin use, she was found to have neither anti-HMGCR or anti-SRP antibodies. We believe the cause of our patient’s myopathy was likely not toxin (statin, alcohol, etc..) induced as it occurred while under clinical observation (rehab, hospitalization). It is likely that our patient’s symptoms were due to an as yet un-identified autoimmune process. It is important to note the treatment of NAM is similar regardless of etiology, with recommendation to treat with at least corticosteroids as well as IVIG or immunomodulator therapy in more severe cases.
COLORADO POSTER FINALIST - CLINICAL VIGNETTE Cara E Crouch, MD

Acute hepatitis C infection transmitted by cadaveric bone graft transplantation

First Author: Cara E Crouch, MD Second Author: Miriam Freundt, MD

Introduction: Cadaveric bone graft transplants are commonly used in spinal surgery. Donors are routinely screened for chronic hepatitis and other viral infections using antibody mediated laboratory testing.

Case Description: A 51 year-old female school teacher presented to the hospital after a routine post-operative clinic visit revealed significantly elevated AST and ALT > 3000U/L. She had undergone bilateral L4/L5 laminotomy with L4/5 diskectomy and interbody fusion with structural allograft and autograft 6 weeks prior. She admitted to worsening abdominal pain, nausea, vomiting and fatigue over the past week. Her history was negative for sick contacts, recent travel, alcohol or drug use, sexual activity within the last year, or previous blood transfusions. Physical exam was unremarkable. A RUQ ultrasound with doppler revealed markedly thickened gallbladder walls with trace free fluid near the gallbladder without evidence of stones, common bile duct dilation or abnormal liver flow. Extensive laboratory workup was negative, including acetaminophen and salicylate levels, lipase, iron, TIBC, % iron saturation, ceruloplasmin, anti-smooth muscle antibodies and ANA, as well as antibody testing for hepatitis A, B and C (HAV IgM, HBV core IgM, HBV surface antigen, HCV antibody) as well as HSV I/II combined IgM, CMV IgM, and EBV antibody panel. She was noted to have an elevated LDH and ferritin during workup. Given the inconclusive nature of the results, HCV RNA PCR was checked and found to be positive, genotyping revealed HCV genotype 2b. Her history was reviewed further to assess for any risk factors for HCV infection, none were found except for previous cadaveric bone graft transplant. She was started on sofosbuvir and ribavirin and on 2-month follow up HCV RNA levels were undetectable.

Discussion: Acute HCV infection is an important cause of elevated liver function tests, and often progresses to chronic infection with subsequent risk for cirrhosis and malignancy. Tissue donor screening is currently mandated by the U.S. Food and Drug Administration to include testing for the presence of HCV antibodies but not nucleic acid testing for HCV RNA and donors with acute HCV infections may be missed. This case involves a patient without risk factors for HCV infection other than her prior spine surgery and reinforces awareness for the risk of HCV transmission with tissue transplantation. It is important to be aware that lack of RNA testing can result in transmission of HCV and that this should be considered in post-operative patients with clinical and laboratory pictures that resemble an acute HCV infection, as early treatment can lower rates of seroconversion.
Invasive Rhizopus infection originating from the chest cavity post pneumonectomy

First Author: Miriam Freundt, MD Co-Authors: Assad Haneya, MD, PhD Stephan Hirt, MD, PhD Christof Schmid, MD, PhD

Introduction: Rhizopus belongs to the family of Mucuraceae. As common saprobic fungus, it is found on organic produce. Opportunistic zygomycosis occurs with diabetic ketoacidosis, haematological malignancies, or severe immunosuppression.

Case Description: A 63 year-old male with diabetes mellitus (DM) and prostate cancer developed squamous-cell carcinoma of the left (LUL) and right upper lobes (RUL). After 4 cycles of radio-chemotherapy he underwent interval VATS for atypical RUL wedge-resection and LUL cuff resection. On post-operative day (POD) 2 acute respiratory failure due to total occlusion of the left pulmonary artery prompted left pneumonectomy. Due to diffuse oozing the chest was packed with 11 laparotomy sponges. Worsening septic shock required maximal vasopressor support. On POD 5 the chest was de-packed, irrigated with povidon-iodine and closed. Cultures from pericardium, chest and sputum remained sterile. Blood cultures grew Staph. epidermidis and antibiotics were broadened. A chest tube drained black fluid positive for 2 different Rhizopus species (R. microsporus and azygosporus). IV posaconazole and liposomal amphotericin B were initiated. The chest was frequently rinsed with saline. On POD 8 necrosis of the incision was noted. Within days the necrosis expanded to a palm sized area. Samples revealed generalized invasive zygomycosis. Extensive debridement of pericardium, pleura and chest wall with resection of 4 rips was performed. Invasion of the aorta, heart and bronchus stump could not be excised. Following the family opted for comfort-care and the patient expired.

Discussion: This case represents the fatal outcome of Rhizopus infection originating and hiding in the chest after pneumonectomy. Our patient expressed no typical risk factors. Immunocompromise due to repeat surgery, bacteremia and radio-chemotherapy might have been present but DM was controlled. The source of infection remains unclear. The chest cavity offered ideal environment for this aggressive opportunistic mold and invasion was only noted when outgrowing from surgical incision. Hallmark of zygomycosis is vascular invasion and tissue necrosis, which occurred rapidly despite IV combination antimycotic therapy. At surgical intervention, the large vessels and heart had already been invaded. We reinforce the need for early removal of chest packing, awareness of invasive zygomycosis, timely diagnostic tap with fungal stains and recommend local irrigation with amphotericin B after early radical surgical debridement.
Amiodarone Desensitization by a Novel Protocol in a Patient with Advanced Biventricular Heart Failure and Uncontrolled Ventricular Tachycardia

First Author: Miriam IE Freundt, Second Author: Francis C. Ngo, MD

Introduction: Patients with advanced cardiomyopathy are prone to ventricular tachycardia (VT). Amiodarone is first choice treatment and therapy-limiting allergic reactions are extremely rare. However, we present a case of refractory polymorphic VT with amiodarone as last resort but generalized amiodarone-induced dermatitis, which was successfully desensitized by our novel protocol.

Case Description: A 66 year-old male with idiopathic cardiomyopathy (left ventricular ejection fraction 15%), left bundle branch block, remote cardiac arrest due to VT, biventricular AICD and lymphoma experienced recurrent symptomatic polymorphic VT requiring shocks ultimately climaxing in electrical storm. Historically he had been unable to tolerate amiodarone due to a generalized rash supportive of a delayed non-IgE mediated dermatitis, which had resolved after discontinuation. Allergies included rash to triamterene, triamcinolone and losartan but no anaphylaxis. Dofetilide, mexiletine and metoprolol were at maximal doses, AICD settings optimized, and other available antiarrhythmic medications had failed. Amiodarone desensitization was pursued in the intensive care unit. Dofetilide had been discontinued and metoprolol held for 18 hrs. The following protocol was instituted: Pretreatment with 125 mg methylprednisolone and 20 mg famotidine once 4 hours before the first amiodarone dose. A cumulative dose of 150mg of amiodarone was infused at potentiating dosage each in 50 ml dextrose 5% over 15 mins, and then waited for 15 mins before the next dose. Starting dose was 0.008 mg, followed by 0.02 mg, 0.04 mg, 0.08 mg, 0.2 mg, 0.4 mg, 0.8 mg, 1.6 mg, 4 mg, 8 mg, 16 mg, and 120 mg. No adverse reactions occurred. 400 mg amiodarone daily were started and he was discharged home in stable condition. Unfortunately he was readmitted two days later for recurrent VTs, again requiring multiple AICD shocks. VT could be stabilized with amiodarone infusion and three boluses of 150mg. He eventually received a left ventricular assist device for destination therapy and was continued on amiodarone.

Discussion: In this case break through VT and impending hemodynamic instability on exhausted medical therapy required intervention. Ablation had been discussed at that point but seemed too dangerous without hemodynamic LVAD support. Due to the patient’s history of severe generalized rash, concern for anaphylaxis to amiodarone prompted the need for desensitization. To our knowledge no such protocol has previously been described. Successful amiodarone desensitization using our novel protocol is encouraging for similar cases, where amiodarone remains the only antiarrhythmic option despite previous allergic reactions.
Pulmonary mucormycosis in a diabetic patient: an unusual presentation.

First Author: Kelsi Lacock, MD Second Author: Cara Crouch, MD – Saint Joseph Hospital, Denver, CO

Introduction: Mucormycosis is an opportunistic fungal infection that typically presents as rhino-cerebral disease in diabetic patients. We present a case of this rare infection diagnosed in a patient with poorly controlled diabetes mellitus (DM) who developed primary pulmonary disease and challenging adverse effects from the currently available treatment options.

Case Description: A 57 year-old male with past medical history of poorly controlled DM initially presented to his outpatient physician for chronic productive cough, was found to have a cavitary lesion within the right lower lobe (RLL) and was prescribed two months of amoxicillin/clavulanate. Follow-up imaging demonstrated improvement in the RLL abscess but identified a new abscess in the right middle lobe (RML) prompting his admission to the hospital. His history also included night sweats and an unintentional 80lb weight loss over the previous 6 months. Physical exam was only significant for decreased breath sounds at the right lung base. Labs included blood glucose >400 without acidosis and hemoglobin A1C of 13.1; the remainder of his laboratory workup was negative. A thoracic CT revealed two abscesses within the RML, 5cm and 1.5cm in diameter, as well as a thick walled right-sided pleural effusion. He underwent bronchoscopy with brushings and cultures consistent with mucormycosis. He was treated with amphotericin B lipid complex and underwent surgical resection of the RML. Pathology confirmed mucormycosis without evidence of vascular invasion. Treatment was complicated by the development of rigors during amphotericin infusion as well as acute kidney injury. He was maintained on amphotericin B for 3 weeks post-operatively and then transitioned to posaconazole for 3 months at discharge. He subsequently developed anasarca thought secondary to posaconazole that required re-admission and resolved with diuretic therapy.

Discussion: Mucormycosis is an extremely aggressive angioinvasive fungal infection. Incidence of reported cases has been decreasing in diabetic patients, and these patients most often develop rhino-cerebral disease and are typically found to have concomitant diabetic ketoacidosis at presentation. Primary pulmonary mucormycosis is more commonly seen in patients with hematologic malignancies and neutropenia. This case involves a patient with poorly controlled diabetes who developed a primary pulmonary infection, demonstrating the need to keep this diagnosis within the differential of a patient with persistent respiratory complaints. This case also highlights the complicated nature of the treatment regimen, which is often plagued by medication side effects occasionally requiring hospital readmission. Early recognition and treatment with combined IV antifungal agents and surgical resection is imperative for achieving improved outcomes in this rare, and often fatal, infection.
Recurrent stroke-like symptoms in a patient with recent trigeminal zoster

First Author: Michael D. Lam, MD Second Author: Michael T. Morton, MD, FACP

Introduction: Varicella zoster virus (VZV) is a well-known cause of primary chicken pox, or reactivation zoster. However, it may present atypically as well. We present a case of recurrent ischemic strokes for which the etiology was VZV infection.

Case Presentation: A 58 year old woman with past history of bipolar disorder, chronic kidney disease, stage III, and diabetes mellitus, presented to the hospital with 3 weeks of intermittent confusion and apraxia. Seven weeks prior to admission, she was diagnosed and treated for left-sided trigeminal zoster and zoster ophthalmicus, with her current symptoms developing at the completion of her antiviral therapy. Physical exam on arrival was significant for word finding difficulty, disorientation, apraxia and agnosia. The remainder of her exam was normal. Initial studies, including CT of the head, lumbar puncture, and echocardiography, were unremarkable. MRI of the brain showed abnormal signal diffusion in the left deep grey nuclei and left basal ganglia (ipsilateral to her recent zoster). A CT angiogram was performed which showed vascular narrowing at proximal left A1 and M1 segments of the cerebral arteries that may be seen from vasculopathy or an embolic event. Given her recent VZV infection and the temporal relation of the patient’s symptoms, VZV vasculopathy was investigated. Subsequent testing of the patient’s CSF was positive for VZV IgM and IgG, although negative for VZV-PCR. Treatment for VZV vasculopathy was initiated with high dose steroids and a 2 week course of intravenous acyclovir. She showed dramatic neurologic improvement and was discharged.

Subsequently, the patient had two more presentations to the ED with similar cognitive complaints, as well as new right-sided motor weakness. Repeat workup ruled out infectious, epileptic, cardiac, embolic, metabolic or toxic causes of her recurrent symptoms. Repeat MRI showed numerous small acute on chronic ischemic strokes in the distribution of the left middle cerebral artery, thought to be due to persistent VZV vasculopathy and associated vasospasm. She was prescribed a two-month course of antiviral therapy as well as nimodipine for treatment of vasospasm. Her symptoms improved prior to discharge, but unfortunately, she was then lost to follow-up.

Discussion: VZV vasculitis is a rare entity seen either in primary VZV infection (typically children) or in reactivation of latent infection (adults or immunosuppressed patients). Case reports have shown that VZV affects both small and large vessels thus providing a broad spectrum of clinical presentations ranging from broad hemiplegia, to subtle, transient manifestations. VZV vasculitis should be considered as a potential etiology in ischemic stroke when more common causes are absent. Diagnosis is critical to allow quick initiation of treatment to prevent further morbidity and mortality.
The Metamorphosis: One Tumor’s Tale of Transformation

First Author: Lauren B Miller, MD Second Author: Brittany R Folks, MD

Introduction: Patients with MEN1 syndromes have occasionally been found to have neuroendocrine tumors that simultaneously or sequentially secrete different hormones, however each hormone is typically produced by a separate and pathologically distinct tumor. Multiple hormones co-secreted by a single neuroendocrine tumor are exceedingly rare.

Case: A 54 year old woman with a 3 year history of a gastrin-secreting neuroendocrine tumor (gastrinoma) with metastases to the liver, bone, and adrenal glands presented to the Emergency Department with several weeks of intermittent altered mental status associated with dizziness and nausea. On the morning of presentation, she had an episode of seizure-like activity and was found to have a blood glucose level of 20mg/dL during EMS transport. Upon arrival to the hospital, her blood glucose level had risen to 50mg/dL following dextrose administration. Several additional doses of dextrose and a dextrose drip were required to maintain her blood glucose levels above 100mg/dL. She became asymptomatic once normoglycemia was achieved. A pro-insulin level of 99pmol/L, insulin level of 30uIU/mL, and C-peptide level of 3.9ng/mL with a negative sulfonylurea screen and a corresponding glucose of 54mg/dL was consistent with insulinoma. CT imaging of her abdomen and pelvis did not demonstrate the presence of new tumor burden. She was initially treated with prednisone followed by octreotide. She maintained her glucose above 70mg/dL for 48 hours, and both therapies were continued for ongoing treatment at the time of discharge.

Discussion: Insulinomas are thought to arise from the ductal/acinar system of the pancreas. The majority of tumors are benign, but some have malignant potential. The diagnosis of an insulinoma is made when inappropriately elevated insulin levels are found in the presence of symptomatic hypoglycemia. Serum insulin greater than 5uIU/mL, C-peptide level greater than 0.2ng/mL, pro-insulin levels greater than 5pmol/L, and a corresponding glucose less than 55mg/dL are suggestive of the diagnosis. Although the most definitive treatment is tumor resection, diazoxide and somatostatin analogs are reasonable choices in those unable to undergo surgery. The presence of discrete neuroendocrine tumors that secrete different hormones in the same patient are very unusual, particularly in the absence of MEN1. It is exceptionally uncommon for dual-secretion to occur from the same tumor. Our patient had never undergone testing for MEN1 gene mutations, however, she had no significant family history and no evidence of additional malignancies. Imaging during this admission was not significantly changed from previous, and it was the consensus of oncology and endocrinology that her overall clinical picture was most suggestive of a transformation of her gastrinoma into a co-secreting insulinoma.
COLORADO POSTER FINALIST - CLINICAL VIGNETTE Tyler Miller, MD

Systemic Amyloidosis Presenting as Acalculous Cholecystitis

First Author: Santiago Rodriguez, Tyler Miller, Rachel Groff

Case: A 77 year-old male with a history of coronary artery disease, heart failure, and chronic kidney disease was transferred to our hospital with several weeks of generalized weakness and abdominal pain without fever, jaundice, or weight loss. Initial examination was notable for normal vital signs, normal heart and lung sounds, and prominent right-upper quadrant tenderness. CT of the abdomen revealed a hydropic gallbladder without gallstones. He was referred for cholecystectomy; however pre-operative laboratory testing revealed a creatinine of 6.5 (baseline 2.1), a troponin of 8.2, and a BNP of 2538. He was admitted for acute kidney injury and non-ST elevation MI. He was treated for these conditions, and was able to proceed to cholecystectomy several weeks later. The patient’s creatinine improved to 4.3 but never returned to his prior baseline. This prompted further workup including serum light chains which demonstrated a markedly abnormal kappa-to-lambda ratio of 4.8. Histopathological examination of the patient’s gallbladder revealed diffuse apple-green birefringence using Congo red staining. A diagnosis of systemic amyloidosis was made. Unfortunately, the patient went on to develop recurrent heart failure symptoms several months later suspicious for cardiac amyloidosis. Echocardiography at this time demonstrated global hypokinesis, left ventricular hypertrophy, and echotexture consistent with amyloid cardiomyopathy. He was able to continue chemotherapy and return home; however, his overall prognosis remains poor.

Discussion: Amyloidosis refers to the extracellular deposition of abnormal insoluble protein fibrils, leading to disruption of normal tissue and eventually organ dysfunction. Infiltration of the heart, kidney, and liver are the common clinically evident manifestations of the disease. Clinically significant involvement of the gallbladder is extremely unusual. There are only four prior reported cases of amyloidosis presenting as acalculus cholecystitis. Other reported variants include patients with nonspecific gastrointestinal symptoms, hemorrhage, and an asymptomatic patient in whom gallbladder cancer was suspected. Tissue biopsy is the only way to confirm amyloidosis, but several other clinical manifestations may raise suspicion for the diagnosis. These most commonly include unexplained progressive heart failure, nephrotic syndrome, and macroglossia. In retrospect, our patient had kidney and heart involvement at the time of his initial presentation. However, the diagnosis was not suspected until he developed worsening organ failure. Treatment depends on the type of amyloidosis, but long term prognosis is poor for most cases.

Conclusion: We report a case of systemic amyloidosis presenting as acute cholecystitis. This is a highly unusual presentation with only four prior documented cases. The clinical presentation of amyloidosis is variable, but may be considered particularly in cases of unexplained concurrent heart or kidney failure.
COLORADO POSTER FINALIST - CLINICAL VIGNETTE Muthulakshmi Yegappan, MD

TACERed Into Paralysis

1st author: Muthulakshmi Yegappan, 2nd author: Thomas Seibert, 3rd author: Aaron Calderon

Introduction: Hepatocellular carcinoma (HCC) is the fifth most common solid organ malignancy. It is often found in advanced stages requiring palliative rather than curative therapy. Trans-catheter arterial chemoembolization (TACE) is commonly offered as a treatment option to non-operative patients. We describe a rare case of cerebral embolization following TACE.

Case: A 69 year old male with history of hepatitis C and hepatocellular carcinoma was admitted for planned palliative TACE. The procedure was uneventful: right hepatic arteries were accessed via right common femoral artery and Adriamycin impregnated LC beads mixed with ethiodol followed by one vial of 100-300 micron embospheres, were introduced with successful interruption of blood flow to the tumor. Later that evening the patient became acutely confused and had difficulty moving his left arm while progressively becoming more somnolent. CT head revealed multiple areas of ischemic changes in the subcortical white matter and cerebellum, and MRI confirmed too numerous to count acute embolic infarcts. Once his mental status improved, a dense left hemi-paresis was uncovered and an echocardiogram revealed the presence of a patent foramen ovale (PFO). It was hypothesized that the chemoembospheres travelled through an intra-tumor arteriovenous malformation, although one was not visualized on arteriogram during the procedure. The embospheres then entered the venous circulation and passed to left heart circulation via a PFO and/or aberrant pulmonary arterial-venous shunts resulting in embolic cerebral infarcts. During his hospital course he also developed respiratory distress with multifocal opacities on chest radiograph. This was thought to be from chemoembolization to the lungs and aspiration pneumonia. He slowly improved and was discharged to a rehabilitation facility with almost normal mental status, left upper extremity hemiparesis, and left lower extremity hemiplegia.

Discussion: Cerebral embolization after TACE is a rare disorder that clinicians should become familiar with. An extensive literature review revealed only 15 cases, however, as the procedure becomes more common, increased events can be expected. Patients typically develop neurologic symptoms during the procedure or soon after. While most patients can anticipate a full recovery, the condition can be fatal. Known risk factors for cerebral embolization after TACE include pulmonary AVMs, repeat embolization, and tumor AV shunt. We suggest that patients with a PFO are at very high risk for cerebral embolism after TACE and that routine screening be considered given that the prevalence of a PFO approaches 25% in the adult population. At the very least, in patients with advanced tumors and significant risk factors for cerebral embolization, alternative treatment strategies should be considered.
Ulcerating Skin Lesions, Cocaine and Levamisole

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Learning Objective: Recognize levamisole as a common etiology of vasculitis in cocaine abusers. Understand the appropriate work up for levamisole induced vasculitis

Introduction: An estimated more than two thirds of the cocaine used in the United States is contaminated with levamisole. Due to its immunomodulatory action, levamisole has been used in the past for rheumatoid arthritis, colon cancer, and pediatric nephrotic syndrome. It is currently used for the treatment of nematode infections in animals. We report a case of skin lesions induced by levamisole contamination of cocaine.

Case: A 28 year old female with active IV drug use presented multiple times to the hospital with painful ulcerating lesions on her nose, right breast, hands, legs, and undersurface of the tongue. She had a long standing history of cocaine abuse, having tested positive for cocaine on toxicology screens multiple times in the past five years. Her WBC counts ranged from 4.7 to 7.4 x 10^9/L while the rest of her bloodwork was normal with negative blood cultures. Skin lesions biopsies showed skin, subcutaneous, and connective tissue necrosis. Skin and subcutaneous tissue showed organizing thrombosis, ulceration and reactive epidermal changes. Immunofluorescent studies of the tissue were negative for IgG, IgM, IgA, C3 and fibrinogen. She was eventually tested for levamisole using chromatography tandem mass spectrometry. These results showed a positive levamisole level of 0.39 mcg/ml. She was discharged after counseling on strict cocaine abstinence. Between her multiple admissions, resolution of these lesions were noted with cocaine abstinence.

Discussion: Levamisole is currently used as a “cutting” or debulking agent to increase the total weight of street cocaine. It modulates the immune response by triggering macrophage chemotaxis and increasing T-cell lymphocyte function. Patients with levamisole-induced toxicity usually present with skin manifestations or joint pain. The exact pathology is unclear as patients may present with true vasculitis or pseudovasculitis. Leukopenia, neutropenia, and agranulocytosis are very common lab abnormalities seen in such patients. Urine toxin screen typically is positive for cocaine for approximately 72 hours after last use. Levamisole needs specialized testing and it is positive for less than 48 hours after last use. Antihuman elastase antibody level is a sensitive and specific test for levamisole-induced vasculitis. The natural progression of this condition is generally benign, complete clinical resolution of skin lesion occurs 1 to 3 weeks after stopping levamisole exposure.

Conclusion: Increased physician vigilance is essential to suspect exposure to levamisole-contaminated cocaine. Any known IV drug using patients, when presenting with an unexplained rash, neutropenia, and multiple immunological abnormalities should be tested for cocaine and levamisole.
Anti-NMDA receptor encephalitis: A Potentially Fatal Autoimmune Encephalitis

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Introduction: Anti-NMDA (N-Methyl D-aspartate) receptor encephalitis is a rare form of an acute autoimmune process that is more prevalent in young females with a possible association with ovarian teratomas. This condition may initially present as a prodromal viral-like illness with multi-stage progression of symptoms. The presentation usually includes prominent psychiatric manifestations such as agitation, bizarre behavior, hallucinations amongst other symptoms like autonomic instability, insomnia, and memory impairment. This is followed by decreased level of consciousness that is often fatal without timely intervention.

Patient Description: Our case is of a 30 year old female, with no significant past medical history, who presented with a few days of confusion, agitation, bizarre behavior and hallucinations. Lumbar puncture showed mild lymphocytic pleocytosis. MRI of the head showed nonspecific sulcal flair signal hyperintensity. She was started on acyclovir for possible viral meningoencephalitis. In the next few days, her mental status deteriorated and she had become minimally responsive. Her oxygen saturations dropped and an ABG revealed hyper-capnic respiratory failure requiring an emergent intubation and an ICU transfer. In the ICU, the patient was worked up for autoimmune and infectious causes for this possible encephalitis. The patient was also found to have episodes of choroathetoid movements of her upper and lower extremities on the left side, oro-facial dyskinesias, rigidity and opisthotonic posture. A repeat brain MRI showed resolution of the previously seen hyperintensity. At this point, she was presumed to have anti-NMDA receptor encephalitis based on the clinical presentation and the multi-stage evolvement of symptoms. She was started on high dose of methylprednisolone and intravenous immunoglobulin (IVIG). Cell binding assay for NMDA receptor antibody was reported positive. We followed the treatment protocol developed by Dalmau et al. The patient’s tumor (ovarian teratoma) was removed and she received a five-day course of methylprednisolone and IVIG. She continued to experience episodes of extreme agitation and seizures. Her symptoms began to improve after three doses of rituximab. She continued to show slow recovery on immunosuppressive therapy.

Conclusion: Anti NMDA receptor encephalitis is an autoimmune condition with limited understanding of the underlying pathology. Various theories hypothesize that antibodies directed against synaptic proteins are the likely offenders. As we become more familiar with this condition, timely recognition and appropriate intervention is of paramount importance. A high index of suspicion is warranted in young healthy patients presenting with encephalitis associated with psychotic features and dyskinesias. Our case highlights the limited literature available on anti NMDA receptor encephalitis recognition and treatment. It is therefore prudent to become familiar with the symptomology to offer timely intervention.
A 66-year-old woman with a history of RAI Stage 1 chronic lymphocytic leukemia (CLL), on active observation, presented to her outpatient physician with abdominal discomfort and mild transaminasemia ten days after initiating allopurinol for hyperuricemia. Allopurinol was discontinued and she was hospitalized one week later when laboratory testing revealed markedly worsening liver chemistries. She was discharged after 3 days when serial laboratory testing showed a stable downtrend in liver chemistries, however was readmitted 6 days later with dramatic re-uptrend in liver chemistries. Her physical examination was notable for jaundice, splenomegaly and hepatomegaly without skin rash or mental status changes. Laboratory testing revealed a white blood cell count 238,000 cells/uL with 85% lymphocytes (baseline 65,000 cells/uL with 70-80% lymphocytes) but no eosinophilia and normal basic chemistries. Liver chemistries were significant for alanine aminotransferase (ALT) 4,310 U/L, increased from 1,950 U/L one week prior, 237 on initial presentation and normal at baseline. Total bilirubin peaked at 18.2 mg/dL, with international normalized ratio (INR) 1.2 and normal albumin and platelets. Further testing for viral hepatitis, autoimmune hepatitis, cytomegalovirus (CMV), Epstein-Barr virus (EBV), Human herpesvirus-6 (HHV-6), and acetaminophen toxicity was unrevealing. There was no evidence of biliary or vascular obstruction on abdominal ultrasound with Doppler and magnetic resonance cholangiography. Liver biopsy ultimately revealed giant cell transformation of hepatocytes. There was no evidence of steatosis, siderosis, cholestasis, or granulomas. There were portal lymphoid infiltrates consistent with known CLL.

Due to concern for rapidly progressive liver injury, she received five days of oral N-acetylcystine (NAC). When bilirubin continued to uptrend, oral prednisone 60 mg per day was initiated with gradual improvement. Prednisone was subsequently tapered, and on follow up 2 months later the patient was asymptomatic with normalized liver chemistries and WBC was at her baseline.

We describe a patient with acute liver injury after allopurinol initiation, manifesting as giant cell hepatitis rather than the typical presentation of allopurinol-induced liver toxicity. Most cases of allopurinol-induced liver injury are thought to be due to a hypersensitivity reaction, manifesting with rash, eosinophilia, and systemic symptoms (DRESS syndrome). Clinical manifestation can range from isolated laboratory abnormalities to fulminant liver failure and death. Similarly, the clinical course of giant cell hepatitis, a histopathological entity not previously described with allopurinol-induced liver toxicity, is often fatal or of transplant-dependent severity. Early suspicion/recognition and prompt discontinuation of allopurinol, as well as expedient initiation of NAC and steroids, may affect the clinical course favorably.
INTRODUCTION: Pulmonary tumor thrombotic microangiopathy (PTTM) is a rare but lethal diagnosis. It is a rapidly progressing disease associated with metastasizing tumor cells that cause sudden dyspnea, severe right sided heart failure and ultimately hemodynamic collapse.

CASE PRESENTATION: A 40 year old female patient with no medical history presented after a brief syncopal episode that was preceded by chest pain and dyspnea. Initial evaluation revealed a modestly elevated troponin with right axis deviation on EKG that prompted a workup to rule out acute coronary syndrome and pulmonary embolism. Cardiac catheterization revealed clinically insignificant myocardial bridging while 2D echocardiogram was essentially normal. Chest CT angiography with good contrast bolus showed no pulmonary embolus, but did show concerning axillary lymph nodes, which were confirmed by needle biopsy to be metastatic breast cancer. The patient was stable and awaiting chemo-port placement when she had sudden hemodynamic collapse requiring intubation and multiple vasopressors. Bedside echo showed dilated right ventricle with severe pulmonary hypertension. Repeat CTA again showed no PE so presumptive diagnosis of PTTM in light of confirmed malignancy was made. A ventilation-perfusion scan showed extensive bilateral peripheral mismatched areas consistent with PTTM. A pulmonary artery catheter was placed for hemodynamic monitoring in addition to starting nitric oxide to offload the right ventricle. Unfortunately, despite best efforts, our patient had progressive right heart failure and passed after prolonged PEA arrest. Post mortem autopsy confirmed the diagnosis of PTTM in the setting of metastatic breast cancer along with malignant cells cultured from the tip of the PA catheter.

DISCUSSION: PTTM is a devastating disease in which tumor cells invade the pulmonary vasculature and trigger the coagulation and inflammatory cascades. The pathophysiology, however, is not clearly understood. The clinical scenario is rapidly progressing dyspnea and chest pain that can progress to hemodynamic compromise and ultimately death. Diagnosis is usually clinical, but VQ scans may show a peripheral mismatch not demonstrated by CTA as the affected vessels are generally the fourth and fifth generation. Echocardiogram will typically show right heart strain and signs of pulmonary hypertension. Depending on progression of symptoms, PET scanning or transbronchial biopsy may also help with diagnosis. Anticoagulation and pulmonary vasodilators are of uncertain benefit at this time. The malignancies that have the highest potential of PTTM are breast cancer, gastric adenocarcinoma and lymphangiosis carcinomatosa. Several case reports have reported more indolent progression than with our patient, but the overall mortality still remains high. The average life expectancy after diagnosis is a mere 16.2 days. By increasing awareness of PTTM, more cases will be recognized and more antemortem diagnoses will be made which is the first step toward fully understanding this deadly disease.
A Case of Ehrlichiosis: Going on A History and a Hunch

First Author: Giovanna L Uzelac, MD Second Author: John Piper, MD

Over the last 30 years, the incidence of tick borne illnesses has steadily increased. Significant morbidity and mortality due to human monocytic ehrlichiosis (HME) has been documented. Oftentimes, clinicians can only rely on their history, as tests for ehrlichiosis can take days to weeks to identify the causative organism. Increased awareness of tick borne illnesses, especially in endemic areas, will lead to earlier suspicion, diagnosis, and thus earlier initiation of appropriate therapy which can potentially decrease the morbidity and mortality caused by tickborne diseases.

A 71-year old woman presented with 3-4 days of fever, weakness, and confusion after returning from a trip to Chicago. She initially presented to her primary doctor who recommended supportive care for a suspected viral syndrome. She continued to decline and presented to the emergency department, was admitted, and treated for a suspected urinary tract infection. Laboratory studies also revealed a leukopenia (white blood cell count 2.4k/uL), thrombocytopenia (platelet count 60,000) and mildly elevated transaminases. Two days into her admission she was transferred to the ICU for respiratory distress and concern for impending respiratory failure. Echocardiogram and VQ scan did not identify a cause for her respiratory distress, and as her neurologic status also declined, there was a suspicion for a meningoencephalitis. Cerebrospinal fluid demonstrated elevated protein and white blood cells, but also many red blood cells. A more detailed history was obtained that included a possible tick bite several weeks prior. She was empirically started on doxycycline. During the first 24-48 hours she worsened, developing seizures that required transfer to the neurologic ICU. Rocky Mountain Spotted Fever IgG titer was 1:512 on day 4 of doxycycline therapy. Despite negative IgM antibodies this was the leading diagnosis until day 10 when Ehrlichia chaffeensis PCR returned positive. She continued to require ICU level of care for multi-organ failure. She continued to require ventilator support until day 14 of antibiotics and seizures were eventually controlled on antiepileptics. Most other lab studies returned to normal except for her renal function, and she was discharged on dialysis.

The onset of HME can be insidious or it can be fast, potentially fatal. Many times, early clinical signs are nonspecific, resembling countless other diseases. Leukopenia, thrombocytopenia, and mild elevation in transaminases can be helpful in making a presumptive diagnosis of ehrlichiosis. However, the most important clues are in the patient history, which may provide the only clue to the diagnosis, although many times a tick bite remains unnoticed. It is imperative for clinicians to recognize the possibility of ehrlichiosis, to obtain appropriate diagnostic tests, and to initiate treatment with doxycycline promptly.
Barking Up The Wrong Tree: Recurrent Syncopal Episodes as The Presentation of Coronary Vasospasm

First Author: Munaza Akunjee, MD Second Authors: Antonio Corona, MD and Kimia Ghaznavi, MD

Coronary artery vasospasm, associated with variant angina, is a well-documented disorder with established methods of diagnosis and treatment. Clinical suspicion for this condition, however, remains indefinite. While its presentation is similar to that of typical angina, there have been rare instances that coronary vasospasm has presented with syncope. Here, we present a case of three-vessel coronary vasospasm presenting as recurrent, syncopal episodes. This raises the question whether the term, “variant angina”, remains appropriate as the designation of this condition.

Our patient is a 64 year old male who was brought to our institution by his sister for a witnessed episode of syncope. He had an extensive medical history which includes hypertension, COPD, renal cell carcinoma, colon cancer, as well as well-controlled generalized tonic-clonic seizures due to a traumatic brain injury sustained 20 years earlier. The patient described preceding symptoms of flushing and dizziness. No reports of chest pain, shortness of breath, palpitations, or seizure-like activity were made. The patient claims that he had two similar incidents one month prior to his presentation. Physical examination findings were unremarkable. A neurologic cause of his symptoms was investigated. A CT scan of the head was done in the emergency department showing no acute findings. Laboratory studies showed a complete blood count and comprehensive metabolic panel that were within normal limits. A 12-lead EKG showed no ischemic changes and no abnormal rhythms. Troponin-I levels were slightly elevated at 0.054 ng/ml, however. Cardiac enzyme measurements were repeated, and Troponin levels were discovered to be trending upwards to as high as 13.7 ng/ml. A series of 12-lead EKG’s were also obtained showing 3mm ST segment elevations in the inferior leads lasting for 6 minutes before returning to baseline. The patient remained asymptomatic during this time. The patient underwent cardiac catheterization, which revealed severe coronary artery spasm of the left anterior descending, left circumflex, and right coronary arteries. No angiographic evidence of epicardial coronary artery disease was found. Intracoronary nitroglycerin was infused, relieving the vasospasm. Isosorbide mononitrate and amlodipine were initiated and the patient remained symptom-free and stable. He was discharged in stable clinical condition. He has since followed up one month after his admission with no recurrence of syncope.

Our case illustrates how variant angina can be an inaccurate representation of coronary vasospasm. Reports of syncopal episodes, with the underlying mechanism hypothesized to be ventricular arrhythmias, have been made. This case seeks to shed light on the different symptoms coronary vasospasm can present with, which are not limited to angina, and the need to recognize them.
Redefining Tropical Pyomyositis: A Case of Pyomyositis of the Pectoralis Major in an Immunocompetent Adult

First Author: Ahmed Babiker, MBBS Co-Author: Antonio Corona, MD

Pyomyositis has historically been associated with pyogenic infections of the skeletal muscles of the lower extremities, immune deficient states, and being endemic to tropical countries. Documented case reports from this past decade, however, are changing how this infection is viewed. Our case illustrates how our classic definition of pyomyositis needs to evolve, and be considered in the differential diagnosis of patients presenting with fever and muscle pain.

A 25 year-old previously healthy male was seen at our urgent care department for complaints of left chest wall muscular pain he had been experiencing for about a week. At that time, the patient related the symptoms to his work as a porter at a local grocery. The patient had no history of HIV or immunosuppression, no IV drug abuse, no recent travel and no previous hospitalizations. He had no visible skin breaks on examination. He was given ibuprofen for pain relief and was discharged home. The patient returned to our institution 11 days later, complaining of worsening pain and swelling of his left chest wall, now associated with fevers and chills. A CT scan with IV contrast of the area revealed a diffusely enlarged pectoralis major muscle with inflammatory stranding, but with no evidence of abscess formation. Treatment with intravenous cefazolin was initiated, however, the patient’s condition worsened during the succeeding hospital days. As a result, an MRI of his chest was done which revealed a complex, multiseptated collection in the lateral inferior aspect of the left pectoralis major muscle. A left chest wall incision and drainage was then performed yielding purulent material as well as several blood clots. The blood clots were suspicious for underlying trauma the patient had sustained related to his work. Culture reports from the drainage were found to grow MRSA. Blood cultures and nasal swabs obtained from admission were found to be growing MRSA, as well. His antibiotic was then changed to vancomycin. Thereafter, the patient had marked improvement clinically. He was discharged home improved and stable, with IV antibiotics to complete 14 days. He has since followed up at our outpatient services with complete resolution of symptoms.

The above case demonstrates a case of pyomyositis occurring in the pectoralis major in the absence of immunosuppression. Although preceding trauma and community acquired MRSA colonization are two well-documented risk factors for this disease, the pathophysiology behind this purulent infection is not fully understood. As pyomyositis continues to be increasingly recognized in temperate climates, physicians should be more vigilant to this disease entity as early recognition and institution of appropriate management are crucial to avoid severe complications.
Help! My ACLS Algorithm Isn’t Working!

Joseph Jennings, MD

CASE PRESENTATION: A 52 y/o male with documented severe CAD s/p multiple percutaneous coronary interventions (PCIs) presents with a 3-day history of chest pain that has acutely worsened. He was diagnosed at this time with an inferior wall STEMI due to late in-stent thrombosis and restenosis of his right coronary artery and underwent successful revascularization. After step-down from the CCU, the patient became acutely hypotensive and non-responsive. He was in cardiogenic shock due to a ventricular tachycardia (VT). The VT was resistant to boluses of amiodarone, lidocaine, magnesium, and external synchronized/unsynchronized shocks. An abnormality was noted in the patient’s EKG: a wide complex tachycardia with a right bundle branch block morphology but left axis deviation. This finding can be seen in a specific type of VT: idiopathic left VT, also known as verapamil sensitive VT or Belhassen VT. With the patient in critical condition and not responding to treatments within the ACLS algorithm, the decision was made to push verapamil. The VT immediately broke back into normal sinus rhythm with resolution of the patient’s hypotension. A similar episode was rapidly treated with verapamil with an identical response. Due to the significant hemodynamic instability during these episodes, he was never able to pursue possible ablation. He was maintained on oral verapamil without further episodes.

DISCUSSION: Idiopathic left VT became known as Belhassen VT after Dr. Bellhassen reported the termination of the arrhythmia with verapamil in 1979. This also why it is sometimes called verapamil sensitive VT. This arrhythmia is historically seen in young healthy males with normal hearts complaining of recurrent palpitations. This patient had never previously experienced palpitations or had a history of arrhythmias. The subtle finding of a right bundle branch block morphology coupled with a left axis deviation suggested that this may not be as simple as scar-mediated VT. Our theory was somewhat confirmed given the patient’s immediate response to intravenous verapamil. The clinical dilemma highlighted here revolves around the decision to push verapamil in a severely hypotensive patient due to a VT. If this were another atypical cause for a wide complex tachycardia (ie a supraventricular tachycardia with aberrancy) instead of scar induced VT or Belhassen VT, the treatment given could have blocked the AV node and resulted in acute worsening of the tachycardia and hypotension as conduction was shunted through an accessory pathway.

CONCLUSIONS: Belhassen VT is typically seen in males with no cardiac disease presenting with recurrent palpitations. It was potentially identified in a post STEMI patient with severe CAD presenting with acute cardiogenic shock. This atypical presentation highlights the importance of utilizing ACLS algorithms when responding to cardiac events while also considering atypical causes.
An Illusion for Pancreatic Cancer: Autoimmune Pancreatitis (AIP)

First Author: Myat Soe, MBBS Other authors: Manash Das, MD; Linda Green, MD

Introduction: Autoimmune pancreatitis (AIP) is a recently emerged entity of chronic pancreatitis of autoimmune origin, first recognized by Sarles et al in 1961 as an idiopathic pancreatitis with obstructive jaundice and hypergammaglobulinemia, with the term “AIP” first described by Yoshida et al in 1995. If not carefully evaluated and not aware of the existence of this entity of pancreatitis, it can be misdiagnosed as pancreatic cancer, leading to unnecessary pancreatic resection as AIP usually presents as pancreatic mass with vague abdominal symptoms and weight loss.

Case Description: We present a case of AIP in a 77 years old African American man presenting with vague upper abdominal pain, vomiting, significant weight loss, and new onset diabetes mellitus over 3 months period. Physical exam was unremarkable except for mild upper abdominal tenderness and progressive weight loss. Laboratory evaluation revealed mild anemia, and mild conjugated hyperbilirubinemia with elevated lipase and alkaline phosphatase. CT/MRI of abdomen and endoscopic ultrasound revealed hypodense mass in the pancreatic head with main pancreatic duct dilatation and bile duct stricture. ERCP showed distal common bile duct stricture and pancreatic stent was placed. Given the constellation of these clinical features and data, pancreatic cancer was considered as the most possible diagnosis. However, fine needle aspiration biopsies done for 2 times via endoscopic ultrasound were negative for dysplasia and malignancy, but showed inflammatory infiltrates in glandular tissues. Ca 19-9 level and IgG4 level were within normal limit. Considering AIP as a possibility, the patient was started on steroid trial, which he responded well. He had symptoms relief, better control of diabetes, weight gain and complete resolution of pancreatic mass and bile duct stricture at the end of 6 months of steroid treatment.

Discussion: In summary, this case illustrates the existence of this new entity of chronic pancreatitis, which can mimic pancreatic cancer, and importance of systematic evaluation of pancreatic mass with timely expert consultation. Learning from this clinical vignette, AIP is an important differential diagnosis to consider for pancreatic mass, in addition to pancreatic malignancy. Recently, it is classified as type 1-lymphoplasmacytic sclerosing pancreatitis (LPSP) and type 2- idiopathic duct centric pancreatitis (IDCP). Clinically, type 1 AIP appears to be pancreatic manifestation of systemic IgG4 related disease whereas type 2 AIP does not have systemic involvement, as seen in our case. Both types may present as pancreatic mass with obstructive jaundice, vague upper abdominal pain and weight loss, which can be mistaken for pancreatic cancer. With International Consensus Diagnostic Criteria (ICDC), the incidence of AIP has risen in the last few years and it is being increasingly recognized in Western population. Improved diagnostic criteria (ICDC), advance in EUS guided FNA biopsy and steroid responsiveness provide accurate and timely diagnosis of AIP and differentiate it from pancreatic cancer.
Eosinophilic Polymyositis: A rare cause of severe rhabdomyolysis in a 22-year-old female

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Introduction: Eosinophilic myositis (EM) is an inflammatory myopathy characterized by the presence of eosinophilic infiltrates in muscle, along with potential involvement of cardiac and central nervous systems. We describe the case of a young patient with rhabdomyolysis, which we believed was caused by eosinophilic polymyositis.

Case Presentation: A 22-year-old African American female with no past medical history presented to the emergency department with complains progressive generalized diffuse muscle aches for weeks. She denied recent illness, trauma, heavy physical exertion, excessive heat exposure, drug/herbal medication usage, or medical or family history of autoimmune diseases. Examination of the extremities revealed diffuse muscle tenderness on palpation with limited range of motion secondary to muscle pain. Laboratory findings demonstrated no leukocytosis, but the percent of eosinophils was elevated with absolute eosinophilia. Other significant laboratory findings were severely high creatine phosphokinase (CPK) and transaminases. Patient was admitted for severe rhabdomyolysis requiring aggressive IV fluid hydration. Work up for parasitic infections, systemic autoimmune diseases, endocrine disorders, hematological diseases, and hypereosinophilic syndromes were ruled out. Muscle biopsy showed widespread eosinophilic infiltrate consistent with eosinophilic polymyositis as well as numerous plasma cells. The patient was started on high dose systemic corticosteroid. Her symptoms gradually improved within 5 days. The absolute eosinophil count and CPK trended down, and patient was discharged 4 weeks after hospitalization.

Discussion: This case illustrates a systematic work up of rhabdomyolysis in the presence of peripheral eosinophilia. Many differentials of eosinophilic myositis must be ruled out before establishing diagnosis of idiopathic EM. Within idiopathic EM, defining different clinical presentations and muscle biopsy results are required to conclude the diagnosis of Eosinophilic Polymyositis. To our knowledge, ours is the first case report documenting severe rhabdomyolysis without other organ involvement, due to eosinophilic polymyositis. EM is a relatively rare and understudied clinical entity, with no definitive guidelines for treatment. The present case reports an unusual presentation of EM and successful resolution with high dose corticosteroid therapy.
Primary bone marrow gray zone lymphoma presenting with leukemic phase and profound thrombocytopenia

Despite the involvement of the bone marrow in systemic lymphoma is a common event; Primary Bone Marrow Lymphoma (PBML) is an extremely rare presentation with unclear clinicopathological diagnostic criteria and prognosis.

Case Description: A 57-year-old man with history of DM and HTN, presented with 10-day history of back pain, fatigue, diaphoresis, and 1 day of gingival bleeding and melena. He denied fever or lymphadenopathy but he endorsed a 20 lb weight loss in the past 5 months. Physical exam revealed an ill appearing, middle age Hispanic male with evidence of a diffuse petechial rash. He had no palpable lymphadenopathy nor hepatosplenomegaly. Labwork revealed a WBC 8.7 x10^3/mcL, Hb 13.8 gr/dl, platelets of 7,000/mcL. BMP was unremarkable but LDH was significantly elevated at 12,900 units/L. His calcium and phosphorus were normal and uric Acid was elevated at 6.3mg/dL. HIV testing was negative. Peripheral blood smear showed circulating immature looking lymphocytes, few tear drop cells and markedly decreased platelets. Bone Marrow biopsy revealed extensive involvement by a high-grade B cell lymphoma, unclassifiable (B-UCL), with features intermediate between diffuse large B cell lymphoma (DLBCL) and Burkitt lymphoma. Immunohistochemistry showed that cells were positive for CD20 and CD10 and negative for CD3, CD5, cyclin D1, CD34, TdT, and CD30. Ki67 proliferation was 95% and c-MYC was positive in >90% of tumor cell nuclei. Molecular studies using FISH panel was positive for BCL2 gene translocation t(14;18), but negative for BCL-6 and C-MYC rearrangements. CT scans of the chest, abdomen and pelvis did not revealed enlarged lymph nodes or splenomegaly. CNS evaluation was negative for leptomeningeal involvement. IPI was high-intermediate risk. Patient was started on Dose-Adjusted EPOCH regimen, and following first cycle of treatment his constitutional manifestations improved and the platelet count normalized. BM biopsy after 3rd cycle of treatment showed no evidence of residual lymphoma consistent with a complete remission.

Discussion: Lymphoma exclusively confined to the bone marrow with no lymphadenopathy or other extranodal involvement has been reported in less than 20 case series/reports in the last 5 decades(1). Martinez reported 21 cases from review of 12 institutions over a 25 year period which comprised 15 DLBCL, 4 Follicular, and 2 peripheral T-cell lymphomas (2). No other cases were found of B-UCL type PBML. B-UCL is an aggressive lymphoma with the majority of patients presenting with advanced-stage disease and high IPI scores. About 50% of the cases harbor a MYC translocation including 32% with double hit rearrangements. Perry reported a median OS of 9 months and 5-year OS of 30% (3). Although therapy is not standardized, response to R-CHOP is poor; therefore an intensive therapy approach is advised in hope for improved outcomes (4).
FLORIDA POSTER FINALIST - CLINICAL VIGNETTE Brittany McCreery, MD

A CASE OF VANISHING PLEURAL EFFUSION

First Author: Brittany McCreery, MD Second Author: Rumi Khan, MD

CASE: A 53 year old male injection drug abuser with history of cirrhosis and CKD presented to the emergency department with left arm redness and swelling. Blood cultures were obtained and empiric antibiotics for presumptive cellulitis were started. Within two hours of presentation the patient developed new symptoms of dyspnea and was found to be hypoxic. Stat chest x-ray revealed bilateral perihilar patchy infiltrates and right-sided effusion. CT thorax confirmed a large right pleural effusion, no pulmonary emboli. Echocardiogram showed EF of 55% and normal valves. When a drug screen returned positive for cocaine and opiates, upon further questioning, he admitted using heroin the morning of presentation. Within 24 hours, his dyspnea resolved and he was successfully weaned off supplemental oxygen. No diuretics were given. A follow up x-ray showed dramatic improvement of the effusion and infiltrates. Cultures remained negative. He was discharged home with oral antibiotics.

BACKGROUND: According to the National Institute of Drug Abuse, 4.2 million Americans have used heroin at least once, with the number of users doubling between 2007 and 2012. There was an estimated 213,118 ED visits for heroin-related complications in 2009 alone. Heroin overdose is manifested by a triad of altered mental status, miosis, and decreased respiratory drive. Hospitalization occurs in 3-7% of cases, typically for prolonged respiratory depression, altered mental status, or non-cardiogenic pulmonary edema (NCPE). NCPE in heroin overdose frequently presents within 2 hours of use. Clinical findings include rales, frothy sputum, and hypoxia. Chest radiograph suggests bilateral infiltrates, though unilateral and lobar infiltrates have been reported. Pathophysiology of heroin-related NCPE is unclear. One proposed mechanism is opiate-mediated release of histamine in the lung parenchyma increasing lymphatic flow and capillary permeability leading to edema. Recent case series found NCPE rates of 2.1%-10% in heroin overdose visits. NCPE commonly resolves in 24-36 hours with supportive care, while a minority require intubation. Despite the favorable prognosis, NCPE occurs near universally in fatal heroin overdoses.

DISCUSSION: NCPE with infiltrates on chest x-ray has been previously described in presentations of heroin overdose. In this case, however, the patient’s dominant radiological finding was pleural effusion. The timing of onset and resolution fits the characteristic pattern of heroin overdose. The patient was also cocaine positive, but available literature that describes cocaine induced pleural effusion shares concomitant pericardial effusion and resolution of the effusion occurs over weeks. Normal echocardiogram and negative cultures excluded alternative diagnoses such as heart failure and pneumonia. This case appears to uniquely identify rapidly resolving pleural effusion as a complication of heroin overdose and suggests this manifestation should be added to the spectrum of pulmonary pathology associated with heroin overdose.
FLORIDA POSTER FINALIST - CLINICAL VIGNETTE Jordan C Ray, MD

Chemical Mediastinitis and Pericarditis Secondary to large Pancreaticopleural-mediastinal Fistula

First Author: Jordan C Ray, MD, Jason Prater M.D., Jose Melendez Rosado M.D., Brian P. Shapiro M.D.

Introduction: Pancreaticopleural fistulas are an uncommon complication of chronic pancreatitis and are increasingly becoming more recognized. Commonly a result of disruption of the pancreatic duct pancreaticopleural fistulas can lead to chemical inflammation resulting in pericarditis, mediastinitis and pleuritis.

Case presentation: A 35-year-old male presented with one week of substernal chest and epigastric pain with radiation to his back, and shortness of breath. A healthy male with past medical history only noted for extensive alcohol abuse, the patient noted his chest pain worsened with inspiration, and lying flat on his back. Basic laboratory studies were obtained noting normal lipase and liver functions. Initial computed tomography of his chest revealed fluid collection in the posterior mediastinum with additional collection around the aorta as well as a loculated right pleural effusion. Magnetic Resonance (MR) imaging was obtained to further define the mediastinal fluid collection which revealed a very large caliber fistula arising from the pancreatic duct at the junction of the body and tail tracking posterosuperiorly to pass through the esophageal hiatus, directly abutting the posterior aspect of the pericardium, which appeared thickened and extremely hyper-enhancing, consistent with pericarditis. A complex right moderate loculated pleural effusion was also noted on MR. Thoracocentesis was performed on the right pleural effusion and was shown to have elevated amylase consistent with a pancreaticopleural fistula resulting in mediastinitis and pericarditis. The patient was initially treated medically with pleural drains and octreotide. However, rapid accumulation of pleural effusions and complex loculations prevented complete nonsurgical resolution. The patient was treated with surgical drainage of the loculated pleural effusions with pleural decortication and continued chest tube drainage for several weeks. Attempts to close the fistula from the pancreatic duct through endoscopic retrograde pancreatoduodenography were unsuccessful as the proximal pancreatic duct was atretic and closed. After removal of chest tubes repeat imaging showed improvement of fluid collection. Chest radiographs at 6 months continued to show resolved pleural effusions.

Discussion: Acute mediastinitis secondary to pancreaticopleural fistula has been infrequently described in the medical literature. Commonly, mediastinitis is a result of tracking oral pharyngeal infection, surgical complications or esophageal rupture. However, in rare cases, it can result from chemical inflammation from pancreatic enzymes. Pancreaticopleural fistulas result most commonly from alcoholic chronic pancreatitis. Treatment of fistulas commonly requires drainage of the fluid collections and potentially surgical closure of fistulizing pathways.
Immune Reconstitution Syndrome in a Patient with Suspected Rheumatoid Arthritis Masking Late Onset Whipple’s Disease

Jordan C. Ray M.D.; Hilary Steele M.D.; Paul Cho; Jason T. Lewis, M.D.; Archana Roy, MD; Lisa Brumble M.D.

Introduction: Late onset Whipple’s Disease is extremely rare with a reported incidence of approximately 30 cases per year. Whipple’s classic presentation of migratory arthralgias, diarrhea and abdominal pain most commonly affects middle aged males of European descent. Early on Whipple’s disease can go misdiagnosed. Late in the disease patients often present with continued joint and abdominal pain, significant weight loss, profound diarrhea and vitamin deficiencies. On occasion, an Immune reconstitution syndrome can present on initiation of treatment. Its high fevers, joint pain and hypotension can easily be confused with sepsis.

Case Presentation: A 55 year old female presented to an outside institution with dyspnea on exertion and persistent diarrhea. Prior to admission the patient had a past history of migratory arthralgias for approximately 15 years and had been on a myriad of biological and disease modifying agents for suspected Rheumatoid arthritis without relief of her symptoms. Initial evaluation revealed a 40 pound weight loss over 6 months, non ischemic cardiomyopathy and iron deficiency anemia. Celiac sprue was suspected and the patient underwent endoscopy with small bowel biopsies which showed foamy macrophages with Whipple bacillus strains stained with PAS stain. The patient was diagnosed Whipple’s disease and underwent initial treatment with ceftriaxone. Approximately four hours after initial treatment the patient presented with fever, chest pain, diffuse arthralgias, rash and hypotension. Sepsis was suspected and the patient underwent invasive monitoring, broad spectrum antibiotics and the use of vasopressor medications. This syndrome persisted despite continued treatment with intravenous antibiotics. With a concern for sepsis versus a drug reaction the patient was transferred to a local tertiary center for further management. Immune reconstitution reaction was suspected. Multiple biopsies of skin lesions reviled erythema nodosum- like lesions and septal panniculitis with PCR positive for Tropheryma Whipplei. The patient completed a course of 14 days of intravenous antibiotics with a gradual decline in her immune reconstitution syndrome. She was discharged with follow up and a 1 year course of trimethoprim-sulfamethoxazole.

Discussion: Whipple’s disease is a rare condition with vague symptoms which can easily mimic other arthritic conditions. Vitamin deficiencies and their sequela including heart failure can occur as malabsorption is a common late manifestation. In patients who have received previous immunosuppressive therapies the potential for immune reconstitution syndrome increases. Immune reconstitution can present with erythema nodosum and a severe inflammatory syndrome that can mimic septic shock. The treatment of Whipple’s disease is prolonged involving both intravenous and oral antibiotics for a total course of close to one year.
Foix- Alajouanine syndrome: A rare and treatable cause of paraplegia

First Author: Debjit Saha, MD Pooja Pundhir, M.D. Hany Elmahdy, M.D. John Chaloupka, M.D.

Spinal dural arteriovenous fistulas (SDAFs), also known as Foix- Alajouanine syndrome, are a rare and commonly under-diagnosed cause of myelopathy. It usually presents as a myelopathy slowly progressing to paraplegia, commonly found in men in their fifth decade of life.

A 59-year-old male with a past medical history of hypertension, gastrectomy secondary to vitamin B12 deficiency and alcohol dependence, presented to the emergency room with progressive bilateral lower extremity weakness and claudication that started one week prior. This gradually progressed proximally limiting his ability to stand and sit, resulting in multiple falls. He also noticed new lower extremity distal paresthesias in the last day. He also had an episode of spontaneously resolving non-bloody diarrhea two weeks prior while visiting Ecuador. Examination was remarkable for morbid obesity, lower extremity paraparesis, 3/5 muscle strength distally and 2/5 in hip flexors, worse on the left. Bilateral patellar and Achilles reflexes were absent, as well as Babinski’s. There was no evidence of saddle anesthesia and rectal tone was intact. Initial differentials were Guillain-Barre Syndrome, B12-deficiency related neuropathy or spinal canal stenosis. MRI revealed moderate L3/L4 spinal canal stenosis with bilateral foraminal narrowing with suspicion for flow voids in the left thoracic spinal cord vasculature suggestive of possible dural AV fistula (DAVF). A subsequent diagnostic spinal angiogram confirmed a left T11 DAVF. A transarterial embolization of the AV fistula was performed by the neuro-interventional radiologist. The patient recovered remarkably with resolution of weakness and paresthesias the next day.

Our patient presented with progressive myeloradiculopathy, which was diagnosed as SDAF and treated successfully. The initial symptoms of this disease entity usually consist of gait disturbances, numbness, paresthesias and intermittent radicular pain mimicking peripheral nerve lesions. This wide range of symptoms often make the diagnosis delayed resulting in irreversible paraparesis with sensory and sphincter disturbance. SDAF usually consists of an arteriovenous shunt between a branch of a dural artery and a medullary vein resulting in coronal venous plexus hypertension with subsequent decreased cord perfusion and progressive congestive myelopathy. MRI with contrast enhanced angiography (MRA) has 80-90 % sensitivity; it commonly displays a non-specific hyperintense T2 signal. CT myelography can be done alternatively, which may demonstrate the serpentine vessels within the intradural space. These studies can guide the spinal angiogram, which is the gold standard diagnostic test and required for therapeutic intervention. Occlusion of the fistula by surgery or endovascular embolization is helpful in stabilizing or curing the neurological deficits. Our case exemplifies that a high index of suspicion with prompt diagnosis and appropriate management can stop the progression to irreversible neurologic impairments in patients with SDAF.
A new diagnosis of Hemoglobin SC Disease saves a woman’s life

First Author: Wassim Samra, MD

A 52 yo Black woman with a medical history only significant for hypertension presented to the ED due to acute onset right sided pleuritic chest pain associated with shortness of breath. In the ED, CT Angiogram of the chest showed subsegmental pulmonary artery filling defects consistent with PE and no consolidation. Lower extremity dopplers were negative for DVT. Within 48 hours, patient’s dyspnea and chest pain worsened. She developed a fever and her chest xray showed new infiltrates. Her labs on admission showed a hemolytic anemia. Her CT revealed a small, calcified spleen. These findings led to the suspicion of an underlying, undiagnosed hemoglobinopathy. She denied any known history of anemia, sickle cell crisis, or family history of sickle cell diseases. Despite treatment with broad spectrum antibiotics for pneumonia, her respiratory status continued to deteriorate. Her hemoglobin electrophoresis panel came back with a Hgb S of 43.8%, Hgb C of 43.8 % and Hgb F of 12.4%, consistent with Hgb SC disease. At this point the diagnosis of acute chest syndrome was made and she was quickly started on exchange transfusion. She was also continued on treatment with antibiotics, anticoagulation, aggressive hydration, and supplemental oxygen. Within 2 days, her respiratory status improved and she was no longer requiring oxygen.

Discussion: Acute chest syndrome (ACS) is a known complication and a leading cause of death for patients with sickle cell syndromes. However, the incidence of ACS in patients with HbSC is significantly less than that seen in HbSS. In this particular case, the investigation of the unexplained anemia and the calcified spleen led us to the new diagnosis of hemoglobin SC disease. Fortunately, with this knowledge, the diagnosis of ACS was made which led to appropriate treatment of exchange transfusion, preventing further deterioration and death. This case is unique because this patient’s initial presentation of a crisis was acute chest syndrome, rather than the typical presentation of a painful crisis. In retrospect, the pulmonary artery filling defects were realized to be in-situ thrombi of sickled cells rather than emboli. This case illustrates the importance of considering hemoglobinopathy and acute chest syndrome, especially in African American patients, presenting with hemolytic anemia and acute respiratory symptoms, or findings of pulmonary embolism.
A Rare Case of Goblet Cell Carcinoid Tumor Presenting as Small Bowel Obstruction

First Author: Sam Thomas, MD Preceptor: Dr. Lara Zuberi

A 51 year old male presented to our hospital with a three day history of colicky right lower quadrant abdominal pain with nausea and vomiting. Vitals were stable, and physical exam showed diffuse abdominal tenderness with increased severity localized to the right lower quadrant. A CT scan of the abdomen and pelvis revealed multiple dilated and fluid filled loops of small bowel with transition point involving the terminal ileum. It showed circumferential thickening with no definitive mass seen, suggestive of terminal ileitis.

Symptoms did not respond with aggressive non-operative management, therefore the patient was taken to the operating room for exploratory laparotomy. A 5-cm cecal mass diffusely involving the appendix was discovered with extension into the wall of the cecum and ileum. A right hemicolectomy with small bowel resection and lymph node resection was then performed. Immunohistochemical stains of the mass were positive for chromogranin, synaptophysin and CK20 which confirmed the diagnosis of poorly differentiated goblet cell carcinoid tumor.

The tumor penetrated into the surface of the visceral peritoneum and directly invaded the cecum and ileum with lymphovascular invasion. Twenty seven lymph nodes were examined with six being involved. By post-op day three, the patient had return of bowel function and began to tolerate a diet. The patient was followed up and to date the post operative period has been uneventful.

Goblet cell carcinoid or adenocarcinoid is a rare variant of appendiceal carcinoid with mixed endocrine and exocrine features. They often present with symptoms of an inflamed appendix, which makes this case especially rare given the extensive tumor extension which resulted in a small bowel obstruction. They rarely present with serotonin syndrome. Goblet cell carcinoids are treated with right-sided hemicolectomy and lymphadenectomy and in many cases chemotherapy can be utilized. Goblet cell carcinoids have a 10-year survival rate of approximately 60%.
Neurocysticercosis presenting as Chronic Relapsing Aseptic Meningitis

First Author: Prakhar Vijayvargiya Second Author: Larry M. Bush Third Author: Maria T. Perez

Neurocysticercosis with chronic relapsing aseptic meningitis is a rare clinical entity. We present a case of neurocysticercosis that presented in such a relapsing fashion that necessitated craniotomy to eventually make a diagnosis. A 60 year old female with no significant past medical history presented in the late winter months complaining of acute onset of severe headache of two days duration. She described the headache as diffuse, constant and the worst that she has ever had. She mentioned travel to Central and South America in the preceding few years. Rest of history and physical examination was unremarkable.

Laboratory tests were within normal limits. CT scan prior to lumbar puncture was normal. Spinal fluid analysis was suggestive of pleocytosis (78% lymphocytes) with negative cytologic and microbiological studies. MRI of brain was interpreted as normal. Her headache improved on symptomatic treatment and she remained well until 14 months later when she presented with similar symptoms. During this hospitalization, MRI of brain was found to have prominent leptomeningeal enhancement along the sylvian fissure and suprasellar cistern. Spectroscopy did not demonstrate evidence of tumor spectra. Once again her symptoms fully resolved with analgesics and empirical antibiotics. However, she presented for a third time six weeks later with exact same clinical scenario. Follow up MRI was felt to now have worsening of meningeal thickening. She underwent a craniotomy with biopsy of the affected area. Surprisingly, on histologic examination a parasite consistent with Taenia solium was seen. She received a one month treatment of albendazole (400 mg BID) along with a tapering course of dexamethasone and has been clinically well for over a follow up period of 8 months. The cysticerci of pork tapeworm (Taenia solium) may rarely involve the ventricles or subarachnoid space (extraparenchymal neurocysticercosis).

When it involves the meninges, CSF analysis mirrors tuberculosis or fungal meningitis with lymphocytic pleocytosis. Diagnosis relies on astute clinical acumen as, depending on the stage of the infection, imaging may only demonstrate subtle abnormalities. Ring enhancement, edema and calcification may be seen only in advanced cases. Our patient’s presentation was peculiar in that the symptomatic meningitis episodes were separated by long periods of feeling well. Only a few cases have been documented in the literature with chronic relapsing meningitis secondary to neurocysticercosis. High index of clinical suspicion is therefore required to make an diagnosis. This case also emphasizes the need for early tissue diagnosis in instances where the diagnosis is otherwise elusive.
Extramedullary involvement in acute promyelocytic leukemia (APL) is a rare condition. Most reported cases tend to involve the central nervous system or skin and less frequently other sites. Although leukemic and lymphomatous infiltration of the gastrointestinal tract has been well documented, the involvement of the appendix in cases of APL is very limited. We present the case of a patient with myeloid sarcoma (MS) of the appendix as initial presentation of APL.

A 43 year old female patient with no significant past medical history presents to the emergency room complaining of persistent fevers, weakness and fatigue for the past two weeks with mild lower quadrant abdominal pain for the past two days. Vital signs were significant for heart rate of 115 beats/minute and temperature of 101.4 F. On physical examination, patient had pale conjunctiva, no lymphadenopathy could be appreciated, lungs were clear to auscultation and abdomen was soft, non-distended, with mild tenderness in the right lower quadrant without signs of peritoneal irritation. Initial laboratory results were significant for hemoglobin of 6.8 g/dL, 2,000 white blood cells/uL with: 12% segmented, 3% bands, 40% lymphocytes, 4% monocytes, 4% metamyelocytes, 2% promyelocytes, 4% blasts, 20% other cells and platelets of 3,000. Fibrin degradation products >20 mcg/ml and D-Dimer >35.2 mg/L FEU. CT of the abdomen showed a thickened and hyperemic appendix without perforation or abscess, compatible with acute appendicitis. Initial treatment consisted of transfusion of packed red blood cells, platelets and initiation of broad-spectrum antibiotics. Once the patient was stabilized, she underwent bone marrow biopsy and laparoscopic appendectomy, without complications. Subsequent bone marrow biopsy revealed t(15:17) and (q22:12) mutations and reverse transcriptase-polymerase chain reaction (RT-PCR) for PML-RARA demonstrated a long form fusion transcript consistent with the diagnosis of APL. Appendix pathology relieved infiltration by leukemic blasts that co-expressed myeloperoxidase and CD68, consistent with myeloid sarcoma of the appendix. The patient completed a course of ATRA, daunorubicin and cytarabine. Repeat bone marrow biopsy demonstrated complete remission and the patient was subsequently discharged home.

The association of acute appendicitis in the setting of acute leukemia has been previously described however documented cases of appendiceal involvement in APL are not common. To our knowledge this is the first documented case of a patient with MS of the appendix mimicking acute appendicitis as the first presentation of APL that underwent chemotherapy and was discharged with remission of the disease. Leukemic infiltrate may have caused the inflammation of the appendix ultimately leading to the presentation of acute appendicitis. MS can arise concurrently with, follow, or precede the diagnosis of intramedullary acute myelogenous leukemia.
Intestinal Angioedema in the Setting of Angiotensin Receptor Blocker Use

First Author: Mohamad Zetir, MD Mary S. Hedges, M.D.

Intestinal angioedema is a rare cause of abdominal pain in patients, and the diagnosis is often missed. The condition can be either hereditary or caused by the use of angiotensin converting enzyme inhibitors (ACE-I) and even less commonly, angiotensin receptor blockers (ARB). Patient is a pleasant 27 year-old woman with a past medical history of hypertension who was admitted to our hospital due to abdominal pain.

The patient described the pain as an abrupt stabbing-like sensation in her mid-abdomen, which spread diffusely. This was followed by an episode of profuse non-bloody diarrhea. Other associated symptoms included nausea and an episode of non-bloody vomiting. Patient denied fevers, chills, or family history of inflammatory bowel disease. Patient experienced similar symptoms in the past when she was placed on an Angiotensin receptor blocker due to hypertension. Patient was initially placed on an ACE-I which was discontinued due to cough. Prior to her admission at our hospital, patient presented to an outside hospital due to similar symptoms and was discharged on a short course of Flagyl/Cefdinir with no improvement in symptoms. Patient was later re-admitted to the outside hospital, and CT of the abdomen and pelvis showed dilated bowel loops and edematous bowel walls. Patient underwent an EGD as well as a colonoscopy with biopsies, which was reportedly negative for inflammatory bowel disease. Patient was ultimately discharged home with the diagnosis of infectious enteritis and received a 7-day course of meropenem through a PICC. Patient was admitted to our institution due to recurrence of symptoms. During the admission, an extensive chart review of outside records, as well as an extensive medication review was performed. The ARB was discontinued with a presumed diagnosis of Intestinal angioedema and patient reported improvement in symptoms.

A follow up two months after discharge confirms cessation of symptoms. Intestinal angioedema can present as abdominal pain, with associated nausea, vomiting and diarrhea. Abdominal CT or ultrasound can be used to detect abdominal wall edema. Intestinal angioedema is seen in patients on ACE-I and in patients with C1 inhibitor deficiency. It is a rare diagnosis that is often misdiagnosed as other abdominal etiologies such as gastroenteritis. Angiotensin receptor blockers rarely cause angioedema, with intestinal angioedema being even rarer. It is vital to make this diagnosis early to avoid unnecessary testing and treatments.
Hemolytic Uremic Syndrome, a rare manifestation of Clostridium Difficile colitis

First Author: Daisy Azana, MD Zina Abbas, MD Riyadh Al-Rubaye, MD Nomi Traub, MD

Hemolytic Uremic Syndrome (HUS), characterized by a triad of hemolytic anemia, thrombocytopenia, and acute renal failure, usually occurs in children, often following a diarrheal illness. We report a case of HUS in an adult, associated with colitis due to *Clostridium difficile*.

A 32 year old Hispanic female with a history of IV drug use presented with a 3 day history of fever, bloody diarrhea and abdominal pain. She denied recent antibiotic use, sick contacts, or travel. She appeared acutely ill with a temperature of 36.2°C, heart rate of 110-142, and blood pressure of 94/70 mm Hg. Her abdomen was distended with moderate diffuse tenderness.

Initial laboratory data showed a hematocrit of 41.2%, WBC of 16 x 10^3/µL, platelet count of 314 x 10^9/L, creatinine of 0.9 mg/dL, and PT /PTT within normal limits. CT scan of the abdomen and pelvis revealed severe colitis from the cecum to the descending colon. Empiric antibiotic therapy (IV ciprofloxacin and metronidazole) was initiated for treatment of infectious colitis. Stool from the first day of admission was positive for *Clostridium difficile* toxin by enzyme immunoassay; cultures for E coli O157:H7, Salmonella and Shigella were negative. Oral vancomycin and metronidazole were substituted for the antibiotic regimen.

During hospitalization, the patient developed microangiopathic hemolytic anemia, thrombocytopenia, and renal failure. Laboratory findings included a hematocrit level of 17.2%, with a reticulocyte count of 4%, a platelet nadir of 31 x 10^9/L, and lactate dehydrogenase (LDH) of 1414 U/L. Peripheral blood smear revealed schistocytes. The patient's creatinine peaked at 5.5 mg/dL. A renal biopsy displaying thrombotic microangiopathy supported our presumptive diagnosis of HUS associated with *Clostridium difficile* colitis.

The patient underwent plasmapheresis, hemodialysis, and continued on oral vancomycin and metronidazole for a total of 21 days. The patient received 13 plasmapheresis sessions, followed by 2 doses of rituximab due to slow improvement of thrombocytopenia. At discharge, the patient's creatinine level was 1.7 mg/dL, platelet count was 147 x 10^9/L, hematocrit was 25.2%, and LDH was 241 U/L. Three prior adult cases of HUS associated with *Clostridium difficile* colitis have been reported. All were women who survived without renal or neurologic deficits. Adult cases seem to have a better prognosis compared to pediatric cases. The pathogenesis of HUS associated with *Clostridium difficile* colitis is unclear. Animal experiments have demonstrated that *Clostridium difficile* toxin A induces endothelial cell dysfunction in mesenteric venules, potentially leading to a disruption in the mucosa. Through this type of breach, *Clostridium difficile* toxins may directly damage renal microvasculature. This association needs further investigation.

This case demonstrates a rare association between *Clostridium difficile* colitis and HUS in the adult population. With the rising incidence of *Clostridium difficile* colitis, physicians may encounter unusual manifestations of this common illness.
Gordonia: Master of Disguise, Cause of Infections

First Author: Mohammed Hasan Khan, MD Abhishek Garg MD Tarun Kukkadapu MD Amudhan Jyothidasan MD

Gordonia spp are gram positive coryneform bacilli which are difficult to identify and rarely implicated in infections in both immunocompetent and immunocompromised humans. They were previously classified as Rhodococcus spp and continue to be misunderstood as such. They have been identified as causative agents of catheter related blood stream infections [CRBSI], brain abscess, endocarditis and cutaneous infections. We present a case of pacemaker pocket infection caused by Gordonia bronchialis one of five gordonia species implicated in human infections.

An 81 year old female presented with syncope found to be due to sick sinus syndrome and a permanent pacemaker was implanted uneventfully. Five weeks after implantation she started developing fevers and pain and erythema at the surgical site following which she returned to the hospital, cultures were drawn and she was started empirically on levofloxacin. The organism was a gram positive coryneform bacillus initially identified as rhodococcus but cultures later grew Gordonia bronchialis susceptible to fluoroquinolones, cephalosporins, sulfa based antibiotics and doxycycline. The device was removed and she was treated with Bactrim to complete the course followed by re-implantation of the device and was discharged home on doxycycline for ten more days.

Five gordonia spp implicated in infections are Gordonia terrae, Gordonia bronchialis, Gordonia polysoprenivorans, Gordonia sputi and Gordonia otitidis. These organisms have been implicated in CRBSI, endocarditis, brain abscess and cutaneous infections. Like all gram positive bacilli they are difficult to identify and the use of HPLC is required to determine the genus level and separate Gordonia from the related genera Dietzia, Corynebacterium, Rhodococcus and Tsukamurella. This is important for appropriate identification of the organism and institution of appropriate antibiotics. Our case highlights the importance of considering performing PCR-RFLP and HPLC to identify gordonia spp. in cases of infection with gram positive bacilli to avoid confusion with morphologically similar organisms. This also has practical implications as gordonia has been known to cause endocarditis which could alter management with appropriate identification.
Hemoptysis in a Triathlete: A Case of Swimming Induced Pulmonary Edema

CPT David Schmitt, DO (Associate); MAJ Samuel Burkett, MD (Member); COL Michael Quinn, MD (FACP), D.D. Eisenhower Army Medical Center

Introduction: Acute pulmonary edema, not associated with aspiration or a closed glottis, has been described in swimmers and divers and has been termed Swimming Induced Pulmonary Edema (SIPE). The exact pathophysiology of SIPE remains uncertain. This case illustrates a presentation of SIPE in a healthy, male triathlete.

Case Presentation: A healthy, 57 year-old, active duty male developed acute dyspnea, productive cough, and hemoptysis within minutes of starting the swimming portion of a triathlon in late September. The patient reported taking aspirin 325mg daily and a white willow bark supplement containing Salicin. In the Emergency Department, the patient’s symptoms had improved significantly. His physical examination revealed bilateral rales and a normal cardiac examination. A chest radiograph demonstrated increased central vascularity and a computed tomography pulmonary angiography revealed scattered ground-glass opacities in an upper lung field distribution. Bronchoscopy revealed alveolar hemorrhage, the presence of venous lakes, and bronchoalveolar lavage fluid was negative for infection or malignancy. The patient’s symptoms resolved over the initial 24 hours.

Discussion: Swimming-induced pulmonary edema (SIPE) is a syndrome whose pathophysiologic characteristics have not been fully elucidated. Cold water immersion, coupled with an elevated cardiac output, may expose regions of the capillary bed to high pressures that favor the extravasation of fluid by hydrostatic forces and potential stress failure of the capillaries. Confounding factors in this patient’s case were the use of antiplatelet medications and the presence of venous lakes on bronchoscopy. Patients with SIPE present with dyspnea, cough, hypoxemia, and occasionally hemoptysis. Physical examination and chest radiographs usually reveal evidence of pulmonary edema. Treatment is symptomatic and conservative. Improvement and resolution of symptoms are usually rapid, with radiographic normalization in 24 to 48 hours.
GEORGIA POSTER FINALIST - CLINICAL VIGNETTE Kelly D Schrapp, MD

A rare case of Moya Moya disease in an African American male

First Author: Kelly D Schrapp, MD

Introduction: Moyamoya is a chronic progressive cerebrovascular disease characterized by bilateral stenosis of the arteries around the Circle of Willis with prominent arterial collateral circulation. We describe a case of young male who presented with isolated right hand weakness which was diagnosed with Moyamoya disease. The purpose of this case report is to draw attention to this disease, not as familiar in Internal Medicine as in neurology.

Case Presentation: 40-year-old African American male with history of hypertension presented with acute numbness and weakness of right hand of one day duration. He spontaneously regained some mobility initially but same symptoms returned the next day associated with severe headache and photophobia. Social and Family history were not significant. Patient’s blood pressure was 172/110 mmHg on admission. Physical examination was essentially benign except for decreased sensation and strength of 1/5 in right hand. Right forearm and arm had normal strength and sensation. Rest of neuro exam was normal. CBC, CMP, TSH, B12 were normal. ANA panel, ACE level, Sjogren AB, HIV, UDS, RF, ESR, lyme disease AB, SPEP, SSA, SSB, RPR, P-ANCA, C-ANCA were all negative. CT head was negative. CSF analysis including west nile were negative. MRI brain was done at this time which showed several foci of restricted diffusion, encephalomalacia, gliosis were found in left posterior and anterior frontal lobes compatible with acute to early subacute infarction. Angiography done showed attenuated and irregular anterior greater than posterior circulation. No flow was found in either anterior cerebral artery. Cervical, petrous, cavernous internal carotid arteries were patent but diminutive on the right. Supraclinoid internal carotid arteries were narrowed thread-like, right more than left. Distal MCA branches were narrow thread like with extensive collateral circulation. Vertebral arteries were patent, with minimal irregularity in the distal right. The basilar artery demonstrated mild narrowing irregularity in its mid and distal segments. The superior cerebellar and posterior cerebral arteries were patent. A cerebral angiogram was done which confirmed Moya Moya disease.

Discussion: Moyamoya disease is a progressive occlusion of cerebral arteries, particularly involving the Circle of Willis and the arteries feeding it. The network of vascular collaterals developing bordering stenotic vessels gives rise to the emergence of a “puff of smoke” (Moyamoya in Japanese) on angiography. The stenoses are typically bilateral. However, unilateral involvement does not exclude the disease. It was first described in Japan and mostly found in Japan and other Asian countries. It has been found less frequently in Europe and North America. The occlusive lesions in the Circle of Willis rarely progress in adult patients. Only 8 cases have been reported to display the progression of occlusive lesions in adult patients with Moyamoya disease.
The Association Between Atrial Fibrillation and Sleep Apnea

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In patients with newly diagnosed atrial fibrillation (AF), physicians should investigate the possibility of underlying sleep apnea, which predisposes to cardiac arrhythmias, including atrial fibrillation. Treatment of underlying sleep apnea tends to prolong the period of normal sinus rhythm (NSR) following electrocardioversion or catheter ablation. Conversely, following catheter ablation for AF, the existence of underlying sleep apnea confers a 25% greater risk of AF recurrence. Though an association between AF and sleep apnea appears to exist, causality remains uncertain, and the mechanism unclear.

A 61-year-old academic internist was making Saturday rounds with residents, when he experienced palpitations. In the emergency department, he was found to be in AF with a ventricular rate of 140 beats per minute. After receiving diltiazem, his systolic blood pressure dropped into the 70s, with heart rate in the 30s. He was admitted for observation. Although his rate normalized with metoprolol, his rhythm remained AF. Thyroid hormone, metabolic panel, blood count, cardiac enzymes, chest radiograph, and echocardiogram were normal. He had no prior history of hypertension, AF, or other cardiac arrhythmias. Except for patent foramen ovale (PFO), his past history was negative for heart conditions. He had no contributory family medical history, did not smoke or drink, was not known to snore, and denied significant daytime sleepiness. His body mass index (BMI) was normal at 23.7. His shirt neck size was 16.5 inches. Following a 3-week course of apixaban, he underwent successful electrocardioversion. Unfortunately, he remained in sinus rhythm for only 3 days, and afterward required metoprolol and digoxin for rate control. Though suggestive symptoms were lacking, the patient’s cardiologist proposed the possibility of concomitant sleep-disordered breathing, and the patient reluctantly underwent overnight polysomnography. The 7-hour study documented 65 obstructive apneas, 49 central apneas, 36 mixed apneas, and 14 hypopneas, for an apnea-hypopnea index (AHI) of 23, denoting “moderate” sleep apnea. Subsequent overnight polysomnography documented the efficacy of Adaptive Servo Ventilation (ASV) in overcoming the mixed and central components of the patient’s sleep-disordered breathing, and the patient began nightly therapy. Shortly thereafter, the patient substituted dronedarone for digoxin and metoprolol. A second elective electrocardioversion successfully restored NSR. Approximately 8 months after his second electrocardioversion, the patient remains in NSR, without occupational or lifestyle limitations.

Sleep apnea causes hypoxemia, inflammation, sympathetic hyperactivity, and hypertension, and, along with other factors, can lead to left atrial enlargement and eventual AF. Treatment of sleep apnea with continuous positive airway pressure (CPAP) has beneficial effects on those factors. Therefore, the diagnosis of sleep apnea (especially central sleep apnea) should always be considered – and appropriate treatment attempted – in the management of AF.

Cerebral venous air embolism is a rare, yet potentially fatal condition. We present a case of retrograde cerebral venous air emboli arising from hepatic portal venous gas secondary to mesenteric infarction.

A 69-year-old male with history of gastric amyloidosis, presented to the hospital with two days of fever and lethargy. Upon arrival, he was found to be critically ill requiring emergent intubation and subsequent transfer to the intensive care unit. Patient's abdomen was rigid and absent bowel sounds were noted on physical examination. Despite aggressive fluid resuscitation, he required initiation of norepinephrine. Empiric antibiotic coverage with piperacillin-tazobactam and vancomycin were chosen for presumed septic shock. Pertinent laboratory tests revealed a WBC count of 24.5 with 28% bands, elevated creatinine 0.9 (baseline 0.3), arterial pH 6.94, HCO3 11.8 and lactic acid level 10.8. CT scan of the brain detected multiple foci of air in the right frontal, fronto-parietal, and left lateral frontal sulci consistent with cerebral venous air emboli. Further imaging including CT scan of the abdomen and pelvis revealed moderate thickening and dilatation of the small bowel with diffuse scattered intestinal pneumatosis suggestive of mesenteric infarction with resultant extensive intrahepatic portal venous gas. The patient was deemed a poor candidate for surgical intervention and died as a result of septic shock. We believe the cerebral venous air emboli was a result of retrograde flow of air arising from the hepatic venous gas ascending via the inferior and superior vena cava to the cerebral venous system.

Paradoxical air embolism to the brain is less likely mechanism in this case due to the absence of air in the cerebral arterial system. To our knowledge, there have been no reported cases of retrograde cerebral venous air embolism arising from hepatic portal venous gas. The clinical significance and prognosis in this setting requires further investigation.
A Case of Black Esophagus After PEA Arrest

Adjoa Anyane-Yeboa

Introduction: Esophageal necrosis or “black esophagus” is an extremely rare disorder of the esophagus with only few cases described in the medical literature (1, 7). The pathogenesis of the disorder is unknown; however, several investigators have postulated that an ischemic insult leading to esophageal hypoperfusion may be a contributing factor (1, 3, 4). Patients often present with symptoms of acute upper GI bleeding, with diagnostic endoscopy showing circumferential esophageal necrosis terminating at the GE junction (1, 4). Here we present a case of esophageal necrosis in a patient after cardiac arrest.

Case: The patient is a 50-year-old man who presented with melena. Two weeks prior, the patient had cadaveric renal transplant for end stage renal disease. Post-operative course was complicated by cardiac arrest with pulseless electrical activity. The patient underwent 5 minutes of cardiopulmonary resuscitation with return of spontaneous circulation. He was started on a cooling protocol, antibiotics and vasopressors. He later developed large volume melena with hemoglobin drop from 8 to 6 grams. Subsequent upper GI endoscopy was significant for black discoloration and sloughing mucosa from the mid-esophagus to the GE junction. The cardia, body and incisura of the stomach were normal. Endoscopic findings were consistent with esophageal necrosis. Repeat endoscopy two months later showed resolution of necrosis.

Discussion: Black esophagus is an extremely rare disorder of the esophagus. Risk factors for the development of black esophagus include male sex and age older than 65 (5). It has been theorized that the higher frequency of black esophagus in men is because men have a higher percentage of atherosclerotic vascular disease and other comorbid illnesses that put them at increased risk for development of ischemia (6, 8). Other risk factors include renal failure, malnutrition, hyperglycemia, sepsis, malignancy, comorbid cardiovascular disease, and hypercoagulability (5).

Definitive diagnosis of black esophagus is made via upper endoscopy (1, 4). An endoscopic finding of circumferentially black, necrotic esophageal mucosa with predominant involvement in the distal one-third is diagnostic (1, 4). With typical endoscopic findings, the diagnosis of black esophagus can be made once ingestion of corrosive agents has been ruled out (1). Treatment is mainly supportive. Black esophagus typically resolves with resolution of the underlying problem. Intravenous acid suppression, most frequently with proton pump inhibitors, and TPN are also common modalities used (3,4). Several studies report a high mortality rate in patients with black esophagus however death is rarely associated with esophageal necrosis itself but rather from other underlying illnesses (1, 4, 7).

The etiology of esophageal necrosis in our patient was likely secondary to ischemia due to cardiac arrest. Treatment of the underlying problem resolves the disorder, therefore once hemodynamic stability was maintained our patient improved and repeat endoscopy showed spontaneous resolution of disease.
An Unusual Case of Liver Abscess:

Anushka Baruah MD, Nyal Siddiqui DO

Case Report: A 37 year old African American gentleman with past medical history of recently diagnosed right hepatic lobe abscess status-post pigtail catheter drainage and antibiotic therapy at an outside hospital, presented with complaint of right upper quadrant abdominal pain and pus drainage at catheter site. A CT scan of the abdomen demonstrated presence of a large multiloculated hepatic abscess measuring 6.7 X 5.2 cms and an overlying right oblique intra-muscular abscess measuring 1.3 X 4.0 cms. He denied fevers, chills, vomiting, yellowish discoloration of skin, rash and weight loss. Laboratory tests were consistent with anemia of chronic disease, low total proteins and albumin levels but negative for abnormal liver enzymes and leucocytosis. He underwent abscess drainage with pigtail catheter placement. Pus was sent for bacterial, fungal, acid fast bacilli, gram stain, PPD, echinococcus, entameba serology and blood cultures were drawn as well. Meanwhile, we treated him with levofloxacin, ceftriaxone and metronidazole. A CT scan repeated a week after initiation of antibiotics, revealed worsening of the existing hepatic abscess, new smaller abscesses in the left lobe, and formation of pulmonary nodules. During this time, fungal cultures started growing broad based budding yeast. A diagnosis of blastomycosis liver abscess was made and the patient was put on amphotericin and levofloxacin, followed by step-down therapy with itraconazole.

Discussion: Blastomycosis is a systemic pyogranulomatous fungal infection, which is endemic to regions around the Great Lakes, Lawrence, Mississippi and Ohio river basins. Historically, it was known as Gilchrist’s disease, named after the man from Baltimore who discovered the fungus in 1894. This condition more commonly affects males than females and children due to the nature of physical activity they are involved in. Infection spreads through inhalation of infectious aerosolized conidia present in wet soil or organic matter. While the most common locations of infection in descending order include lung, skin and bone, blastomycosis is known to involve the reticuloendothelial system manifesting as liver abscesses and splenic lesions in rare instances. Involvement of tissue other than lungs constitutes disseminated disease. Histologically, the primary immune response to infection is seen as a mixed inflammatory picture with polymorphonuclear cell predominance and resultant granuloma and microabsscess formation. Immunocompromised patients may not mount such an inflammatory response to infection, so granulomatous lesions will characteristically be absent. Diagnosis is based on fungal cultures and chemiluminescent DNA probe test. While azoles form the first line of therapy in most cases, presence of immunocompromise, resistant infections and widespread dissemination warrant the use of stronger antifungals like amphotericin B. It is pertinent to treat all patients with blastomycosis given the long term implications of inadequate or lack of appropriate and timely management.
Neurosyphilis presenting as bipolar disorder in a young woman

First Author: Christopher W Bogan, MD Second Author: Alexandra Van Meter, MD

Introduction: Here we describe a case of neurosyphilis presenting as bipolar disorder, which is rare in the antibiotic era.

Case description: A 36 year old female with no psychiatric or medical history presented to another hospital with a 10 day history of erratic behavior, paranoid and erotomanic delusions, and hazardous driving resulting in 2 motor vehicle accidents. She denied history of HIV, syphilis, or other sexually transmitted diseases. She had no history of receiving treatment for syphilis. Initial evaluation demonstrated an extremely labile and elated mood with pressured speech, delusional thought pattern, and poor insight with impaired judgment. Medical workup was negative for organic etiology. Brain MRI and EEG were both negative for acute processes. She was diagnosed with bipolar disorder and started on lithium and olanzapine. Despite treatment, she continued to have mood lability and delusional thinking. Her course was complicated by fever, tachycardia, physical exam findings consistent with meningitis, and peripheral leukocytosis. A lumbar puncture (LP) was performed and showed WBC 23, 97% lymphocytes, glucose 90, and protein 44. She was transferred to our hospital for further management.

On presentation, Acyclovir was started for possible viral meningitis, but CSF gram stain, HSV, and NMDA antibody were negative and it was discontinued. With LP demonstrating a lymphocytic pleocytosis, there was concern for neurosyphilis. Testing demonstrated a positive RPR at 1:128 and a positive serum FTA-ABS. CSF VDRL was negative. She received 2 weeks of IV penicillin for neurosyphilis, and all psychiatric medications were discontinued. At follow up visits, she was noted to have significantly improved cognitive abilities and emotional functioning while being off psychiatric medications. Most recently, she had an RPR titer of 1:32, indicating successful treatment of her disease.

Discussion: This case illustrates an unusual presentation of neurosyphilis as a psychiatric disorder. Although the CSF-VDRL was negative in this case, neurosyphilis was considered to be the most likely diagnosis based on the high RPR titer, positive FTA-ABS, and dramatic response to treatment. Furthermore, CSF-VDRL may be falsely negative in up to 70% of patients with neurosyphilis.

Neurosyphilis and its psychiatric complications are rarely encountered in the present day. Since the antibiotic era, the presentation is variable and includes neuropsychiatric symptoms, stroke, ophthalmic symptoms, seizures, and spinal cord disease. In 1992, Roberts and Emsley presented 21 cases of neurosyphilis, with personality changes and memory impairment being the most common presenting symptoms. Saik et al. suggested that routine screening for syphilis should be considered for all psychiatric patients.

This case further exemplifies the importance of considering neurosyphilis in patients presenting with psychiatric disorders.
To Drop or Not to Drop: Managing Severe Hypernatremia in the Setting of Hyperosmolar Hyperglycemic State.

First Author: Camilo Cano Portillo, MD Venkat Rajasurya, MD Deepthi Gudivada

Hyperosmolar hyperglycemic state (HHS) is a life-threatening emergency manifested by marked elevation of blood glucose, hyperosmolarity, and little or no ketosis. HHS is frequently associated with hyponatremia. Management of severe hypernatremia in the setting of HHS can be challenging. There is evidence that rapid normalization of serum sodium concentration can lead to cerebral edema. We would like to present a case of a patient with HHS who also had severe hypernatremia. In such situations, stepping outside established protocols may be necessary to achieve the desired outcome.

A 49 year old previously healthy woman came to the emergency department presenting with one week of fatigue, dysuria, polyuria and diarrhea. On examination she appeared dehydrated and disoriented. Her laboratory results were significant for 18000 white blood cells per mm³, serum glucose of 800 mg/dl, corrected serum sodium of 177 meq/l, and serum osmolality of 405 mOsm/Kg. CT abdomen revealed pyelonephritis, emphysematous cystitis, and mild sigmoid colitis. The patient was admitted to the ICU and started on an insulin drip at 4 units/hour and on antibiotics. Her calculated free water deficit was 8 liters. Our goal was to slowly modify the serum osmolality by careful correction of the serum glucose and sodium. We did not want the rate of correction of the serum sodium to surpass 0.5 meq per hour. However, after initial resuscitation with half normal saline, we were unable to reach the target rate of correction due to the patient’s diarrhea. In consequence, we gave free water through a nasogastric tube and unconventionally changed her intravenous fluids to dextrose 5%. This allowed us to keep up with her free water losses. Once we had achieved the target sodium correction rate, we started dextrose 5% with half normal saline and continued correcting her metabolic status. By day 3, the patient’s serum osmolality had gradually reduced to 330 mOsm/L at the cost of maintaining her serum glucose between 250 and 300 mg/dL and slowly reducing the serum sodium to 150 meq/L. Her mental status became normal and there were no complications associated with our fluid management.

Rapid correction of the serum sodium or serum osmolality in HHS can lead to cerebral edema due to fluid shifts. Fluid and electrolyte management in HHS can be further complicated by additional comorbidities. It is necessary to alter the usual composition and administration rates of fluids depending on the feedback obtained from frequent monitoring of the serum osmolality and corrected sodium. Slow correction of the metabolic abnormalities is necessary to prevent adverse consequences.
Thyroid Hormone Resistance: A Case Report

Samaneh Dowlatshahi, MD, SeyedAmirHossein AfsharImani, MD

Objective: Resistance to thyroid hormone is a rare condition caused by tissue refractoriness to the effects of circulating thyroid hormone, and may be misdiagnosed as hyperthyroidism. This syndrome is characterized by elevated circulating thyroid hormones, and unsuppressed TSH levels. Although most patients are euthyroid, rarely they may present with clinical hyperthyroidism, if the pituitary gland is more insensitive than other tissues to thyroid hormones. In this study we present a case of thyroid hormone resistance with clinical evidence of hyperthyroidism.

Methods: We present a case of 58 year old male who suffered from thyrotoxicosis for many years.

Case Presentation: A 58 year old male who suffered from thyrotoxicosis and diarrhea for many years and had been under treatment for atrial fibrillation with rate control medications. He had been tested for thyroid function in the past which revealed elevated fT3 and fT4 with slightly elevated TSH concentration. Pituitary adenoma was excluded as magnetic resonance imaging showed normal pituitary gland, alpha subunit was within normal range and TSH concentration increased after TRH administration. Sonography revealed normoechogenic, slightly enlarged thyroid gland. Methimazole had been tried in the past without any significant improvement. The diagnosis of thyroid hormone resistance was made and he was started on bromocriptine at a dose of 10 mg per day. After 2 months of treatment he achieved a state of constant euthyrosis and following next few months thyroid volume diminished.

Discussion: Failure to differentiate thyroid hormone resistance from primary thyrotoxicosis has resulted in the inappropriate treatment of nearly one-third of patients. Also, the diagnosis allows appropriate genetic counselling, and initiation of treatment.

Conclusion: In this case report we emphasize the importance of timely diagnosis of thyroid hormone resistance, which prevents many patients from being wrongly diagnosed as Graves disease and therefore various inappropriate treatments. Also, we present a successful treatment of this rare condition with bromocriptene
Successful Treatment of an Acute Hypertriglyceridemia-Induced Pancreatitis Using Insulin and Heparin Infusion

First Author: Samaneh Dowlatshahi, MD

Objective: Hypertriglyceridemia over 1,000 mg/dl can provoke acute pancreatitis and its persistence can worsen the clinical outcome. There are no clinical guidelines to severe hypertriglyceridemia, but therapy with insulin, heparin, a combination of both, plasmapheresis, or octreotide have been tested successfully.

Methods: We report a case of a 43-year-old female with clinical acute pancreatitis along with incidental finding of an severe hypertriglyceridemia, who had a good outcome after treatment with insulin, and heparin intravenous infusion.

Case Presentation: A 43-year-old female with previous history of acute pancreatitis, was admitted to Intensive Care Unit (ICU) because of severe abdominal pain, anorexia, vomiting, and hyperventilation. She was diagnosed with acute pancreatitis. Her laboratory tests revealed: Amylase: 1740 (25-125 IU/L), Lipase: 536 (0.0-6 IU/L), Anion Gap: 10 (10-20 mmol/l), Glucose: 110 mg/dl, normal liver function panel, HbA1c: 5.2% (<5.7). Ultrasound showed evidence of pancrease edema consistent with acute pancreatitis, there was no evidence of cholelithiasis, common bile duct dilatation, or cholecystitis. Patient was diagnosed with acute pancreatitis. Treatment was initiated with fasting, gastric decompression by nasogastric tube, normal saline infusion with rate of 125 cc/h, and analgesia with morphine. Her fasting lipid profile the next day revealed: Triglyceride: 18000 mg/dl, and total cholesterol: 970 mg/dl. Patient was started on insulin and heparin drip, and dextrose 5% infusion. Triglyceride levels decreased progressively so insulin infusion remained at 0.5 to 1iu/kg/h. At 48 hours, TGC levels dropped to 6174,and decreased to 476 at 96 hours during her stay in ICU, there were no neurological disorders, respiratory or kidney problems, and she did not experience abdominal pain after discontinuation of analgesia within 24 hours after admission. There were no bleeding and no clinical or laboratory signs of infection.. She was discharged from the ICU after 72 hours, following clinical stabilization, and remained stable on floor where she remained hospitalized for 1 week. She was discharged with prescription of gemfibrozil 600 mg twice daily.

Discussion: In this case report, the triglyceride levels of 18000 was succesfully treated with combination of insulin and heparin drip. Both activate the lipoprotein lipase enzyme (LPL) bound to endothelium. In addition, heparin mobilizes and releases the enzyme of the endothelium to plasma. Insulin promotes the synthesis of LPL and stimulates the uptake of fatty acids released from triglyceride hydrolysis by LPL itself.
Colistin Induced Hypercapnic Respiratory Failure: Old Drug, Toxicity Revisited

Amrutha Mary George Jacob, Patricia Macias, Amith George Jacob

INTRODUCTION: Increase in multidrug resistant gram negative bacilli has led to the re-emergence of colistin use in sepsis. Colistin neurotoxicity can prolong ventilator dependance by causing respiratory failure. We report a novel case of colistin toxicity presenting as hypercapnic respiratory failure

CASE PRESENTATION: A 75 year old on dialysis presented with abdominal pain and intermittent fevers for 3 days. On examination she was febrile, tachycardic, tachypneic and hypotensive with right upper quadrant abdominal tenderness. Laboratory investigations revealed leukocytosis with bandemia. She was started on crystalloids, pressors, vancomycin, piperacillin-tazobactam. Further workup revealed cholangitis for which she underwent endoscopic drainage. On day 2 of admission blood cultures were positive for Klebsiella Pneumoniae resistant to carbapenemase for which colistin therapy was started. On day 4 she developed sudden hypercapnic respiratory failure requiring intubation. A-a gradient was normal on ABG raising concern for neuromuscular disorder or hypoventilation. No obvious cause for respiratory deterioration was identified. A diaphragmatic EMG revealed low action potential with normal conduction velocities. Given duration and timing of clinical deterioration critical care myopathy was unlikely. Colistin induced neurotoxicity was suspected and she was switched to gentamicin. She improved in 48 hours and was successfully extubated. Rest of her hospitalization was uneventful

DISCUSSION: Respiratory failure from colistin associated toxicity is seldom reported. Neurotoxicity incidence from the largest study till date is 7.3%1. Colistin acts via disruption of cholesterol cell membranes making highly lipid rich neurons more vulnerable to toxicity. Proposed mechanism of colistin neurotoxicity involves blockade of presynaptic acetylcholine release, usually exacerbated by renal disease, hypocalcemia or use of other neurotoxic drugs. Respiratory muscle paralysis is more common when administered to critically ill patients with multiple comorbidities and can occur with both parenteral or inhaled2 forms. Cases usually present with respiratory muscle fatigue that progresses to apnea and is more common in patients with renal disease3 given the fact that colistin is renally cleared

CONCLUSIONS: In our patient the time-frame of events and recovery following discontinuation of colistin were not suggestive of critical care myopathy. Though most common side effects are nausea and nephrotoxicity physicians need to be aware of possible neurotoxicity especially given its frequent use in the multi-drug resistant microbial era

ILLINOIS POSTER FINALIST - CLINICAL VIGNETTE Baqer Haider, MBBS

An outlier of inflammatory arthropathy in Coxsackie B infection.

First Author: Baqer Haider, Second Author: Aaron Maki

Introduction: Coxsackie B infections have been known to present with varied clinical manifestations including myopericarditis, meningoencephalitis and polymyositis, however arthropathy has not been widely recognized with only 11 cases reported.

Case: An 18-year-old African American male presented to the hospital with complaints of fever, vomiting, weakness in his upper and lower extremities, unsteady gait and joint pain. A few days prior to the onset of symptoms he had a diarrheal illness. He denies any recent history of travel, sick contacts, animal bites, scratches or insect bites. Physical examination revealed scattered non-confluent macules less than 1cm on upper chest and arms bilaterally. Bilateral tenderness and swelling was present in shoulder, knee and ankle joints. Motor strength was noted to be 2/5 in the upper and lower extremities. Investigations revealed pancytopenia, creatinine kinase of 22,000 U/L, transaminitis and impaired renal function secondary to rhabdomyolysis. Myositis specific antibodies were negative along with connective tissue disease panel. Bacteriological studies yielded negative results and viral studies showed, apart from a past parvovirus B19 infection, positive Coxsackie B4 titers at 1:16 and B6 titers at 1:8. Initially there was suspicion of hemophagocytic syndrome and possibly dermatomyositis; however, patient’s rash was not typical and scant factors in support. An echocardiogram demonstrated a low normal ejection fraction of 45-50% with mild global hypokinesis. He was given aggressive intravenous hydration which resulted in shortness of breath; with diuresis his respiratory symptoms improved. Intravenous infusion of methylprednisolone 125mg every eight hours was begun and within a 24 hour period his muscle enzymes trended downwards and his inflammatory myopathy and arthropathy gradually improved. He was discharged 3 days later in stable condition on oral prednisone 80mg daily. He was seen one week later as an outpatient with complete resolution of symptoms and prednisone was tapered. Four weeks later Coxsackie B titers were rechecked and found to be negative at B4 < 1:8 and B6 <1:8.

Discussion: This case represents features strikingly outside the realm of a usual Coxsackie B infection and therefore of great importance to a wide range of physicians. Coxsackie B viruses are both highly resistant to chemical treatment and highly contagious primarily through the fecal-oral route, so a high index of suspicion for unusual presentations of this infection may aid in the timely diagnosis and treatment of this potentially fatal disease.
ILLINOIS POSTER FINALIST - CLINICAL VIGNETTE Abdalla Hassan, MD

Rapidly Progressive Multicenteric Castleman’s Disease in Patient with Acute Retroviral Syndrome: A Case Report

Carroll Christie, MD Abdalla Hassan, MD

Introduction: Multicenteric Castleman’s Disease (MCD) is a lymphoproliferative disorder that occurs more frequently in Human Herpes Virus-8 (HHV-8) positive HIV patients. We are reporting a unique case of rapidly progressive Multicenteric Castleman’s disease in a patient with acute retroviral syndrome (AVR).

Case Presentation: A 40-year-old homosexual male presented to our institution with fevers, chills and a syncopal episode. The patient had a history of hypertension, illicit drug use, and was recently diagnosed as having HIV. Two weeks prior to his admission, he experienced an episode of syncope, followed by 5 days of fever and chills and diffuse body aches. He also reported having a negative HIV test 2 months earlier. On presentation, he was febrile and tachycardic. Physical examination demonstrated right-sided non-tender cervical lymphadenopathy with hepatosplenomegaly. His labs were significant for pancytopenia (WBC of 4.1 thousand/mcL; HgB 6.1 gm/dL; Platelet 78 thousand/mcL), hyponatremia (131 mmol/L), and creatinine of 1.5 mg/dL. At that time, the working diagnosis was Anti Retroviral Syndrome (AVR), however, transfusion refractory anemia is not a characteristic of AVR. Peripheral blood smear showed spherocytosis, and iron studies were significant for anemia of chronic disease. Moreover, computed tomography showed hepatosplenomegaly with multiple enlarged lymph nodes in the abdomen and pelvis. Lymph node biopsy was obtained and was consistent with HHV-8-associated Multicentric Castleman’s disease. The patient started anti-retroviral therapy for HIV, and Gancyclovir and Rituxamab for MCD. Two days later, he continued to deteriorate and had drops in hemoglobin and platelets requiring multiple transfusions. The patient developed severe respiratory distress requiring intubation and transfer to an intensive care unit; however, after four days, the patient expired.

Discussion: Castleman’s disease is also known as angiofollicular hyperplasia, and is non-clonal disease of the lymph nodes. The exact pathophysiology of MCD is still controversial, with IL-6 hypersecretion playing a major role. The association between chronic HIV and HHV-8-associated Castleman’s disease is well documented in the literature; however, no prior cases reported rapidly progressive Multicenteric Castleman’s disease in AVR. This case provides evidence of the occurrence of MCD in AVR and its associated poor prognosis.
ILLINOIS POSTER FINALIST - CLINICAL VIGNETTE Abdalla Hassan, MD

Two Lumens-One Artery, Spontaneous Spiral Coronary Artery Dissection in Middle-Age Female Presenting with Unstable Angina: Case Report

Abdalla Hassan, MD Ahmad Parvinian, MD

Introduction: Spontaneous coronary artery dissection (SCAD) is an uncommon and challenging clinical entity. It has a striking predilection for young, otherwise healthy female patients with a mean age of 35-40 years. Herein, we present a case of acute coronary syndrome secondary to SCAD.

Case presentation: A 51-year-old female with a history of hyperlipidemia presented to our emergency department with chest pain that began several hours previously while she was seated at her desk. She described the pain as a retrosternal "burning" sensation with radiation to the left shoulder and neck. It was associated with nausea and lasted approximately 20 minutes before subsiding spontaneously. Physical examination was unremarkable. Her vitals were normal. The initial EKG revealed normal sinus rhythm without ischemic changes. The troponin level was 0.18 ng/mL. Two hours later, the patient’s chest pain recurred, with her heart rate and blood pressure rising to 97 BPM and 143/71 mm Hg, respectively. Repeat EKG showed new T-wave inversions in the anteroseptal leads and the troponin level rose to 1.02 ng/mL, peaking three hours later at 1.28 ng/mL. Her echocardiogram was normal. The patient was treated with aspirin, a beta-blocker, and a statin, and was started on heparin and nitroglycerin drips. The following day she underwent coronary angiography, which revealed spiral dissection of the mid- to distal LAD and proximal RCA vasospasm that resolved with intracoronary nitroglycerin infusion. Afterwards, she remained asymptomatic and was treated conservatively with a regimen consisting of aspirin, clopidogrel, a beta-blocker, a statin, and isosorbide mononitrate, as well as amlodipine for coronary spasm.

Discussion: The overall incidence of SCAD in angiographic series ranges from 0.28 % to 1.1 %. The clinical presentation of SCAD is variable and ranges from unstable angina to sudden cardiac death. The most common conditions associated with SCAD are coronary atherosclerosis and the peripartum period. The theory underlying the association between atherosclerosis and coronary artery dissection is that atherosclerotic plaque inflammation and rupture may disrupt the intimal-medial junction, resulting in intimal flap formation and intramural hematoma. The prognosis of patients with SCAD has improved in recent years, with a recent analysis demonstrating a survival rate approaching 90%. The choice of treatment must be individualized based on both clinical and angiographic factors. In conclusion, SCAD is a rare yet important cause of unstable angina, myocardial infarction, and even sudden death. It is paramount that physicians maintain an awareness of this entity when presented with patients complaining of chest pain and who lack classical risk factors.
A case of Strongyloides Hyperinfection leading to diffuse alveolar hemorrhage and appendicitis.

First Author: Laura N Hernandez, MD Neha Jaswal, MD

Strongyloides is a neglected tropical disease often overlooked in the developed world. In immunocompromised patients, it can present as hyperinfection syndrome, meaning Strongyloides larvae are confined to organs normally involved in the pulmonary autoinfection cycle (i.e., GI tract, lungs, and peritoneum). Mortality from hyperinfection is as high as 87%. Prompt recognition and treatment are important to decrease mortality. Steroid use is associated with hyperinfection. While HIV infection is associated with Strongyloides infection, it does not appear to increase risk of hyperinfection. We report a case of young man with AIDS presenting with dyspnea and melena, found to have hyperinfection syndrome with development of diffuse alveolar hemorrhage, ARDS and appendicitis.

33-year-old man of Mexican origin with history of advanced AIDS diagnosed in 2012, high viral load, and CNS toxoplasmosis who was receiving corticosteroids presented with complaints of shortness of breath, fever, diarrhea and melena for one week. He was septic and hypoxic. Stool guaiac was positive. Routine lab were notable due to a 6 gram drop in hemoglobin over two weeks, mild leukopenia and moderate hyponatremia. Chest x-ray revealed diffuse patchy infiltrates. He required intubation for respiratory failure and vasopressors. He underwent diagnostic bronchoscopy and bronchoalveolar lavage revealing bloody lavage. Esophagogastroduodenoscopy showed friable mucosa with ulcerations. Blood culture grew Pseudomonas aeruginosa. Stool for ova and parasites came back positive for Strongyloides stercolaris. The parasite was also seen in BAL samples and duodenal pathology. He was Initially covered with broad-spectrum antibiotic then narrowed down based on the sensitivity pattern. Ivermectin was started for Strongyloides treatment. Hospital course was complicated by right lower quadrant pain. CT scan of the abdomen showed free air in the peritoneal cavity. He was taken for emergent exploratory laparotomy showing perforated appendix and pathology revealed the parasite. He was treated with ivermectin for two weeks including rectal enema with clearance of the parasite and successfully discharged.

Various cases of strongyloides hyperinfection have been described in the literature presenting as diffuse alveolar hemorrhage, ARDS, abdominal pain, gastrointestinal bleeding and perforation. Gram Negative sepsis is also part of the spectrum due to either disruption of the bowel wall, allowing entrance of the bacteria to the systemic circulation, or adherence of the bacteria to the larvae surface during parasite migration. Appendicitis is a very uncommon presentation of hyperinfection syndrome. On literature search we found two case series describing the various organ involvement but none described diffuse alveolar hemorrhage and appendicitis as initial presentation. Our case is also unique in terms that rectal ivermectin enema was used when patient developed paralytic ileus. Only few cases have been described to use rectal formulation of ivermectin. This case illustrates the importance of considering uncommon pathogens in immunosuppressed patients presenting with multisystem involvement.
Connecting the dots - a case of autoimmune polyglandular syndrome type II

First Author: Janet Jang, MD Second Author: Dhananjay, Kulkarni, MD

Introduction: Autoimmune Polyglandular Syndrome (APS) Type II is characterized by Addison’s disease with autoimmune thyroid diseases and/or type I Diabetes Mellitus. It is a rare disease with prevalence of 14-20 cases per million in the United States. In APS type II, about 56% of patients present with Addison’s disease with chronic thyroiditis and about 11% present with the complete triad.

Case description: A 33 year old female with no significant past medical history presented to her primary care physician’s office with chief complaint of nausea, vomiting, and weight loss over the past two months. She was feeling fatigued and light-headed. On physical examination, she was hypotensive with a blood pressure of 80/54. She was not in acute distress and there was no thyroid enlargement or nodularity. Heart rate and rhythm were regular with no murmurs. Neurological exam revealed no focal findings. Labs revealed a TSH >100, free T4 of 0.4, and sodium level of 121. She was admitted for further evaluation. She was started on intravenous fluids but remained hypotensive. Laboratory tests revealed low random cortisol level of 2.58, hyponatremia and high normal potassium levels. Endocrinology was consulted and she was started on IV dexamethasone for adrenal insufficiency. She responded well and was continued with tapering dose of hydrocortisone. During the course of hospitalization, anti-thyroid-peroxidase antibody was positive suggesting autoimmune thyroiditis. She was started on levothyroxine for primary hypothyroidism. Upon subsequent evaluation, anti-21 hydroxylase antibody was positive, supporting diagnosis of autoimmune Addison’s disease.

Discussion: APS type II is a familial condition in nature and is often transmitted as an autosomal dominant trait with incomplete penetrance. It usually occurs in the third to fourth decade of life and has a female predominance with female: male ratio of 2.7-3.7:1. HLA-DR3 and HLA-DR4 increase disease susceptibility. Laboratory investigations include electrolytes, anti-thyroid peroxidase, anti-21 hydroxylase, and anti-glutamic acid decarboxylase antibodies. Imaging studies such as CT scan can be utilized to look for abnormalities of adrenal gland. Treatment involves hormone replacement therapy in most cases.

Patients with a new diagnosis of hypothyroidism should be evaluated for adrenal insufficiency if there are suggestive clinical symptoms such as weight loss (which is not typical of hypothyroidism), persistent hypotension despite fluid resuscitation, along with high or high normal potassium levels accompanying hyponatremia, such as in our case. This is crucial because if Addison’s disease and hypothyroidism do occur concurrently, administration of thyroid hormone without replacing glucocorticoids, can precipitate adrenal crisis by the action of thyroxine in enhancing hepatic corticosteroid metabolism. Therefore it is crucial that such patients be treated with glucocorticoids prior to thyroid hormone therapy. If these conditions are identified together, further work up for APS is warranted.
Double trouble: A case of DRESS syndrome with overlapping Steven Johnson’s syndrome

First Author: Sima Kavand, MD Second Author: Charles Vainder, MD

Drug reaction with eosinophilia and systemic symptoms (DRESS) and Steven Johnson’s Syndrome (SJS) are two distinct cutaneous drug reactions. In this abstract, we report a patient with hypersensitivity reaction to phenytoin with clinical findings of both syndromes.

A 36 year old male with diabetes mellitus and recently onset seizure was admitted to our hospital with fever, diarrhea and maculopapular rash, started two days prior to arrival. Drug history was remarkable for phenytoin, started recently for seizure disorder and insulin. In examination, patient appeared ill with facial edema. There was generalized morbilliform eruption over the trunk and extremities. In blood test, He had elevated WBC with eosinophilia, elevated liver enzymes, serum creatinine and CRP. One day after admission, he developed erosive lesions over his lips and buccal mucosa and epidermal loss of his scrotal skin. Biopsy of skin lesion was consistent with SJS. Diagnosis of DRESS syndrome was proposed based on the clinical and laboratory features and recent exposure to phenytoin, although the mucosal involvement and epidermal loss was also suggested an overlapping feature with SJS. Phenytoin was replaced by Keppra and Prednisone 40 mg daily was started for the patient. One week later, the patient was discharged from the hospital with tapering dose of Prednisone while he was clinically improving.

This case demonstrates the fact that adverse cutaneous drug reaction can sometimes present with an overlapping feature. Although determining the causative agent is more critical than a precise diagnosis, having specific diagnosis for every clinical encounter is very essential.
It Is Not The Plasmodium That Dropped The Counts – A Case Of Hemophagocytic Syndrome.

First Author: Sathish Kumar Krishnan, MD Second Author: Dhileepan Selvarajan, MD Third Author: Praveen Jayapal, MBBS

Introduction: Hemophagocytic lymphohistiocytosis (HLH) is a hyperinflammatory syndrome caused by excessive cytokine production due to highly activated but ineffective immune process. It is an aggressive and life threatening condition. High index of suspicion is needed to diagnose the condition which is potentially treatable.

Case description: A 24-year-old male presented to the Emergency Department with a 5-day-history of intermittent fever and abdominal pain. The history was significant for recent travel to India. His vitals were BP: 106/84 mmHg, HR: 106/min, RR: 18/min and temp: 101.2 F. His physical examination was significant for pallor, left upper quadrant tenderness and moderate splenomegaly. Complete Blood Count revealed pancytopenia – Hb: 9.0 g/dL, WBC: 3000/dL and platelets: 80000/dL. Liver function test was remarkable for direct hyperbilirubinemia and mild transaminitis. Peripheral smear examination showed plasmodium falciparum. He was treated with artesunate. He was hemodynamically stable and his fever resolved, but his pancytopenia worsened. On day 4, his complete blood count was Hb: 7.2 g/dL, WBC 2600/dL and platelet 36000/dL. He developed confusion, petechiae, ecchymoses and spontaneous gum bleeding. In view of worsening pancytopenia, a bone marrow biopsy was performed, which revealed numerous hemophagocytes with the malarial gametocytes. His ferritin and triglyceride level were also found to be significantly elevated. A diagnosis of HLH was made and was treated with high dose dexamethasone. He clinically improved and the pancytopenia resolved.

Discussion: Hemophagocytic lymphohistiocytosis can be of two types – familial and secondary. Familial occurs mostly in children less than 5 years of age. Secondary HLH occurs mostly in adults due to bacterial, viral and parasitic infections, and malignancies. The diagnosis needs five of the following features – fever, splenomegaly, pancytopenia, hypertriglyceridemia/hypofibrinoginemia, elevated ferritin, elevated CD 25, absent natural killer (NK) cell activity and hemophagocytes in the bone marrow exam. Patients can also have altered mental status, seizure, lymphadenopathy, skin rashes, jaundice, acute kidney injury, multi-organ dysfunction and ARDS. Secondary HLH can be easily missed as many infections can cause cytopenia and many features of the disease can occur in sepsis. So, persistent cytopenia and lack of improvement with appropriate therapy should heighten the suspicion for HLH. Prompt recognition and treatment with high dose dexamethasone has shown to improve outcome.
ILLINOIS POSTER FINALIST - CLINICAL VIGNETTE Aman Kugasia, MD

Systemic lupus erythematosus, psoriasis, psoriatic arthritis successfully treated with Ustekinumab.

First Author: Aman Kugasia, MD, Udit Yadav, MD, Meenakshi Jolly, MD.

FDA has approved ustekinumab for the treatment of moderate to severe plaque psoriasis. It is a human monoclonal antibody that inhibits interleukins 12 and 23, which are involved in the TH-17 signaling pathway. There have been case reports of subcutaneous lupus erythematosus (SCLE) successfully treated with ustekinumab indicating involvement of TH-17 pathway in the pathogenesis of SCLE. Here we report the first known case of successful treatment of psoriasis, psoriatic arthritis and systemic lupus erythematosus (SLE) with ustekinumab.

A 48 year old gentleman with psoriasis and psoriatic arthritis involving both knees and arthralgia of small joints of hands came to the rheumatology clinic for the management of arthritis. Patient’s past medical history was significant for autoimmune hemolytic anemia treated with rituximab 7 years ago, thrombocytopenia and recurrent inflammatory knee effusions. Physical exam was significant for erythematous scaly plaques covering both elbows and lower back and moderate left knee effusion. Labs were remarkable for thrombocytopenia (52000 cells/microliter), positive anti-nuclear antibody (1:640) and anti ds-DNA antibody. Patient had not responded to etanercept for psoriatic skin lesions in the past and at that point he was taking infliximab. Diagnosis of SLE was made based on hemolytic anemia, thrombocytopenia, positive antinuclear antibody, positive anti ds-DNA antibody and arthralgia. Treatment with infliximab was stopped due to concern for drug induced lupus. Patient was started on mycophenolate mofetil and prednisone for treatment of SLE. Meanwhile, cyclosporin was started by dermatology for the management of psoriatic skin lesions so mycophenolate mofetil was discontinued to avoid excessive immunosuppression. Patient was showing modest improvement in the skin and joint lesions along with improvement in platelet counts. After three months, we initiated ustekinumab as a steroid sparing agent to treat lupus along with psoriasis and psoriatic arthritis so cyclosporin was discontinued and prednisone was tapered off. After three doses of ustekinumab there was complete resolution of skin lesions and normalization of platelet count. However due to persistent left knee arthritis, methotrexate was added to ustekinumab. After two months of treatment with ustekinumab and methotrexate patient knee arthritis has also resolved. Patient has been on current regimen for the past 30 months without any recurrence of psoriatic lesions, thrombocytopenia or hemolytic anemia. No medication related adverse effect were noted during this period.

Recently a subset of T cells, distinct from T helper (T_h)1 and T_h2 cells, producing interleukin (IL)-17 (T_h17) was defined and seems to have a crucial role in mediating autoimmunity and inducing tissue inflammation. Ustekinumab acts by inhibiting interleukins 12 and 23, ultimately leading to TH-17 pathway blockage. Manifestation of SLE has responded well to ustekinumab highlighting fact that there may be role of TH-17 blocking agents in the management of SLE. Further research is needed to characterize specific subset of SLE patients who may benefit from TH-17 pathway blockage.
A severe case of Microscopic Polyangitis causing diffuse alveolar hemorrhage and anemia

First Author: Mohamad Hani Lababidi, MD, Chukwuka Okolo, MD

Learning objective: - Diffuse alveolar hemorrhage should be considered in pts who develop progressive dyspnea with alveolar opacities on chest imaging. - Pulmonary and renal involvement suggests a multisystem disease. - Small-vessel vasculitis should be suspected in any patient who presents with a multisystem disease that is not caused by an infectious or malignant process. Introduction: - ANCA-associated vasculitides include granulomatosis with polyangiitis (Wegener’s or GPA), microscopic polyangiitis (MPA), Churg-Strauss syndrome (CSS) and renal-limited vasculitis. - MPA is a systemic necrotizing vasculitis characterised by inflammation of the small blood vessels, the absence of granulomas on histopathology, and the presence of circulating anti-neutrophil cytoplasmic antibodies (ANCAs).

Case presentation: - A 58 year old male otherwise healthy presented to the ED with 5 day history of exertional dyspnea and nonproductive cough associated with fever and night sweats. He also reported 12 pounds weight loss for the past 1 month. Does not use any medications. He is a previous smoker of 1 PPD for 20 years. - On admission he was febrile, T 101.7, HR 106, RR 24, BP 156/80, O2 sat 97%. - PE was significant for tachypnea, pale conjunctiva and dry mucous membranes. - In the ED he was found to have a Hgb of 5.4 elevated Cr of 7.2 and his CXR showed bilateral pulmonary infiltrates. UA on admission also showed large proteinuria and large hematuria. Pt was transfused with 2 units of PRBCs and was started on empiric Abx for possible pneumonia. Iron studies showed anemia of chronic disease. - Further workup was as following: HIV (neg), Hepatitis panel (neg), TB Quantiferon (neg), Anti-GBM Ab (neg), Anti-dsDNA Ab (neg), PR3-ANCA (neg), MPO-ANCA positive. Pt was admitted to the medical floor, however, on the same day he desaturated down to 88% on 4L NC with tachypnea and confusion. Stat CXR was obtained that showed greatly worsening infiltrates compared to admission. - Pt was transferred to the ICU and intubated. Received high dose steroids (1 gm solumedrol daily x 3 days then prednisone 60 mg daily), cyclophosphamide (75 mg Bid) and started on plasmapheresis (x 7 days). Atovaquone for PCP ppx. He received further PRBC transfusions for drop of his Hgb (5 Units total) and 20 units of FFP. Bronchoscopy revealed diffuse blood oozing from all pulmonary segments, consistent with pulmonary hemorrhage. Kidney biopsy was performed that showed Pauci-immune crescentic GN (which is typical for MPA)

Discussion: - Micriscopic Polyangitis is the most common cause of the pulmonary-renal syndrome of alveolar hemorrhage and non-productive cough associated with fever and night sweats. Peak incidence age 30-50 years, Incidence 8 cases per million - Triggered by infections, drug and toxins (propylthiouracil, hydralazine, cocaine, silica). - Targets of ANCA are proteiase 3 and myeloperoxidase in the neutrophils and monocytes granules causing there activation and further damage of the vacular walls. - Manifests as: Glomerulonephritis (nearly 80% of patients), Weight loss (>70%), Mononeuritis multiplex (60%), Fevers (55%), Cutaneous vasculitis (>60%), Alveolar hemorrhage, in contrast, occurs in only about 12% of patients. - corticosteroids and immunosuppressants cyclophosphamide are the mainstay of therapy, plasma exchange, in severe DAH.
Beware of Wild cARDS: Blastomycosis

First Author: John J Lee, MD Vaishnavy Bhaskaruni, Kaveh Tayebi, Sindhu Joseph. MacNeal Hospital, Berwyn, IL.

Blastomycosis is a pyogranulomatous disease caused by *Blastomyces dermatitidis*. Its clinical presentation ranges from asymptomatic to severe respiratory failure. This case reports Blastomycosis related Acute Respiratory Distress Syndrome in a previously healthy patient.

A previously healthy 58 year old male presented with increasing dyspnea for three days. On admission, his heart rate was 110, respiratory rate was 19, and his oxygen saturation was 85% on room air. Chest x-ray revealed bilateral coarse interstitial infiltrates. The patient was started on Vancomycin, Levofloxacin, and Piperacillin-Tazobactam. During the hospital stay, the patient became increasingly hypoxic, with rapid respiratory deterioration. Empiric intravenous steroids were initiated with no clinical improvement. A computed tomography of the thorax was obtained, which revealed bilateral patchy lung consolidation. Bronchoscopy was non-revealing, and the studies from bronchoalveolar lavage (BAL) including fungal culture were negative. Given the lack of clinical improvement, an open lung biopsy was done, with pathology revealing blastomycosis. Immediately after surgery, the patient developed severe respiratory failure consistent with ARDS. Liposomal Amphotericin B treatment replaced antibiotics and intravenous methylprednisolone was continued. The patient’s PaO2/FiO2 ratio gradually improved, and he was successfully extubated one week later. Methylprednisone was tapered, and converted to oral prednisone. The patient will be on liposomal amphotericin for 28 days and itraconazole for one year thereafter.

Our case presented an unusual diagnostic challenge with Blastomycosis. In one case series, 100% of cultures obtained from bronchoalveolar lavage yielded the organism in patients who were known to have pulmonary blastomycosis. In our case, the bronchial washing fungal culture and smear were negative. The diagnosis was only made after the lung biopsy. Moreover, blastomycosis infrequently presents as Acute Respiratory Distress Syndrome, especially in immunocompetent patients. In previous case reports, blastomycosis-related ARDS cases were associated with a mortality rate of 50-89%, when antifungal therapy without adjunctive corticosteroids treatment regimen was employed. In contrast, two case reports show better efficacy when corticotherapy is combined with antifungal therapy. It is presumed that corticotherapy reduces inflammation, a core component of ARDS. In fungal infections, inflammation is likely secondary to host cell mediated immunity, and it is proposed that steroids subdue such a reaction and therefore, increase gas exchange.

Blastomycosis can present in a myriad of forms and may pose a diagnostic challenge. Although bronchoalveolar washings are associated with a high yield in identifying blastomycosis, if there is a high clinical suspicion, a negative bronchoalveolar lavage should warrant immediate lung biopsy to avoid delay in diagnosis and subsequent treatment. Blastomycosis infrequently present as ARDS and in such cases, corticotherapy in adjunction to antifungal therapy should be strongly considered.
Esophageal Perforation as a Complication of Colonoscopy

First Author: Nanditha Malakkla, MD. Chandramohan Meenakshisundaram, MD

Learning Objectives: To identify that Boerhaave’s syndrome can be a rare complication of routine colonoscopy, and to discuss the manifestations, diagnosis, and treatment of Boerhaave’s syndrome.

Case: 76 y o female with no significant past medical history underwent outpatient screening colonoscopy. Procedure was difficult due to tortuous colon and only multiple diverticula were visualized. She vomited once during the procedure and postoperatively she felt nauseous and had dry heaves. Shortly after, she complained of neck swelling. Her vital signs were stable. On examination she had right sided neck and facial swelling with palpable crepitations over neck and upper chest as well as coarse breath sounds on auscultation of both lung fields. Cardiac and abdominal exam was unremarkable. Emergent CT chest showed extensive subcutaneous air within the soft tissues of the neck bilaterally, extending into the mediastinum and along the anterior chest wall. An esophagram revealed a focus of oral contrast actively extravasating approximately at 2.5 cm above the gastroesophageal junction consistent with a small perforation. She underwent left thoracotomy with esophageal repair. She was on total parenteral nutrition (TPN) for a week which was later transitioned to pureed diet. Further hospital course was uncomplicated and she was discharged to a subacute rehabilitation facility.

Discussion: Boerhaave’s syndrome is a spontaneous perforation of the esophagus due to sudden increase in intraesophageal pressure combined with negative intrathoracic pressure caused by straining or vomiting. The tear usually occurs at the left posterolateral wall of the lower third of the esophagus. Usually patients have severe retching and vomiting which is followed by excruciating retrosternal chest and upper abdominal pain after perforation. Other manifestations are odynophagia, tachypnea, dyspnea, fever, and shock. On physical examination subcutaneous emphysema (crepitation) is an important diagnostic feature. Chest radiograph usually reveals mediastinal or free peritoneal air as the initial manifestation, and hours to days later pleural effusion with or without pneumothorax, widened mediastinum, and subcutaneous emphysema are typically seen. The diagnosis of esophageal perforation can also be confirmed by water-soluble contrast esophagram using Gastrografin, which reveals the location and extent of extravasation of contrast. Treatment depends upon the size and location of the perforation. Surgery is generally required for thoracic perforations while cervical perforations can often be managed conservatively with continuous nasogastric suction, intravenous broad-spectrum antibiotics, and parenteral nutrition. Patients with abscesses and effusions require drainage. There has been a case report of a patient who developed Boerhaave’s syndrome following colonoscopy preparation due to vomiting. Our patient did not develop vomiting due to the preparation, but did develop esophageal perforation after colonoscopy.
Beware of the “SPICE” you get on street

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Synthetic cannabinoids are one of the popular “smokable herbs” today, being marketed as “Spice”, “K2”. These recreational substances have been shown as the possible cause of biopsy proven Acute tubular necrosis (ATN) in recent case reports, but the mechanism of action remains unknown. The unexplained toxicology profile of these drugs along with recent increase in the number of Emergency room visits from K2 use has created increased concern, both for the extended adverse effect profile and health care costs incurred. Further, the endless availability, social perception of being safe and the lack of standardized means of testing has further made it difficult for its identification.

We present case reports of two patients with ATN secondary to synthetic marijuana abuse. Our first patient was a 29 year old male who presented with confusion and agitation. Laboratory work on admission showed anion gap lactic acidosis, normal creatinine phosphokinase (CPK) levels and a serum creatinine (SCr) of 1.41. His urine drug screen was positive for Cannabinoids and patient admitted also to using large amounts of synthetic marijuana. Supportive management with intravenous fluids was initiated for pre-renal acute kidney injury. Over the next three days, his renal function worsened with oliguria and a SCr rise to 5.83, suggesting ATN. Our next patient was a young 20 year old male with polysubstance abuse, who was admitted after he was witnessed to have multiple episodes of generalized tonic clonic seizures. He was intubated for airway protection and additional work up showed aspiration pneumonia, anion gap acidosis and acute kidney injury with SCr of 1.6 mg/dl. Despite adequate hydration, his renal function deteriorated with non oliguric ATN and gradual rise in SCr to 6.77 in four days. After extubation, patient admitted to using synthetic marijuana. Over the hospital course, his renal function improved without needing renal replacement therapy.

In light of the extensive abuse potential and overt neuropsychiatric manifestations of K2, they were declared as Schedule I control substances by DEA in 2010. They act by binding to the cannabinoid receptors, CB1 and CB2 similar to marijuana, but differ in being more potent, undetected by routine testing and easily accessible to teenagers and young adults. The adverse effects include nephrotoxicity, hypertension, neurotoxicity, respiratory failure, seizures and many more. It is important that physicians be aware of this phenomenon with K2 use. This knowledge will decrease unnecessary diagnostic testing as well as expedite focused management. We also suggest that laws be implemented more efficiently for regulating access to these agents.
ILLINOIS POSTER FINALIST - CLINICAL VIGNETTE Jorge Morales, MD

A rare but life-threatening complication of warfarin therapy: a case of diffuse alveolar hemorrhage.

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Introduction: Diffuse alveolar hemorrhage is a rare but potentially fatal complication of warfarin therapy. A high index of suspicion and early diagnosis can be lifesaving.

Case Description: A 77 year old lady presented to our institution referred by her primary care physician for evaluation of hypoxia and shortness of breath. She complained of three days of worsening dyspnea on exertion, limiting her exercise tolerance to a few steps. There was no orthopnea, paroxysmal nocturnal dyspnea, cough or fever. She reported a recent admission elsewhere two weeks prior for asthma, and discharged on warfarin for newly diagnosed atrial fibrillation. Other past medical history included hypertension, diabetes and breast cancer in remission. She denied alcohol, smoking or drug use, but reported exposure to biomass smoke (wood stove) for 16 years before moving from Belize. Her medications included hydrochlorothiazide, carvedilol, albuterol and beclomethasone inhalers, and warfarin. Upon presentation, her vitals were: temperature of 98.9°F, pulse rate 103 beats/min, respiratory rate of 20/min and oxygen saturation of 93% on room air. Cardiopulmonary exam was remarkable for an irregularly irregular rhythm, bilateral basal crackles and bilateral ankle pitting edema. Laboratory investigations revealed an initially normal complete blood count with subsequent fall in hemoglobin but otherwise normal basic metabolic panel. Venous blood gas revealed chronic respiratory acidosis. International normalized ratio (INR) was 4.71. Chest radiograph showed bilateral alveolar infiltrates. High-resolution computerized tomography (CT) revealed diffuse groundglass nodular densities. Bronchoscopy with serial bronchoalveolar lavage (BAL) confirmed alveolar hemorrhage. Autoimmune workup was negative. Warfarin was held, with complete symptoms resolution at two weeks follow up.

Discussion: Diffuse alveolar hemorrhage (DAH) is most commonly caused by pulmonary capillaritis due to vasculitis, connective tissue disease and drugs. Warfarin-induced DAH is a rare but potentially fatal event, with 7 cases reported in the literature since its first description in 1965 by Brown et al. It can occur early after initiation of therapy and within therapeutic levels of INR. In general, the diagnosis of DAH requires a high index of suspicion in the occurrence of dyspnea, cough, new alveolar infiltrates and anemia. If present, a falling hemoglobin supports the diagnosis. Like our patient, hemoptysis can be remarkably absent in as many as one third of patients and its absence does not rule out the diagnosis. Serial BALs are usually diagnostic when demonstrating persistent or increasing number of red blood cells. Underlying “pulmonary-limited” anti-GBM antibody and p-ANCA disease should be considered and tested, even in the absence of systemic findings. Prompt diagnosis and reversal of coagulopathy are paramount.
Tumor Lysis Syndrome as a Complication of Chemoembolization with Irinotecan in a Patient with Primary Colonic Adenocarcinoma with Liver Metastases

First Author: Aswin Nukala, MD Second Author: Jennifer Henson, MBA Third Author: Harish Patlolla, MD Fourth Author: Pam Khosla, MD

Tumor lysis syndrome (TLS) is a potentially life threatening oncologic emergency resulting from the rapid lysis of malignant cells in response to chemotherapy or radiation. The rapid lysis of the cells releases the intracellular contents into the systemic circulation resulting in hyperkalemia, hyperphosphatemia, hyperuricemia, elevated lactic acid and hypocalcemia. The electrolyte imbalances can result in life threatening cardiac arrhythmias, seizures, and acute renal failure. The kidneys ability to maintain acid/base equilibrium is impaired precipitating a severe metabolic acidosis.

TLS is most often associated with hematologic malignancies that have a high turnover rate such as leukemias and lymphomas. TLS has been rarely reported following cancer treatments directed towards solid tumors. Based on literature review, since 1977, just 6 cases have been reported of TLS resulting from colorectal cancer. Only one of these patients survived. To the best of our knowledge, we report one of the only cases of TLS presenting in a patient with primary colorectal adenocarcinoma with hepatic metastasis that were directly targeted with transcatheter arterial chemoembolization (TACE) using Irinotecan drug eluting beads.

A 68 yo female with past medical history of primary colonic adenocarcinoma with known hepatic metastases presented to the emergency room complaining of generalized fatigue, diffuse abdominal pain, watery, non bloody diarrhea, and multiple episodes of nonbloody, non bilious vomiting of 5 days duration. The patient was being treated with outpatient chemotherapy with FOLFIRI with cetuximab. Seven days prior, she received chemoembolization with irinotecan directed at her hepatic metastases. The patient was hemodynamically stable on admission, although she was found to have severe electrolyte derangement, including hyperkalemia, hyperuricemia, and hyperphosphatemia and she was in Acute Renal Failure. Blood gas analysis showed severe metabolic acidosis, with elevated lactate. The patient was subsequently admitted to the Medical ICU with a diagnosis of TLS following chemoembolization. She received aggressive fluid hydration, emergent dialysis, and was given allopurinol/rasburicase. She responded very well and was discharged home the following week.

Transcatheter arterial chemoembolization of colorectal liver metastasis with Irinotecan has been described as a novel alternative for patients who have failed attempts at systemic chemotherapy and who are not surgical candidates. In one review of the safety and efficacy of transarterial chemoembolization of colorectal hepatic metastases treated with Irinotecan, a total of 57 embolization sessions were performed with no reports of TLS. Based on our case report, it is evident that Irinotecan, when targeted directly at tumors, has the capacity, although rare, to rapidly debulk tumor burden and result in cytolysis and TLS. Prompt diagnosis is important as well as aggressive IV hydration and possibly emergent dialysis. It is important to know that TLS can be prevented by pretreating certain high risk cancer patients with fluids and allopurinol prior to receiving chemotherapy.
An Unusual Case of Hepatitis C Associated Cryoglobulinemia and Membranoproliferative Glomerulonephritis Presenting as Diffuse Alveolar Hemorrhage

First Author: Aswin Nukala, MD  Second Author: Aravindan Jeyarjasingam, MD  Third Author: Andres Serrano, MD

Cryoglobulinemia is a rare condition in which immunoglobulin and complement complexes precipitate in the blood at temperatures colder than 37 degrees Celsius. The formation of these immune complexes leads to deposition in capillaries and small arterioles resulting in a systemic vasculitis that can present as palpable purpura, neuropathy, arthralgias and myalgias, renal and/or liver failure. Membranoproliferative glomerulonephritis (MPGN) is a frequent finding due to deposition of immune complexes of the hepatitis C virus, IgG, and IgM rheumatoid factors. The lungs, if involved, usually demonstrate a restrictive pattern in which there is an impairment of gas exchange. However, pulmonary vasculitis and resulting hemorrhage is an extremely unusual entity. In this case, the authors describe a rare presentation of hepatitis C associated mixed cryoglobulinemia and membranoproliferative glomerulonephritis (MPGN) resulting in diffuse alveolar hemorrhage.

A 63 year old Hispanic male with a history of IV heroin abuse, Hepatitis C associated mixed cryoglobulinemia (Type 2) and MPGN presented to the emergency room with complaints of worsening dyspnea and hemoptysis with streaks of blood for the past 2 weeks. A basic metabolic profile revealed that the patient had an acute kidney injury with an elevated creatinine of 2.9, which was above his baseline of 1.9. A chest X ray revealed diffuse alveolar infiltrates. A CT of his chest revealed diffuse ground glass opacities in the lung apices and bilateral pleural effusions. Cryoglobulin and hepatitis C antibody were also positive, with viral load greater than 7 million. Complement levels were decreased and rheumatoid factor was elevated at 122 (<14 IU/ml). ANCA related vasculitis was ruled out. The patient underwent bronchoscopy, which revealed an erythematous airway and grossly bloody fluid. Analysis of the BAL revealed greater than 31,000 RBC’s confirming the suspected diagnosis of alveolar hemorrhage. Because of the renal and pulmonary involvement of the underlying cryoglobulinemia, the patient was treated with plasmapheresis and rituximab and improved clinically.

Alveolar vasculitis has been very rarely described as a presentation of cryoglobulinemia. Although numerous pulmonary renal syndromes have been reported, it is an extremely rare entity for cryoglobulinemic MPGN to present in such a way. Through literature review, there appears to be no more than fifteen such cases reported. The pathophysiology likely involves immune complex deposition in the small capillaries of the airway. In this case we highlight the importance of early diagnosis to detect acute renal failure, management of the airway in a patient with active hemoptysis, and laboratory testing to determine whether the patient will benefit from plasmapheresis, corticosteroids, and/or immunosuppressive therapy. Even with successful treatment of acute flare-ups, pulmonary involvement in patients with cryoglobulinemia portends a very poor overall prognosis.
Richter’s Transformation of Chronic Lymphocytic Leukemia to Classical Hodgkin Lymphoma

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A feared complication of Chronic Lymphocytic Leukemia (CLL) and Small Cell Lymphocytic Lymphoma (SLL) is Richter’s transformation. It occurs in 5% of cases and is the progression of an indolent leukemia to an aggressive high-grade large cell lymphoma. In rare cases CLL may transform into classical Hodgkin Lymphoma (HL). Less than one hundred cases have been documented to date.

We report the case of an 88 year old lady admitted to our hospital following worsening fatigue, anorexia and syncope. Prior to admission she received Rituximab and three cycles of Bendamustine with minimal response. Physical examination revealed pallor, cachexia and a right sided scalp laceration. CT of the head showed acute on chronic bilateral subdural hematomas with a depressed skull fracture. Her hospital course was significant for low-grade fevers and persistent lymphocytic leukocytosis. She had marked anemia and thrombocytopenia refractory to transfusions even after pre-treatment with IV dexamethasone and IV immunoglobulin. Work up for infectious etiology and autoimmune hemolysis was negative. Hematologic evaluation revealed a reticulocyte count of 2.5 (index of 0.6). CT scan of the abdomen and pelvis revealed marked splenomegaly and retroperitoneal lymphadenopathy with interval worsening. She underwent a bone marrow biopsy which showed two separate abnormal cell infiltrates. The first was comprised of large abnormal lymphoid cells with multiple lobulated nuclei and prominent nucleoli consistent with Reed Sternberg (RS) cells, supporting a diagnosis of classical HL with 30% bone marrow involvement. Immunohistochemical staining was positive for PAX 5, CD30 and negative for CD20. The second infiltrate was consistent with her prior diagnosis of CLL with 50% bone marrow involvement.

Richter’s transformation portends a poor prognosis in the clinical course of CLL/SLL. It should be on the radar whenever a patient begins to deteriorate with refractory cytopenia. The MD Anderson Cancer Center published a series of 4,121 patients with CLL/SLL, identifying only eighteen patients (0.4%) with transformation to HL. Richter’s transformation to HL can be classified into two types. Type 1 is illustrated by RS cells scattered in a background of CLL cells, whereas Type 2 is illustrated by RS cells within a typical polymorphous, inflammatory background separate from CLL cells. Our case most closely represents a Type 1 pattern. In the MD Anderson series, median survival for Type 1 transformation was 0.8 years. Our patient received treatment with Chlorambucil, Procarbazine and Prednisone/Solucortef and was transitioned to hospice after the first cycle. More aggressive approaches include therapeutic regimens such as Lomustine, Mitoxantrone, Vinblastine combination, the Stanford V regimen followed by radiotherapy and MOPP/ABVD. We opted for a more conservative approached in view of her overall performance status.
Can a Verse (POEM) get any worse!?

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Introduction: POEMS syndrome is a rare paraneoplastic syndrome resulting from underlying plasma cell disorder. The acronym represents several of the defining features which includes Polyradiculoneuropathy, Organomegaly, Endocrinopathy, Monoclonal plasma cell disorder and Skin changes. The patients also have features of extravascular volume overload which can manifest as peripheral edema, pleural effusion, pericardial effusion and ascites which is believed to be from increased vascular permeability due to excess vascular endothelial growth factor (VEGF) activity. Early diagnosis and a prompt multidisciplinary approach increase the likelihood of reduced long-term morbidity and mortality.

Case Presentation: A 52 year old male presented with insidious onset of abdominal distention for the past two months. His past medical history was significant for hypothyroidism and sensory motor polyneuropathy diagnosed five years ago. Physical examination revealed a cachectic male with hyperpigmentation, sclerodermoid skin changes, significant ascites and mild pedal edema. Laboratory studies revealed normal liver function tests with albumin of 4.3 mg/dl and international normalized ratio (INR) of 1.1. Hepatitis and HIV serologies were non-reactive. CA-125 and CEA levels were within normal limits. Ascitic fluid analysis revealed a serum ascites albumin gradient (SAAG) of 0.9 gm/dl and ascitic fluid protein of 3.2 gm/dl. Chest x-ray showed a normal sized heart with mild right pleural effusion. Transthoracic echocardiogram showed normal right and left ventricular function with ejection fraction of 62%. Computerized tomography (CT) scan of the abdomen showed normal liver, massive amount of ascites, splenomegaly and retroperitoneal lymphadenopathy. Serum protein electrophoresis (SPEP) showed an M spike and serum Immunofixation was consistent with IgA lambda monoclonal gammopathy. Serum VEGF and IL-6 levels were elevated. Based on the overall clinical picture and investigations, the patient was diagnosed with POEMS syndrome. The patient was started on melphalan and dexamethasone and showed significant clinical improvement in the follow up period.

Discussion: POEMS syndrome is a rare paraneoplastic syndrome which is caused by an underlying plasma cell disorder. Apart from the characteristic features of POEMS syndrome, patients also have extravascular fluid overload which most commonly manifests as peripheral edema, but pleural effusion and ascites are also common. Ascites may be severe enough to require weekly paracentesis. Patients have a low serum-ascites albumin gradient (SAAG) in the ascitic fluid, consistent with an exudative process rather than a portal hypertension process. There is no standard treatment for POEMS syndrome and no randomized controlled trials of treatment exist in the available literature. Systemic chemotherapy with the use of melphalan plus dexamethasone has demonstrated good response rates with an acceptable toxicity profile. Ascites often responds to the administration of diuretics, but may require drainage with paracentesis. Median survival in patients of POEMS syndrome with extravascular fluid overload was determined to be 6.6 years.
Acute pericarditis as a rare consequence of Severe Diabetic Ketoacidosis

A 33-year-old Hispanic man with insulin-dependent diabetes of 15 years' duration was admitted to the hospital with a 2-day history of nausea, vomiting, and worsening shortness of breath. He endorsed loss of appetite and was unable to hold food down. He vomited a number of times after attempts to drink soup. There were no changes in urinary frequency. He decided to stop taking insulin yesterday because of poor oral intake. He stated that he had been compliant to his insulin until yesterday. His normal insulin regimen includes lispro 15 units before meals, and glargine 20 units at bedtime. He denied any chest pain, palpitations, fever, cough, and heat or cold intolerance. On examination he was alert and oriented to person, place, and time. He was found to have had Kussmaul's respirations. The temperature was 35.3°C, pulse 135/minute, and blood pressure 118/58 mmHg. Auscultation of the heart and lungs was normal. The abdomen was soft and bowel sounds were present. Initial labs showed a blood glucose of 900 mg/dL, plasma bicarbonate 3 mmol/L, blood urea 33 mg/dL, plasma sodium 133 mmol/L, potassium 5.7 mmol/L, with a calculated serum osmolality of 299 mosmol/kg. There was no evidence of any precipitating infection on history. Blood cultures, throat swab for viral infections, and urine culture were all sterile. He was diagnosed with severe DKA and was treated with intravenous fluids and insulin infusion. After 48 hours of hospitalization, he began to complain of substernal chest pain. This pain was very sharp in character, worse on deep inspiration. Electrocardiogram was done and shown definite ST elevation in leads I-III, AVL, AVF and V2-V6. Troponin T was elevated to 29 ng/mL from 0.01 on admission. The Echocardiogram showed normal left ventricular size and contractility with LVEF 63%. He was diagnosed with acute pericarditis and given aspirin. He showed improvement clinically. He denied pleuritic chest pain 1 day after aspirin was started. He was discharged home 5 days after admission.

This case illustrates a rare complication of diabetic ketoacidosis. Although most cases of acute pericarditis are not life-threatening and considered a benign condition, it is important for clinicians to recognize this complication, so that they can provide appropriate treatment for their patients.
What we have learned from lithium toxicity.

First Author: Siwadon Pitukweerakul, MD Pakhad Buddhadev , MD

Lithium toxicity may be acute, such as a patient who is not on lithium therapy that ingested a bottle of lithium tablets in a suicide attempt; acute-on-chronic, such as a patient who is on lithium therapy that also ingested a large number of lithium tablets all at once; or chronic, which commonly presents as patient on a stable lithium regimen that suffers a reduction in renal function. Poly-pharmacy is also known to increase the risk of developing lithium toxicity.

A 44 year-old woman with a past medical history of DM type 2, HTN, depression, bipolar disorder type 1, and epilepsy presented to Emergency Department with dizziness and confusion in this morning. She fell down and hit her head, but did not have obvious external bleeding. She denied chest pain palpitations, numbness, weakness, visual changes, sweating, loss of consciousness, fever, burning urination, or abdominal pain. She also reported the associated symptoms of nausea and 2 episodes of vomiting. According to her fiancé, the patient was completely normal yesterday evening. On the morning of admission, the patient was not her usual self. She seemed drowsy and confused. When asking about medication, the patient reported that she takes her meds regularly. The medications include: fluoxetine, gabapentin, lisinopril, lamotrigine, olanzapine, lithium, metformin and sitagliptan. She has had back pain lately and had also been taking ibuprofen over the counter 6-10 tablets a day for 3 days. Physical exam was unremarkable except for resting and action tremor in both hands. She remained drowsy but was easily aroused on the floor and she remained oriented to time, place and person. Diagnostic work up found a creatinine level elevated to 5.86 mg/dl (last known Cr. was 0.6 mg/dl 2 years ago), arterial Blood gas Shows Normal-gap metabolic acidosis(pH 7.16,pCO2 31, pO2 122, HCO3 11) and a lithium level of 2.5 mmol/L (N=0.5-1.3 mmol/L). On the day following admission, the patient was intubated because of shortness of breath and flash pulmonary edema. She received emergent hemodialysis and her lithium level decreased from 2.5 to 0.9. She was also diuresed with furosemide. Her creatinine improved to 0.89. She was extubated 7 days later.

This case illustrates the value of a complete history. It is important that clinicians be aware of the risk factors for developing lithium toxicity. Medications that cause dehydration or renal impairment can precipitate lithium toxicity because lithium is excreted almost entirely by the kidneys. In this case, patient took high dose of new medication, ibuprofen, which was nephrotoxic given she was already taking lisinopril. Moreover, AKI was likely the cause of the patient’s lithium toxicity. Therefore, this case emphasizes the importance of inquiry concerning new medications or changes in the doses of long-standing medications.
Carbapenem Resistant Aeromonas Caviae Causing Infected Pancreatic Pseudocyst

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Introduction: Aeromonas bacteria is widely distributed in the environment and usually sensitive for carbapenems. Resistance of carbapenems in Aeromonas species is rare. Resistance is usually mediated by chromosomal cphA gene. Here is a rare case of Meropenem resistant Aeromonas caviae associated with necrotizing pancreatitis.

Case: A 50 year old male, with intellectual disability, living in group home presented with abdominal pain and watery diarrhea. His evaluation revealed elevated lipase, Ultrasound showed CBD dilatation and gall bladder thickening. Pt was placed on symptomatic care for acute pancreatitis with IV fluids, pain management. During course of hospitalization patient had intermittent low grade fevers, spiked temperature upto 101.4 and abdominal symptoms of diarrhea and pain persisted. Patient was started on Meropenem. CT abdomen on day 8 was consistent with necrotizing pancreatitis and with large pseudocyst measuring 14.1 x 6.6 cm. A CT guided pseudocyst aspiration and percutaneous drain was placed by Interventional Radiology. Aspiration cultures reported for heavy growth of Aeromonas Caviae resistant to Meropenem and Piperacillin-Tazobactam but susceptible to other antibiotics on the panel. Antibiotic coverage was changed to Fluoroquinolones and with change in coverage patient’s fevers, leukocytosis and diarrhea gradually improved. Follow up CT on Day 15 showed interval drainage of fluid collection anterior to the pancreas. Antibiotics continued for few more days and patient was discharged in stable condition.

Discussion: Aeromonas species are globally distributed Gram-negative, oxidase-positive rods, found in aquatic environments, foods, and the microflora of fish. Though GI tract is by far the most common site from which the bacteria is recovered, its role as etiologic agent for gastroenteritis has not been established. No animal model has been established that can reproduce Aeromonas associated diarrhea. Infection may be acquired in humans by drinking contaminated water, ingestion of sufficient number of organism in contaminated food or through open wounds. Aeromonas has been associated with few outbreaks of diarrhea in long term care facilities which may be related to sub optimal hygienic conditions. Aeromonas has been shown to be a significant cause of infections after natural disasters. Most Aeromonas species are Meropenem sensitive. Very few cases of Carbapenem resistance have been reported. Aeromonas infection has been associated with serious conditions such as Cholangitis and HUS. Most hepatobiliary infections have been in cases with underling malignancy or immunosuppression, usually in patients with biliary tract obstruction. The case above did have biliary tract obstruction, and gall stone pancreatitis complicated with severe necrotizing pancreatitis and Aeromonas infected pseudocyst.
Alcoholic intoxication leading to Rhabdomyolysis and Bilateral Sub-massive Pulmonary Embolism

First Author: Dhavel Save, MD Second Author: Joshua Baru, MD

Introduction: Venous Thromboembolism is an uncommon but potentially lethal event in acute alcohol intoxication complicated by Rhabdomyolysis.

Case: 27 year old Indian man with no past medical history brought to the Emergency Department unresponsive for an unknown period of time. Upon arousal he admitted drinking a bottle of vodka. Physical examination was pertinent for respiratory rate of 24/min, Heart Rate of 130/min, dry mucosa and alcoholic smell of breath. Labs were significant for potassium of 5.1 milliequivalents/Liter, Lactic acidosis with anion gap of 21, transaminitis, Increased Lactate Dehydrogenase (LDH) of 899 and a Blood alcohol level of 330. Other toxicology was negative. Urine dip stick showed large blood but urinalysis showed only one RBC. Creatinine Kinase levels were 21605. A diagnosis of Rhabdomyolysis was made. While in the Emergency room, Patient became tachypneic, tachycardic and hypoxemic with oxygen saturation dropping to 80’s on room air. A Computed Tomographic (CT) Angiogram of the chest was performed and showed bilateral pulmonary embolism with evolving pulmonary infarcts. Bedside Trans-thoracic 2-Dimensional Echocardiogram showed severe Right Ventricular dilatation with hypokinesia and preserved Left ventricular function. Troponin-I was elevated to 0.68. Ultrasound (US) Doppler of lower extremities was negative for thrombus. Anti-thrombin III, Protein C, Protein S deficiency, Factor 5 Leiden, homocysteinemia was ruled out with negative Laboratory tests. Patient was started with anticoagulation with Heparin infusion and was admitted to Medical Intensive care unit (MICU) for observation He stabilized within hours and was eventually discharged home with Low molecular weight heparin bridged with Warfarin therapy.

Discussion: The majority of cases of Rhabdomyolysis are non-traumatic, and alcohol abuse is one of the most common causes. The short term alcohol intoxication, immobilization or coma induced by ethanol-related central nervous system sedation plays an important role in developing Rhabdomyolysis. It causes muscle compression and muscular ischemia, which superimposes or accelerates short-term alcohol myotoxicity, resulting in a massive breakdown of skeletal muscle within a short period. This leads to rapid release of osmotically active agents into the interstitial space and rapid increase of compartmental pressure and can even cause a compartment syndrome. Because of rapid release of muscle cell contents from damaged muscle into circulation, which include tissue thromboplastin and other pro-thrombotic substances, Rhabdomyolysis is a hyper-coagulable state and these patients are at risk of developing Thrombosis. There is also increased factor VIII pro-coagulant protein in muscle breakdown which may be a predisposing factor for DVT. These patients are also likely to be complicated with hyperkalemia, metabolic acidosis, acute renal failure, multi-organ failure, or disseminated intravascular coagulation. Although there are case reports in literature of development of Rhabdomyolysis following acute alcohol intoxication, development of bilateral sub-massive pulmonary embolism is rare and makes this case an interesting clinical vignette.
A Perplexing Cause of Acute Renal Failure in Prostate Cancer

First Author: Anushi Shah, MD Teresa Lynch, MD, Dilini Reyhart, MD.

An 86 year old male with metastatic prostate cancer post retropubic radical prostatectomy in 1993 and stage 3 chronic kidney disease (baseline creatinine 1.9) was transferred for evaluation of acute renal failure with concern for urosepsis and adrenal crisis. He had a 1 week history of anuria and increased pelvic pain resulting in a recent hospital admission for opioid overdose. Pertinent positives on review of systems included penile pain and edema, dysuria, and fevers. Of note, abiraterone acetate and prednisone had been initiated 2 months prior to admission for metastatic disease. On physical exam he was hypotensive, tachycardic, and afebrile. He had significant penile and scrotal edema with dry blood surrounding the urethral meatus. Admission labs showed PSA>2000, hyponatremia (132), hyperkalemia (6.9), hypocalcemia (7.3), BUN 47, creatinine 4.10, AST 272 and ALT 95. CBC demonstrated leukocytosis (23) with neutrophilia (75). Urological consultation was required for cystoscopic urethral calibration and foley insertion. Renal ultrasound demonstrated extensive hepatic hyper-echoic nodules consistent with known metastases. On day 2, urine culture resulted positive for enterococcus, treated with Augmentin. Although renal function and hemodynamic status improved with these measures, his calcium continued to trend down, and by day 3, reached a critical level of 5.0. The hypocalcemia was presumed to be secondary to hyperphosphatemia (6.8) secondary to AKI, but further work up revealed that in addition to hyperparathyroidism (523), the patient also had an LDH of 9725 and uric acid of 13.7. The diagnosis shifted to tumor lysis syndrome with the high tumor load indicated by PSA>2000 (versus 500 prior to initiating therapy), rising alkaline phosphatase, and correlating findings on abdominal ultrasound demonstrating innumerable liver metastases. Nephrology initiated febuxostat, calcium acetate, vitamin D, and IV bicarbonate/D5W, resulting in a drop in LDH to 5037, uric acid to 10.2, and increase in calcium to 6.3 (7.2 corrected). The patient then requested no further intervention and was discharged on allopurinol on day 5.

Tumor lysis syndrome is an oncological emergency resulting in massive derangement of electrolytes and organic acids predisposing to arrhythmias and renal failure. It is most commonly seen with aggressive hematological malignancies and very rarely associated with solid tumors. Of these, prostate cancer is even less commonly implicated. Although limited reports of TLS following treatment with docetaxel and paclitaxel for prostate cancer exist, there are zero cases reported while on abiraterone therapy. A low index of suspicion for TLS caused our patient’s symptoms to be attributed to other confounding variables, leading to a delay in diagnosis and appropriate management. In the case of high tumor burden, regardless of tumor type, a high index of suspicion must remain for tumor lysis syndrome.
Sweetheart: A Case of Tricuspid Valve Endocarditis Presenting as Hyperosmolar Hyperglycemic State (HHS)

First Author: Timothy Shih, DO MS

Infective endocarditis is a disease characterized by inflammation of the endocardium, most commonly of the heart valves. It prototypically presents with a vegetation, a mass consisting of platelets, fibrin, microorganisms, and inflammatory cells. The disease was first described in the mid 16th century, but despite significant advances in diagnosis and treatment the morbidity and mortality remain high. Infective endocarditis has been associated with a number of complications including stroke and thromboembolic phenomena, heart failure, and intracardiac abscess formation. Diagnosis can be a challenge as many of the clinical findings are subtle and nonspecific. However, careful history and physical examination, serologic testing, and imaging can assist in making the correct diagnosis.

Mr. G is a 45 year old male with no previous known past medical history who presented with weakness and a serum glucose of 728 without evidence of metabolic acidosis or ketonuria concerning for HHS. While his HHS was being appropriately treated with an insulin drip, initial workup for an underlying infectious etiology was notable for a leukocytosis to 18,000 as well as blood and urine cultures positive for gram positive cocci. Accordingly, the patient was started on IV vancomycin. Later on, the cultures resulted in pan-sensitive staph aureus, and the vancomycin was changed to IV nafcillin. Although the patient was initially afebrile, he began experiencing fevers on hospital day 5. To assess for the source of bacteremia, a CT of the chest was done which showed multiple peripheral pulmonary nodules suspicious for septic emboli. A TTE and TEE were performed and both were negative for vegetations. The patient continued to have fevers despite appropriate treatment with nafcillin, and so a repeat TTE was performed which revealed a small mobile echodensity seen on the tricuspid valve. The patient was continued on IV nafcillin, however he developed renal dysfunction which was concerning for interstitial nephritis, and his antibiotic was switched to IV cefazolin. The patient improved on cefazolin, which was continued for a total of 6 weeks. Mr. G was discharged with follow up with his PCP and with endocrine clinic for his newly diagnosed diabetes. A repeat TTE 4 months later showed only trivial tricuspid regurgitation and no signs of the previously seen vegetation.

This case highlights the oftentimes challenging nature of obtaining a definitive diagnosis for infective endocarditis. Despite the initial negative echocardiography, the patient was treated for presumptive infectious endocarditis based on high clinical suspicion. Interestingly, the patient developed right sided endocarditis despite having no known risk factors, e.g. drug use or structural heart defects. The patient’s presentation, however, was fairly typical of right sided endocarditis, where septic pulmonary emboli are more common than the more easily visible peripheral embolic phenomena such as splinter hemorrhages, Janeway Lesions, and Osler Nodes. Despite his complicated hospital course, the patient was fortunate in that he had no permanent valvular dysfunction necessitating surgical intervention. The initial presentation in this case demonstrates how the severity of underlying infection can expose undiagnosed diabetes, which furthermore highlights the importance of persistence in searching for underlying disorders in the setting of high clinical suspicion.
May-Thurner Syndrome: A rare cause of Deep Venous Thrombosis

First Author: Nabeel H Siddiqui, MD

May-Thurner Syndrome is a rare cause of Deep Venous Thrombosis (DVT), and one that can be missed easily. Herein, we report a case of May-Thurner Syndrome in a young female.

Case: A 20-year-old female presented to the hospital with left lower extremity pain and swelling for one week. The swelling was initially in her foot and traveled up to her thigh, and the pain made her unable to ambulate. She denied any recent immobilization, travel or limb trauma. She reported oral contraceptive use and history of smoking one cigarette daily each for the past one year. She denied any history of blood clots. Her family history was insignificant. She had stable vital signs. On exam, she had unilateral pitting edema in her left lower extremity up to the thigh, and tenderness to palpation in left posterior leg. D-Dimer was elevated at 7.2. Her coagulation profile and other tests for hereditary thrombotic disorders were normal. Ultrasound venous duplex identified a blood clot from the calf extending cephalad proximal to the femoral head, confirming the presence of DVT. She was started on anticoagulation with therapeutic enoxaparin. To prevent clot embolization, inferior vena cava filter (IVC) was placed. Moreover, as no clinical improvement was observed, tissue plasminogen activator was infused through a catheter in the left iliac vein. However, her pain persisted. Repeat CT angiogram showed extensive thrombus within the left common iliac vein, left external iliac vein and left femoral vein. There was also noticed to be narrowing in the distal aspect of left common iliac vein, secondary to compression from a crossing left common iliac artery. This suggested the diagnosis of a variant of May-Thurner Syndrome. She underwent placement of stents in left common iliac vein and left iliac vein at level of pelvic rim. Eventually, her symptoms of pain and swelling resolved with the preceding interventions. Her IVC filter was removed, and she was discharged in a stable condition on warfarin with follow up arranged with her hematologist.

Discussion: May–Thurner syndrome is a rare condition usually involving compression of the left common iliac vein by the overlying right common iliac artery, however, other variants like the one in our patient also exist. This can result in stasis of blood, leading to thrombosis.

Vascular ultrasound or CT angiogram are used to establish the diagnosis. Treatment is based on angioplasty and stenting of iliac vein.

Our case demonstrates that one should consider rare causes of DVT such as May-Thurner syndrome in young patients with no other identifiable causes. Thorough investigation and imaging can help identify the condition, and hence, prevent re-thrombosis in such patients.
Lung Hamartoma. Is it really a benign pathology?

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Introduction: Pulmonary hamartomas are the most common benign tumor-like lesions of the lung. Mostly found incidentally on routine imaging, they constitute 5-8% of all solitary pulmonary nodules. They arise as an outgrowth from epithelial lung elements and normal mesenchymal tissue of the lung. Ewing’s sarcoma (ES) and peripheral primitive neuroectodermal tumor (PNET) are part of a spectrum of neoplastic diseases known as the Ewing’s sarcoma family of tumors (EFT). It also includes extraskeletal Ewing’s sarcoma (EES), which is quite rare and predominantly involves the soft tissues of the trunk or the extremities. Primary ES of the lung is an extremely rare tumor. We described a case of pulmonary hamartoma which got converted into a pulmonary primary ES tumor over the course of 7 years. This case highlights the importance of routine monitoring of lung hamartomas, which as demonstrated in the present case can convert into a malignant tumor.

Case: A 38-year-old female presented to the clinic with 1 month history of cough, shortness of breath and dysphagia. She had a history of biopsy proven hamartoma at the right cardiophrenic angle, diagnosed 7 years ago. Plain chest radiography revealed significant increase in the size of the previously present mass. Computed tomography (CT) showed a 6 cm x 7 cm x 9 cm soft tissue heterogeneous mass. Similar location of the mass was confirmed after comparison with the previous imaging studies. CT guided core biopsy followed by histopathologic and immunohistochemistry studies confirmed the diagnosis of EES. Positron emission tomography –computed tomography (PET-CT) revealed increased fluorodeoxyglucose (FDG) uptake by the mass, left lobe of the liver and multiple hyper-metabolic bone lytic lesions. Considering the metastatic spread of the tumor, the patient was opted for neoadjuvant chemotherapy followed by the radiotherapy.

Discussion: ES is a rare malignant disease which generally involves pediatric population. Only 5% of all cases occur in adults. Moreover, EES originating in the lung is extremely rare, with less than 15 cases been reported in the published literature. The present case demonstrates a unique clinical occurrence. This patient had a biopsy proven lung hamartoma and presented 7 years later with the conversion of the mass into Ewing sarcoma. ES of the lung is an aggressive tumor and needs multidisciplinary approach. However, as in the present case, the prognosis remains poor. Hamartomas are considered benign tumors and no treatment is indicated for asymptomatic lesions. However, radiographic follow up is recommended for at least 2 years to confirm their benign nature and to establish a growth rate. The present case underscores the significance of routine monitoring of benign lung neoplasms.
Diffuse alveolar hemorrhage (DAH) secondary to amiodarone and apixaban use: A case report

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Diffuse alveolar hemorrhage is a clinical syndrome resulting from pulmonary capillaritis, bland pulmonary hemorrhage, or diffuse alveolar damage. DAH has been reported as a rare adverse event with amiodarone therapy, warfarin therapy, and as a potential complication with rivaroxaban therapy.

We present the case of a seventy-six year old Hispanic female with a medical history significant for heart failure with preserved ejection fraction, obstructive sleep apnea with associated pulmonary hypertension and right heart strain, type two diabetes mellitus, stage four chronic kidney disease, gastroesophageal reflux disease, chronic anxiety, dementia, and hypothyroidism who had presented with complaints of atypical chest pain, shortness of breath, and anxiety. Chest x-ray performed at admission showed patchy asymmetric infiltrates suggestive of worsening heart failure. The patient was then aggressively diuresed for pulmonary edema and presumed worsening heart failure. Thereafter, her hospitalization course was complicated by new onset acute non-valvular atrial fibrillation. Rhythm control with amiodarone was then initiated. Given her high risk for stroke based on CHADS-VASc score of six, anticoagulation was initiated with apixaban. Six days later, the patient developed respiratory failure due to acute respiratory distress syndrome (ARDS) confirmed by extensive bilateral consolidation on chest x-ray. During intubation, gross blood was noted to be lining the endotracheal tube. Amiodarone and apixaban were then held due to suspicion for alveolar hemorrhage. Systemic steroids were also initiated to prevent relapse and extensive continued pulmonary fibrosis. She was maintained on ventilator support with a strategy to treat underlying ARDS secondary to DAH. After four weeks of unsuccessful withdrawal of ventilatory support, the patient required tracheostomy and was then transferred to an inpatient rehabilitation facility.

Amiodarone monotherapy has been associated with DAH, and the concurrent anticoagulant effect of apixaban may have increased her risk of bleeding. The potential pharmacokinetic drug interaction between amiodarone and apixaban or the patient’s diminished renal function, whether independent or additive, cannot be excluded as contributing factors in this case of DAH.

Searching for Sarcoid: Utility of PET/CT Scan

Sarcoidosis is an inflammatory, granulomatous disease of unknown etiology. The disease most often presents with pulmonary symptoms and characteristic radiographic findings of hilar lymphadenopathy. Isolated extrapulmonary sarcoidosis presents a diagnostic challenge.

A 61 year-old gentleman whose past medical history included atrial fibrillation and type 2 diabetes mellitus presented with malaise, anorexia, a sixty pound weight loss, mild cognitive changes and hypercalcemia, 14.1 mg/dL (8.4-10.5 mg/dL). None of his medications were known to cause hypercalcemia. His exam was unremarkable for lymphadenopathy, pulmonary abnormalities, abdominal tenderness, hepatosplenomegaly or skin findings. He was started on intravenous normal saline, furosemide, calcitonin and pamidronate, while workup was initiated. Laboratory data revealed an appropriately suppressed PTH, normal PTHrp, normal serum and urine protein electrophoresis, normal urine Ca:Cr ratio, and a normal kappa/lambda light chain ratio. His 1-25 hydroxyvitamin D was 99 pg/mL (18-72 pg/mL) and his angiotensin converting enzyme level was 99 U/L (9-67 U/L). Skeletal survey was negative for osteolytic lesions. CT showed multiple <5mm calcified nodules throughout the lungs and mild splenomegaly, which were not felt to be significant by the consulting pulmonologist. A whole-body PET/CT was pursued which demonstrated heterogeneous uptake throughout his bone marrow, one hypermetabolic lymph node in his left neck, and mildly prominent splenic uptake. Bone marrow biopsy subsequently revealed normocellular bone marrow and the presence of non-caseating granulomas. The presence of non-caseating granulomas in the bone marrow along with the patient’s clinical presentation confirmed the diagnosis of isolated extrathoracic sarcoidosis as a very rare etiology of refractory hypercalcemia.

Sarcoidosis primarily involves the lungs and while extrapulmonary sarcoidosis is common (30-50%), it is usually concomitant with pulmonary involvement. In a study with 736 sarcoidosis patients, 95% had thoracic involvement, 50% had concomitant extrathoracic disease and only 2% had isolated extrathoracic sarcoidosis. Hypercalcemia is seen in only 10-20% of all cases of sarcoidosis. Extrapulmonary disease can be severe and life threatening and its presence can impact the therapeutic approach. Diagnostic dilemmas arise when trying to search for affected organs, particularly when patients are asymptomatic. The use of PET/CT relies on glucose hypermetabolism by granuloma cells and can be used for mapping of inflammatory sites and identification of occult disease. In one study, PET/CT revealed an occult site not detected by exam or standard imaging in 15% of patients. The sensitivity of PET/CT in detecting active sarcoidosis is 80-90%. As specificity is low, tissue biopsy is required to confirm the diagnosis. This case illustrates the utility of PET/CT in diagnosing extrathoracic sarcoidosis. It is especially useful in those with unusual presentations and normal chest imaging.
A Case of a 30 year old Presenting with a Rare Condition Disguised as B Cell Lymphoma.

First Author: Jinous Etemadi, MD Co-Author: Ahmed Behery, MD

Langerhans cell histiocytosis (LHC) is a rare disease which more commonly affects children. It has a widely variable clinical presentation that can mimic other conditions resulting in delayed diagnosis and initiation of appropriate treatment. In this case a patient presented with recurrent B-symptoms that were initially concerning for lymphoma.

A thirty year old African American male presented with six months duration of fatigue, night sweats, polyarthralgia, and an unintentional twenty-five lb weight loss. In addition he also complained of generalized bone pain and a diffuse scaly rash with extensive xerosis and peeling of skin over his trunk, back, and extremities and had multiple previous episodes since 2004. On exam, non tender inguinal and axillary lymphadenopathy was found. Given his presentation, lymphoma particularly B-cell was the primary concern, followed by EBV and HIV. The patient was admitted and underwent an extensive work up for the above conditions as well as for autoimmune and connective tissue diseases, which was negative. Finally, an axillary lymph node excision biopsy revealed increased CD1a, and langerin positive Langerhans cells as well as aggregates of histiocytes and eosinophils confirming the diagnosis of LCH. The patient was then treated with a course of prednisone to which he responded with resolution of his symptoms.

The exact pathogenesis of LHC is unknown, however based on current hypotheses there is increased proliferation of Langerhans cells with increased production of various cytokines, which contribute to the constitutional symptoms seen in this case. The presentation of LHC is highly variable depending on the extent of involvement which can range anywhere from benign single organ system to multifocal or disseminated involvement with fatal consequences. In the majority of presentations reported there is usually bone involvement and, to a much lesser extent, skin manifestations such as vesicular lesions as well as dermatitis on the scalp or intertriginous regions. This case is unique in that the onset of symptoms occurred during adulthood with an unusual skin findings and more pronounced constitutional symptoms with lymphadenopathy which can be misleading for a lymphoma picture.

This case exemplifies the importance of prompt consideration of rare diagnoses such as Langerhans cell histiocytosis in patients presenting with B-symptoms and a negative work up for more common conditions such as lymphoma or HIV in order to facilitate early treatment.
INDIANA POSTER FINALIST - CLINICAL VIGNETTE Rohan Mehta, MD

Salmonella isolation from perinephric abscess

First Author: Rohan Mehta, MD Second Author: Victor Collier, MD

Perinephric abscess can occur as a result of local spread, hematogenous or lymphatic seeding. The most common etiologic organisms isolated include Staphylococcus aureus, Escherichia coli, and Proteus species. Insidious presentation of the condition poses a significant challenge in diagnosis and the subsequent appropriate medical or surgical intervention. The following is a very rare case in terms of the organism isolate Salmonella sp. from a perinephric abscess.

A 44-year-old man with past medical history significant for End stage renal disease (ESRD) from autosomal dominant polycystic kidney disease (ADPKD) presented to emergency department with a fever of 102.9°F and left lower quadrant abdominal pain. Two weeks prior to this visit, the patient had intermittent fevers, vomiting, and non-bloody diarrhea for 5 days which resolved with supportive treatment. Physical exam was positive for mild LLQ and flank pain without any urinary symptoms. CT scan of the abdomen without contrast revealed bilateral renal enlargement and innumerable cysts without any evidence of an infectious process. He was empirically treated with Vancomycin and Zosyn. However, he continued to have intermittent high grade fevers with severe leukocytosis and was switched to intravenous ciprofloxacin concerning for possible cyst infection. A repeat CT showed some left sided perinephric stranding confirming the suspicion of a cyst super infection but no definitive abscess or fluid collection was visualized. He was transferred to our institution for further evaluation and treatment, given his refractory fevers and leukocytosis. Antibiotics were switched to cefotaxime due to improved cyst penetration and prior failure of ciprofloxacin. He remained febrile with significant LLQ abdominal pain but repeat CT imaging showed a large abscess extending from the left kidney. He was sent to interventional radiology for abscess drainage and cultures subsequently grew Salmonella sp. Following drainage, he had resolution of fever and leukocytosis. He was discharged in stable condition to complete two weeks of outpatient antibiotic therapy. Further review of outside records revealed that he had grown a few Salmonella species from stool culture collected on admission.

This case illustrates the difficulty in diagnosing perinephric abscess due to the slow onset of presentation, radiographic limitations and the limited penetration of certain antibiotics. It also illustrates that unusual pathogens can complicate the clinical picture. Although, most of the perinephric abscesses are an extension of an intra-renal abscess rupture, up to 30 percent can present from a distant foci of infection like gastrointestinal or pelvic structures through hematogenous or lymphatic spread. It appears this patient likely had salmonella enteritis followed by bacteremia, and possible hematogenous seeding to his left kidney resulting in abscess formation. Recognition of this infection is essential to instituting surgical drainage in concordance with appropriate penetrative antimicrobial therapy.
Amiodarone-Induced Cirrhosis in the Absence of Long-Standing Transaminase Elevation

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Amiodarone has been used for many years to treat various tachyarrhythmias. While its side effect profile includes hepatic toxicity, cirrhosis from amiodarone has been rarely reported.

A 74-year-old gentleman presented to the hospital with a progressive fifty-pound weight gain during the previous three months despite increases in his home diuretic. He had no other complaints, and his review of systems was otherwise negative. The patient denied a history of alcohol or illicit drug use. His past medical history included coronary heart disease, systolic congestive heart failure, and atrial fibrillation. His medications included amiodarone 200mg twice daily for 8 years, lasix, carvedilol, atorvastatin, and aspirin. On exam the patient had anasarca including tense ascites and mildly elevated jugular venous pressure and was otherwise normal and without evidence of stigmata of chronic liver disease. A hepatic panel and coagulation studies were normal, including transaminases and alkaline phosphatase, except for hypoalbuminemia of 1.8 mg/dL. Urinalysis revealed no proteinuria. A transthoracic echocardiogram was unchanged from previous, showing an ejection fraction of 35%, without signs of right-sided dysfunction and a high-normal right ventricular systolic pressure. A computed tomography scan of the abdomen and pelvis revealed large-volume ascites and suggested cirrhosis when compared to prior imaging. A review of his previous outpatient lab trends indicated normal hepatic markers throughout the previous 10 years except for a brief period 6 months prior to presentation with elevated transaminases to twice the upper limit of normal. Viral hepatitis serologies were negative. An extensive laboratory workup, including ANA, AMA, Anti-Sm, ceruloplasmin, RF, anti-gliadin, alpha-1-antitrypsin, HIV, thyroid studies, iron studies, and HFE mutation was negative. A paracentesis was performed which revealed normal cytology and cell counts and a SAAG of less than 1.1. The patient underwent a trans-jugular liver biopsy which revealed cirrhosis associated with bile ductular proliferation and periductular neutrophilic inflammation and reported that drug-induced liver injury should be considered. While the biopsy was atypical for amiodarone-induced cirrhosis, which usually mirrors alcoholic liver disease with variable amounts of fibrosis, consultation with the pathologist identified this medication as the most likely etiology for his cirrhosis.

Asymptomatic transaminase elevation occurs in 25% of patients treated with amiodarone but only 1% develop symptomatic acute or chronic liver dysfunction. A recent review article identified only 37 cases of amiodarone-induced liver cirrhosis over a 42-year period. This rare case of amiodarone-induced liver cirrhosis illustrates that hepatic injury can occur in the absence of chronically elevated hepatic biomarkers. Clinicians should be aware that severe organ dysfunction can occur despite appropriate monitoring and that amiodarone use should be avoided if possible to prevent this life-threatening complication.
Unlucky 13: A Bleeding Mystery of an 88 year old female

First Author: Harsh R Shah, DO

Acquired Factor XIII deficiency due to anti-FXIII antibodies is a rare but life-threatening bleeding disorder. Factor XIII is a fibrin stabilizing enzyme which crosslinks fibrin monomers. Deficiency of Factor XIII results in destabilization of formed clots within 24-48 hours, resulting in delayed hemorrhage. Here, we report a case of an 88-year-old female presenting with severe hemorrhage of unknown origin.

An 88-year-old female with a recent diagnosis of autoimmune hemolytic anemia on oral Prednisone developed left arm swelling, pain, and ecchymosis. CT scan of the arm showed a biceps muscle hematoma measuring 17cm in length. On the 4th day, she developed a rapidly evolving hematoma on the contralateral forearm, which prompted bilateral fasciotomies and evacuation of multiple clots. Patient had a normal coagulation profile and peripheral blood smear revealed features of chronic hemolysis.

Subsequently, patient’s Factor XIII levels came back low at 8%. Testing for inhibitor with serial dilutions showed an antibody titer of 1:40. Patient was started on 200mg of Cyclophosphamide and continued on 20mg of Prednisone for inhibitor eradication. On day 66, patient had AIHA flare up (Hg: 6.6g/dL) and was started on Rituximab 375mg/m^2 weekly for 4 infusions. Her Factor XIII inhibitor level on day 68 came up to 12% and inhibitor titer went down to 1:10. On day 98, patient developed several areas of large ecchymosis on the right knee, thigh and buttock. Her Factor XIII activity dropped to < 10% again and inhibitor titer went up to 1:20. She was transfused and was started on IVIG at 1000mg/kg X 5 days. Her Factor XIII is still <10% but inhibitor titer is down to 1:10. Currently, patient is recovering in a rehab institution and is not actively bleeding.

There are less than 60 reported cases of acquired factor XIII deficiency in the literature. In a systematic review that looked at 28 cases, 79% of the patients presented with spontaneous hematomas and 18% presented with ICH. 10 of the cases were associated with medications (5 with Isoniazid) and 7 with autoimmune disorders. However, this is the first reported case presenting with warm antibody hemolytic anemia. Mortality rate was 29% in general and 60% in patients presenting with ICH.

In conclusion, acquired FXIII deficiency is a rare bleeding disorder that can cause moderate to severe bleeding and carries a significant mortality rate. This case illustrates the clinical paradigm that if a patients presents with bleeding symptoms with no abnormal findings on routine tests, the possibility of acquired FXIII deficiency should be considered. Prompt characterization of Factor XIII activity and inhibitor level is essential in order to provide the most appropriate therapy for inhibitor eradication and control of hemorrhagic complications.

EBV Infection in an Immunocompromised Host: When “Mono” is Not Alone

First Author: Snigdha Jain, Resident Physician; Second author: Katherine Harris, Assistant Professor

A 20 year-old woman with a history of ulcerative colitis on azathioprine, primary sclerosing cholangitis and hypothyroidism presented with high-grade fevers, malaise and mild right upper quadrant abdominal pain unrelated to food intake. She presented to an outside emergency room one week prior to admission with fevers and had been diagnosed with infectious mononucleosis. Physical examination was significant for temperature of 38.5 C, tachycardia to 104 beats per minute, BP of 99/55 and mild right upper quadrant tenderness with a negative Murphy’s sign. Laboratory testing revealed pancytopenia with white blood cell count of 2.1, hemoglobin of 11.3 and platelets of 118, all of which were significantly lower than her baseline levels while on azathioprine. Liver enzymes were mildly elevated in a hepatocellular pattern. Abdominal ultrasound revealed splenomegaly without any evidence of gallstones and a HIDA scan was negative for cholecystitis. Her immunosuppressive medications were held and she was initially treated with supportive treatment of intravenous fluids. However, she continued to have high fevers up to 40.5 C, tachycardia and worsening cytopenias. Concern for an additional infectious etiology was raised and testing for atypical infections including Ehrlichia, Anaplasma, Rickettsia, Cryptococcus, Leptospira and Cytomegalovirus was negative. She was started on treatment with valacyclovir for EBV but continued to deteriorate clinically. As she was known to have an autoimmune disease, Still’s disease, autoimmune hepatitis and vasculitides were also considered but all specific immunologic testing was negative. Given her persistent fevers, cytopenias and splenomegaly, concern for hemophagocytic lymphohistiocytosis (HLH) was raised. A ferritin level was checked and was abnormally elevated to 7025 ng/ml, NK cell activity was found to be absent, soluble Interleukin-2 receptor activity was high and a bone marrow biopsy revealed hemophagocytosis, confirming the diagnosis of HLH. She was treated with intravenous immunoglobulin, dexamethasone, anakinra and cyclosporine. Her fevers and fatigue resolved and her laboratory values returned to normal within a few weeks of treatment.

Hemophagocytic lymphohistiocytosis (HLH) is a syndrome characterized by systemic immune activation leading to massive inflammation and cytokine release. It is known to be under-diagnosed given its non-specific clinical manifestations that may overlap with any infectious or inflammatory process. It is a rare but life – threatening disorder that requires a high index of suspicion for diagnosis. This case illustrates that clinical signs and symptoms out of proportion to that expected from a common infection should prompt consideration of an additional systemic inflammatory process, even in an immunocompromised patient, as appropriate and timely treatment can be life saving.
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Individuals with underlying rheumatologic diseases such as dermatomyositis may not adequately respond to tuberculin (PPD) skin tests, creating false negative results. These illnesses are frequently treated with immunosuppressive therapy making proper identification of TB infection imperative.

A 59-year-old Filipino man was diagnosed with dermatomyositis on the basis of rash, electromyography, and muscle biopsy. He was initially treated with IVIG infusions and transitioned to oral prednisone and mycophenolate. The patient’s symptoms improved on this regimen. Six months after starting mycophenolate, the patient began having fevers, night sweats, and productive cough without hemoptysis. He moved from the Philippines 5 years prior to dermatomyositis diagnosis, denied sick contacts, and was PPD negative both at immigration and immediately prior to starting mycophenolate treatment. A third PPD was negative following the onset of these new symptoms. He was treated for community-acquired pneumonia, but symptoms worsened over 10 days and he developed watery diarrhea and a growing non-tender, non-mobile mass on the left side of his neck. A chest x-ray demonstrated a cavitary lesion in right upper lobe suspicious for TB that hadn’t been present one month earlier. Chest CT corroborated this finding also exhibiting necrotic hilar and paratracheal lymphadenopathy. Neck CT demonstrated the left-sided mass as cervical chain lymphadenopathy. Expectorated sputum and stool samples contained acid-fast bacilli (AFB), cultures showing TB bacteria. Fine-needle biopsy of the neck mass (scrofula) also exhibited AFB. An MRI brain showed nodular enhancement suspected to be a tuberculoma. Mycophenolate was discontinued and dermatomyositis treatment was switched to oral prednisone with a 3-day course of IVIG. The patient’s infection showed sensitivity to standard RIPE (rifampin, isoniazid, pyrazinamide, and ethambutol) treatment. Within a week of starting RIPE, the patient’s diarrhea subsided, scrofula diminished, and symptoms significantly improved. By the end of treatment week 3, the patient’s sputum no longer contained AFB; he was removed from isolation, and was discharged to continue RIPE at home. He was discharged on oral prednisone, which effectively addressed his dermatomyositis.

This case illustrates the unreliability of PPD tests in patients with long-term inflammatory diseases such as dermatomyositis. Other immunosuppressive therapies (adalimumab, etanercept, and infliximab) have been affiliated with conversion of latent TB to disseminated TB. Mycophenolate is another immunosuppressive agent with similar mechanistic properties. Thus, it is imperative that patients with long-term inflammatory diseases and high-risk TB factors initiating immunosuppressive therapy receive a TB blood test (such as a quantiferon gold assay) prior to the initiation of therapy to ensure that latent TB is unmasked before it can evolve into a disseminated form of the disease.
All That Glitters is not Gold

First Author: Maria T Story, MD, Second Author: Sarat Kuppachi, MD

A 63 yo healthy male, with no past medical history or allergies, presented to the Emergency Department with a rash and facial swelling of four days duration. He had been receiving intravenous Vancomycin and Ceftriaxone for 18 days after a transesophageal echocardiogram (TEE), performed to evaluate recurrent fevers, demonstrated ‘a small mobile mass on the non-coronary cusp of the aortic valve, possibly a ‘vegetation.’ Six blood cultures prior to TEE were negative.

On admission vital signs included BP 119/67, HR 101, and T39.6 C. Skin examination showed periorbital and facial edema and erythematous patches overlying diffuse edema of the entire body. There were no oral ulcerations or lymphadenopathy. Palms and soles had slightly purpuric macules present. There was no murmur on auscultation. Laboratory studies were notable for 22,000 WBCs, predominantly neutrophils and bands, and 1358 eosinophils. LFTs were not elevated.

To exclude the possibility of infective endocarditis, a repeat TEE was performed. The new study demonstrated ‘echodensities at the edges of both the non-coronary and left coronary cusps of the aortic valve, likely benign hypertrophied Nodules of Arantius.’ When compared with previous images, the findings had not changed.

Despite discontinuing antibiotics the rash evolved into body-wide erythroderma, which led to diffuse desquamation and formation of pseudovesicles on the arms and trunk. Skin biopsy demonstrated a perivascular lymphoid infiltrate consistent with an atypical lymphomatoid drug eruption.

Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) syndrome, resulting from unnecessary antibiotic usage for a benign echocardiographic finding, led to significant morbidity. Clinicians should recognize features of infective vegetation’s to be confident in the diagnosis of infective endocarditis before committing patients to prolonged courses of antibiotics. The key features of infective vegetation’s include a pedunculated mobile echodensity, typically on the free margin of the leaflet. Aortic vegetation’s are normally present on the ventricular surface of the valve and leaflet thickening is absent.

The difficult search for the source of fever should not excuse the exclusion of scientific rigor that is firmly evidence based. In this case we are unable to determine the indication for the TEE in the absence of a detectable murmur. Critical evaluation of the entire clinical picture, including absence of new heart murmur, multiple negative blood cultures, lack of physical findings suggestive of endocarditis, and atypical findings of a ‘mass’ on echocardiogram could have prevented these life threatening complications. Evidence shows that adults who remain undiagnosed after an extensive evaluation for fever of unknown origin have a good prognosis. Approaching treatment strategies because ‘we have to do something’ is not good practice. This case highlights potential life threatening dangers in deciding that ‘this should work’ especially in the absence of clinical evidence. All that glitters isn’t gold, similarly all vegetation’s found on cardiac valves are not infectious...even if the patient is febrile.

Our patient recovered well on a prolonged steroid taper.
Mrs. AM is a 31 y.o. G3P3 female with a witnessed cardiac arrest due to ventricular fibrillation (VF). She was 6 weeks postpartum following an uncomplicated pregnancy and delivery were uncomplicated. She had presented to the emergency department (ED) of a local hospital with severe retrosternal chest pain and shortness of breath that started earlier that day. In the ED, she became unresponsive and was found to be in VF. Cardiopulmonary resuscitation was started immediately. After return of pulse, a12-lead EKG showed ST-elevation in anterolateral leads. Coronary angiography showed diffuse spasm in the mid left anterior descending (LAD) artery with good distal flow. Left ventriculography showed apical dyskinesis and ballooning with hyperdynamic basal segments. Estimated ejection fraction (EF) was 15%. She was transferred to our hospital with a diagnosis of stress-induced cardiomyopathy. Upon arrival, she was chest pain free with borderline low blood pressure. Bedside Swan-Ganz catheter showed low cardiac index, elevated filling pressures and high SVR consistent with cardiogenic shock. She was started on nitroprusside for afterload reduction. Laboratory studies were significant for a elevation in troponin-T (5.09 ng/mL) and CK (3553 U/L). C-reactive protein, D-dimer and respiratory viral PCR were negative. Cardiac MRI showed severely depressed left ventricle (LV) systolic function and extensive transmural scar in anterior wall with matched wall motion abnormality suggesting a diagnosis of myocardial infarction. Coronary CT angiography was performed that showed a dissection flap with a false lumen in the LAD. Given the CT and MRI findings, a diagnosis of spontaneous dissection of LAD leading to acute myocardial infarction was made.

Spontaneous coronary artery dissection is rare, but should be considered as possible etiology of an acute myocardial infarction (MI) in a young patient, especially women in the peri-partum period. Increased hemodynamic stress or arterial wall changes from hormonal effects during pregnancy have been proposed as potential mechanisms. Patients typically present with chest pain, EKG findings consistent with ST-elevation MI and/or cardiac arrest. The diagnosis is commonly made during coronary angiography or other cardiac imaging modalities. Treatment should be based on symptoms, clinical status and affected coronary segments. Although, immediate revascularization may limit myocardial damage, percutaneous coronary intervention can be challenging due to potential for propagation of the dissection flap. Bypass surgery may be considered in unstable patients and in dissections involving the left main artery. Conservative treatment is preferred in stable patients and with dissections involving small arteries.
Testicular Sarcoidosis

First Author: Anjalee Goel Carlson, DO Second Author: Timothy Shaver, MD

Testicular germ cell tumors (GCT) are the most common solid tumors in young men. However, there have only been a few cases of patients with sarcoidosis or sarcoid-like reaction with testicular GCT. Sarcoidosis is an idiopathic, multisystem disease involving the development of non-caseating granulomas, primarily in the lung. There is a 1.1% cumulative incidence of sarcoidosis occurrence with or following testicular cancer. Furthermore, the distinction between sarcoidosis and testicular GCT with metastasis can be difficult as pulmonary hilar lymphadenopathy is present in 90% of genitourinary sarcoidosis cases. Therefore, genitourinary sarcoidosis may mimic a testicular GCT in males as both occur in the same age group of males. In patients that present with sarcoidosis symptoms and a testicular mass, sarcoidosis or sarcoid-like granulomatosis with testicular GCT should be considered in the differential diagnosis. It is important to note that the treatment of GCT has drastically changed and has more than 80% curative rate with current chemotherapy regimens.

A 29-year-old African American male presented with symptoms of cutaneous lesions, lymphadenopathy, and unilateral painless swelling of his left testicle. Lymph node biopsy was performed displaying noncaseating granulomas consistent with diffuse disseminated sarcoidosis. Testicular biopsy also was performed due to the increased risk of sarcoid-like granulomatosis with testicular germ cell tumors. Frozen section was consistent with sarcoid granulomatosis. Steroid therapy was initiated and marked improvement was noticed by time of discharge.

Although this patient did not have a testicular GCT, it is essential that the patient be managed as if it is high on the differential as the outcome is based primarily on the initiation of treatment. Since both genitourinary sarcoidosis and testicular GCT present in patients of the same age and clinically may present the same, it is essential to keep both in consideration. Patients with sarcoid-like symptoms and testicular enlargement or mass need to be evaluated for testicular cancer, as there is an elevated risk for coexistence of sarcoid-like granulomatosis and testicular GCT.
KANSAS POSTER FINALIST - CLINICAL VIGNETTE Kaitlin M Ditch, MD

STORM IN AN UNSUSPECTING PATIENT

First Author: Kaitlin M Ditch, MD Georges Elhomsy, M.D.

Introduction: Thyroid storm is an extreme accentuation of thyrotoxicosis that occurs primarily in patients with untreated Graves’ disease but can occur in patients with toxic multinodular goiter. It is usually precipitated by surgery, trauma or infection. It is characterized by symptoms of severe hypermetabolism. Fever is almost always existent. Tachycardia and arrhythmias may be associated with heart failure. Delirium and psychosis may occur and progress to stupor and coma (1). Although rare (2), thyroid storm has a mortality rate of 20 to 50% (1).

Case Description: A 28 year old female with medical history of asthma presented to the emergency department with three week history of upper respiratory symptoms and chest pain. The physical exam revealed temperature of 100.2°F, pulse of 159 bpm and bilateral wheezing, decreased air entry and increased expiratory phase. EKG revealed supraventricular tachycardia that did not respond to several doses of adenosine. Cardizem drip was initiated and synchronized cardioversion was performed but without success. Later she developed respiratory failure and was intubated. Laboratory evaluation revealed leukocytosis, lactic acidosis, and normal urinalysis. Imaging showed no abnormalities. She was treated for asthma exacerbation and community acquired pneumonia. Later, sputum culture was positive for Oxacillin sensitive staphylococcus aureus, and nasopharyngeal swab was positive for coronavirus.

On the fourth day of admission the patient was successfully extubated; however, she was still stuporous, tachycardic febrile and had elevated LFTs. Only then were her thyroid function tests ordered and revealed low TSH 0.08 uIU/mL (0.35-5.50 mIU/mL), elevated total T3 332 ng/dL (87-178 ng/dL), elevated free T4 5.2 ng/dL (0.6-1.1 ng/dL), and elevated Thyroid Stimulating Immunoglobulin. The patient was diagnosed with thyroid storm with Wartofsky score of 80, highly suggestive of thyroid storm. She was treated with methimazole, propranolol, hydrocortisone, and SSKI. Shortly after, the patient improved dramatically, with resolution of her fever, tachycardia and neurological symptoms. She was discharged home one week later.

Discussion/Conclusion: The Burch-Wartofsky Scores (1) is a clinical tool that can help confirm the diagnosis of thyroid storm. Score of 45 or greater indicate thyroid storm while scores less than 25 are unlikely thyroid storm. The score’s parameters are temperature, CNS effects, cardiovascular dysfunction (Tachycardia, A-Fib, CHF) gastrointestinal-hepatic dysfunction and precipitant events, Thyroid storm should be treated with thionamide (Methimazole or PTU) to block thyroid hormone production, Potassium iodide (SSKI) to prevent thyroid hormone release and should be given at least one hour after thionamide, hydrocortisone to decrease peripheral conversion of T4 to T3 and propranolol to control heart rate.

While thyroid storm is rare, its high mortality suggests that it should be considered in the differential diagnosis of the critically ill patient with hyperpyrexia and tachycardia. Thus, we recommend checking thyroid function tests in these patients.

Undiagnosed Systemic Lupus Erythematosus Presenting as Hemophagocytic Lymphohistiocytosis

First Author: Justin G Fernandez, MD Christopher Dakhil, M.D.

Hemophagocytic lymphohistiocytosis (HLH) is a rare disease that occurs primarily in the pediatric population. When diagnosed in adults, it is usually known as secondary HLH. Incidence is reported as roughly one case per million persons per year. It can be triggered by conditions that affect immune homeostasis such as infections, genetic mutations and rheumatologic disorders. The following case demonstrates a rare instance in which undiagnosed systemic lupus erythematosus (SLE) resulted in HLH.

A 28 year-old male with no past medical history and a recent unremarkable cervical lymph node biopsy presented with progressive weakness, flu-like symptoms and recurrent fever of 2 months. Vital signs were within normal limits except for temperature, which was 100.3°F. His exam was unremarkable except for a malar rash and a left cervical scar from the aforementioned lymph node biopsy. His labs showed pancytopenia, neutropenia, positive antinuclear antibody, hypertriglyceridemia, fibrinogen of 126 mg/dl, ferritin >40,000 ng/ml and hemophagocytosis was present on bone marrow biopsy. All workup for a source of infection was negative. A tentative diagnosis of HLH was made based on clinical presentation and the above laboratory data, which satisfied the HLH-2004 trial diagnostic criteria. The patient was then transferred to a regional quaternary medical center and was treated with an HLH protocol using etoposide and dexamethasone. Later, it was determined that the disease was secondary HLH after a workup of his malar rash revealed SLE. The patient was treated for SLE with an immunosuppressive regimen of cyclosporine and dexamethasone, and he improved dramatically. He was eventually discharged home in stable condition.

Adult HLH usually presents secondary to infection but is rarely due to a rheumatologic condition such as SLE. Diagnosis may be difficult as there is frequently an overlap in the clinical and laboratory picture. This diagnosis should always be kept in mind when those with rheumatologic conditions acutely decompensate and present with multiple blood abnormalities.
Multiple Myeloma as Cyclic Vomiting Syndrome

First Author: ROSSA KHALAF, Nassim Nabbout, MD, FACP

Introduction: Multiple myeloma (MM) is a neoplastic proliferation of immunoglobulin-producing plasma cells that accounts for 10% of hematological malignancies and 1% of all cancers in the USA. It mainly presents with hypercalcemia, renal failure, anemia of chronic disease, and lytic bone lesions with bone pain. Rarely, patients may have neurologic disorders present involving the central and peripheral nervous systems. With this clinical picture, diagnosis is established with presence of protein M >3 g/dl in serum/and urine and presence of 10% or more clonal plasma cells. We present a patient who presented with cyclic vomiting syndrome (CVS) for a year before the diagnosis of MM was made.

Case report: A 58-year-old female with a past medical history of chronic normocytic anemia and hypertension presented with recurrent nausea, bilious vomiting, and intermittent constipation over a period of fourteen months. These presentations were associated with dehydration and acute kidney injury that would resolve with hydration. Workup, including EGD, colonoscopy, CT of the abdomen/pelvic, MRI of the brain, UDS, and gastric emptying, was negative. A diagnosis of cyclic nausea and vomiting disorder was made. Over the ensuing 14 months with continued symptoms, unintentional weight loss, emergency room visits, and repeat imaging, there was an incidental finding of diffuse pelvic bone and spine lytic lesions on CT scan. During this period, creatinine and calcium were normal; hemoglobin was within the patient’s baseline with usual normocytic normochromic anemia. Further workup revealed +2 rouleaux formation, M-Spike elevation, and Kappa/lambda ratio of 43.9. Bone marrow biopsy showed 90% cellularity of which 80% were plasma cells. A diagnosis of diffuse pattern of multiple myeloma was confirmed and patient was started on chemotherapy regimen of bortezomib.

Conclusion: This patient’s cyclical vomiting presentation is explained by multiple myeloma induced neuropathy. This process is explained by diverse etiologies including compressive, plasma cell infiltrative or autoimmune/cytokines mediated. Diagnosis of multiple myeloma can be challenging and requires a high index of suspicion to establish the diagnosis early since this affects prognosis. Clinicians should have a judicious clinical approach to detect multiple myeloma especially when the classical presenting symptoms of CRAB (elevated Calcium, Renal failure, Anemia, Bone lesions) are absent.
KENTUCKY POSTER FINALIST - CLINICAL VIGNETTE Michael E Jesinger, MD

TRIPOLAR DISORDER

Michael Jesinger, MD Archana Narla, MD Romil Chadha, MD

Learning Objectives:

· Describe a rare presentation of acute on chronic lithium toxicity

· Highlight complications of lithium therapy and outline treatment options

Case Presentation: A 55 year-old lady with history of bipolar disorder presented with worsening of mood and visual hallucinations for two weeks. Her bipolar disorder was well-controlled with lithium over the last 20 years; she recently increased her lithium dose in order to control her symptoms better. Her exam was notable for bradycardia, fine intention tremors, apraxia, confusion and slurred speech. Laboratory workup revealed acute kidney injury with creatinine of 2.5 mg/dl and elevated lithium level of 3.6 mmol/L. Lithium was discontinued and fluid resuscitation was initiated. However, she became obtunded and repeat lab work revealed severe hypernatremia (164 mmol/l), hypercalcemia (iCa 5.8 mmol/l) and elevated parathyroid hormone (422 pg/ml) consistent with lithium induced nephrogenic diabetes insipidus and lithium induced primary hyperparathyroidism. She was started on free water and amiloride to take care of nephrogenic diabetes insipidus. Even with one slow hemodialysis session the lithium level normalized with full recovery of her mental status. Initiation of cinacalcet corrected her calcium. By time of discharge she regained her full functionality and sensorium.

Discussion: Lithium is an effective and widely used medication for mood. However, lithium has a narrow therapeutic index with frequent toxicity during treatment. Acute lithium poisoning typically presents with nausea, vomiting and diarrhea; with neurologic findings such as confusion, agitation and ataxia developing late. A common but often unrecognized complication of long-term lithium therapy is hyperparathyroidism and associated hypercalcemia and hypocalciuria. The exact mechanism by which lithium increases serum calcium levels is unknown but may be due to an increased threshold for the calcium-sensing mechanism within the parathyroid gland, overproduction of PTH by inhibiting the action of GSK 3b, and inhibition of calcium transport across cell membranes. Renal failure often complicates hypercalcemia which leads to concurrent hypocalciuria. Approximately 10% of patients taking Lithium will develop hypercalcemia, and hypocalciuria with a smaller percentage having a high serum PTH concentration. Compared to the general population affected by hyperparathyroidism, higher percentage of patients (33%) develop parathyroid hyperplasia in lithium-induced hyperparathyroidism. This hyperplasia is the probable reason why acute discontinuation of lithium does not result in immediate changes in calcium homeostasis. Treatment is with discontinuation of lithium. If hypercalcemia does not resolve after discontinuation, parathyroidectomy may be an alternative in select populations. In addition, there have been case reports describing the use of cinacalcet; a calcimimetic drug that may be used to decrease or normalize the serum calcium. This may be a good option for non-surgical candidates currently and in future has potential to become the drug of choice for lithium induced primary hyperparathyroidism.
KENTUCKY POSTER FINALIST - CLINICAL VIGNETTE Justin R Kingery, MD PhD

“You’re Not Dying” and Other Acceptable Lies: Ethical Communication in Global Health

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The concept of “global health” is ever evolving and becoming a core of medical education. As western trained physicians transition to practicing medicine in the developed world, due to limited resources, they are presented with the challenge of making decisions based less on diagnostic tools and rely more on clinical judgment. The ethical principles of autonomy, beneficence, non-maleficence and justice are also a core of western medical education.

This case describes a 45 yo Kenyan patient with stage IV esophageal cancer examined by a U.S. medical team and determined to be appropriate for end of life care. Upon informing the family of their options, a translator intervened noting that it is “unacceptable” to provide negative information regarding death and possible poor outcomes and that “discouragement” of the patient and family would be detrimental to the patient’s health. The medical team was ultimately faced with the ethical decision of 1) adhere to local norms and “encourage the patient” at risk of negative association of death with visiting physicians vs 2) adhere to western medical values of patient autonomy and justice by describing the likely outcome. This case further explores the concept of “truth-telling” in healthcare and ultimately, questions if western principles of ethics apply in the global health setting. An argument for respecting the Kenyan culture hinges on the concept that they are comprised mostly of a collectivist society, therefore, patient autonomy is less of a factor. Individualist societies, such as the United States, value patient autonomy over “encouragement” of the family structure. Ultimately, culturally sensitive research methods to explore these differences and preferences are both valuable and needed.
Early Continuous Venovenous Hemodiafiltration in Preventing Permanent Kidney Injury in Severe Rhabdomyolysis

First Author: Ramsy A Abdelghani, MD Senior Author: Jones Samuel, MD

Acute kidney injury (AKI) associated with increased pigment load in rhabdomyolysis can often lead to irreversible kidney damage. Traditional means of pigment removal are often insufficient. Recent trends have shown the use of continuous venovenous hemodiafiltration (CVVHDF) using a high-flux dialyzer in severe cases of rhabdomyolysis can lessen these irreversible effects. However, the optimal timing of CVVHDF initiation, as well as its efficacy, is still controversial. We present a case of severe rhabdomyolysis admitted to our ICU where early CVVHDF decreased irreversible kidney injury in the patient.

A previously healthy 37 year old African American female with no significant past medical presented to our hospital complaining of bilateral lower extremity pain that began earlier that day. On examination, the patient had weak, cool lower extremities. In addition, the patient had no sensation and no palpable pulses in her lower extremities. The patient was found to have acute bilateral common femoral thromoemboli, which required fasciotomy and ultimately, a right above the knee amputation (AKA). On labs, the patient had an anion gap metabolic acidosis with anion gap of 24. Serum Creatinine Kinase (CPK) and myoglobin were 2,331,300 U/L and 152,414 ng/mL, respectively. Pt had oliguria of < 0.5ml/kg.hr with a peak serum creatinine of 1.8 mg/dL (GFR 41 mL/min/1.73). Due to the high pigment load and lack of response to volume resuscitation, the patient was dialyzed with immediate CVVHDF in an attempt to preserve kidney function. The patient was weaned off dialysis, and at discharge, the patient’s creatinine was 1.4 mg/dL (GFR of 54 mL/min/1.73).

Our case adds to the theory that early CVVHDF can help preserve vital kidney function over traditional dialysis due to its ability to clear myoglobin more effectively. Therefore, we believe CVVHDF should be considered in patients with AKI secondary to severe rhabdomyolysis. Further larger studies are needed to determine additional benefits, common complications, and contraindications to CVVHDF in AKI secondary to severe rhabdomyolysis.
Arterial Fistulization to the Duodenum as a Complication of Chronic Pancreatitis: A Case Report

First Author: J. Brent Rhodes, Jr. Second Author: Angela Johnson

Introduction: Chronic pancreatitis is associated with serious potential complications. Most commonly, this is secondary to pseudoaneurysm formation or direct complication of surgical intervention. Here, we discuss the case of a 39 year old man with chronic pancreatitis complicated by arterial fistulization of the duodenum.

Case: A 39 year old male with past medical history of hypertension and alcohol abuse presented with severe abdominal pain, localized to the epigastrum and right upper quadrant. This led to multiple emergency department visits, culminating in a diagnosis of gallstone pancreatitis. The patient underwent elective laparoscopic cholecystectomy, but returned five days later with continued abdominal pain, elevated lipase, and transaminitis. ERCP was unsuccessful secondary to duodenal wall edema. Repeat imaging demonstrated a complex process in the region of the pancreatic head consistent with a large hematoma versus pseudocyst with concern for compressive physiology. An external biliary drain was placed and the patient improved somewhat over the next several days. On hospital day 15, he was noted to have multiple large, bloody bowel movements. Emergent esophagogastroduodenoscopy was performed demonstrating fresh blood in the duodenum, but no identifiable source for intervention. He was subsequently transferred to the ICU. Emergent arteriogram was performed, revealing active hemorrhage from a proximal branch of the superior mesenteric artery, which was then embolized. The patient had several more episodes of large bloody bowel movements associated with hemodynamic instability, and required two further coil embolizations. Due to the patient’s high surgical risk, operative intervention was deferred. After several more episodes of acute hemorrhage and over sixty units of packed red blood cells transfused during his stay, the patient was taken to the operating room on hospital day 45, where intraoperatively, a fistula between the inferior pancreaticoduodenal artery and the second portion of the duodenum was identified and repaired. The patient was stable postoperatively and was transferred to the floor four days later. He had no further episodes of acute bleeding and was discharged to home in stable condition.

Discussion: This case illustrates the potential for life threatening vascular complications of chronic pancreatitis. Classically, acute blood loss results from rupture of pseudoaneurysms, as a result of surgical intervention, or as indirect upper gastrointestinal bleeds from peptic ulcers or esophageal varices. In this case, we present the direct fistulization of the duodenum from the inferior pancreaticoduodenal artery, which from our literature search is a previously undescribed entity. This significant finding must be considered as an etiology in future cases of acute gastrointestinal blood loss following pancreatitis.
Massive Pulmonary Embolism: A rare presentation of Acute HIV-1 Infection

First Author: Jonathan R Schroeder, MD Second Author: William Varnado, MD Third Author: Catherine O’neal, MD Fourth Author: Vince Cataldo, MD

INTRODUCTION: Acute HIV infection rarely presents as venous thromboembolism with only 6 described cases in the medical literature. HIV infection predisposes to hypercoagulability by a number of pathways.

DESCRIPTION: An 18 year old male with scalp psoriasis (initiated on adalimumab two weeks prior) presented to the emergency department complaining of dyspnea on exertion, pleuritic chest pain, and left leg pain for 2 weeks. Review of systems also revealed one month of subjective fevers, malaise, and headaches. His vital signs revealed mild hypoxemia and tachycardia. An activated partial thromboplastin time (aPTT) was prolonged at 58 seconds and his platelets were decreased at 100,000 / ul. Lower extremity compressive venous ultrasonography revealed acute deep venous thrombosis (DVT) of the left popliteal vein and computed-tomography (CT) angiogram of the chest revealed extensive bilateral pulmonary emboli and a large saddle embolus, pulmonary infarction, and hepatosplenomegaly. Selective pulmonary angiography with targeted thrombolysis confirmed bilateral pulmonary artery emboli. His hospitalization was complicated by progressive severe thrombocytopenia and fevers with rigors. His social history revealed he had experienced his first unprotected sexual encounter with a man one month prior to symptoms. HIV antibodies were positive and a quantitative viral load revealed 4 million copies per ml and a CD4+ lymphocyte count was recorded at 534 cells per ml. Assays for anti-cardiolipin antibodies and ß-2-glycoprotein antibodies were positive. He received empiric treatment for the anti-phospholipid syndrome and heparin-induced thrombotic thrombocytopenia, dose-adjusted bivalirudin was substituted for heparin as a bridge to warfarin. Anti-retroviral therapy and intravenous immunoglobulin were also initiated for HIV-associated thrombocytopenia. His platelets improved and were stable on discharge. The patient was asymptomatic and compliant with ART and warfarin therapy at a four week follow up appointment and laboratory revealed normal complete blood counts and a marked reduction in viral load with only 119 copies / ml detected.

DISCUSSION: HIV infection has been associated with syndromes of thrombosis and thrombocytopenia including acquired coagulation factor abnormalities, the presence of anti-phospholipid antibodies, heparin-induced thrombocytopenia, and thrombotic thrombocytopenic purpura-hemolytic uremic syndrome. These syndromes are more commonly associated with advanced HIV infection and AIDS, however thrombosis and thrombocytopenia are a rare complication of early HIV infection likely as a result of intense viremia and inflammation leading to endothelial dysfunction. HIV screening status should be considered at all patient encounters. The initiation of anti-TNF therapy, which has been associated with thrombosis, or unexplained thromboembolism should also prompt consideration of screening for HIV.
An Unusual Complication of Crohn’s Disease: Neuro-Enteric Fistula and Gram Negative Rod Meningitis

David J Buzanoski, MD

Introduction: Fistula formation remains a significant issue for patients with Crohn’s Disease. Although most fistulas are either perianal or entero-enteric, the tracts may involve many sites. Posteriorly fistulizing disease is an uncommon complication of Crohn’s Disease that poses a diagnostic challenge due to a lack of associated gastrointestinal symptoms. This case describes an individual with extensive infectious complications, including a neuro-enteric fistula and meningitis, resulting from fistulizing Crohn’s Disease.

Case Presentation: A 31 year old male with a history of Crohn’s Disease was transferred to our hospital for workup and treatment of meningitis. Symptoms of fever, headache, and back pain had been present for 1 week. He had also suffered from months of progressive back pain and leg weakness. Since his diagnosis of Crohn’s 15 months prior, the patient had been unable to wean from steroids and remained on prednisone & azathioprine. In the weeks preceding admission, he experienced no worsening abdominal symptoms.

Physical exam revealed a cachectic male with normal vital signs, nuchal rigidity, and photophobia. Abdominal exam revealed right sided tenderness, and his right leg was held in full flexion. Extending the leg was painful. There were no focal neurologic deficits.

CBC demonstrated WBC: 18.1, hemoglobin: 9.3 mg/dL, and platelets: 278,000. Blood cultures from the outside hospital grew *Bacteroides fragilis* and *Aggregatibacter segnis*. CSF, also obtained prior to transfer, showed WBC: 445 and protein > 600 mg/dL. CSF culture was also polymicrobial, with *Escherichia coli* and *A. segnis* isolated.

CT of the abdomen/pelvis demonstrated severe inflammation, strictures of the distal ileum & sigmoid colon, several psoas abscesses, and multiple fistulous tracts - including neuro-enteric fistulas associated with air-fluid collections throughout the presacral space, sacrum, epidural space, and psoas muscles. MRI showed L5-S1 diskitis, an epidural abscess (L4 to S1), and sacral osteomyelitis.

The patient responded to antibiotic therapy and did not require neurosurgical intervention for the epidural abscess. Psoas abscesses were drained by interventional radiology. Bowel resection and diverting ileostomy were performed during the hospitalization. He required weeks of parenteral nutrition before tolerating oral intake. His functional status improved throughout the hospitalization, and he ambulated without assistance by the time of discharge.

Discussion: Fistula formation is a common complication of Crohn’s Disease, with some studies estimating an incidence of nearly 35% in the 10 years following diagnosis. Only a small percentage of fistulas extend to retroperitoneal structures, with the most common complication being psoas abscess formation. These complications pose a diagnostic challenge due to the frequent absence of typical abdominal symptoms.

Although rare, multiple case reports describe neuro-enteric fistulas causing epidural abscess or meningitis. The risk of such occurrences highlights the importance of maintaining a high index of suspicion when evaluating a Crohn’s Disease patient with new or progressive back pain. Such patients may warrant earlier consideration for diagnostic imaging targeting both spinal and intra-abdominal pathology.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Selwan Bangean Abdullah, MD

Ependymoma: Surprising Explanation of Neurologic Findings in an untreated SLE patient

First Author: Selwan Bangean Abdullah, MD 2nd Author: Sarah Finn, MD 3rd Author: Rudolf Pullmann

Introduction: Patients with systemic lupus erythematosus (SLE) may present with various neurological manifestations including stroke, cognitive dysfunction, seizure, headache, psychiatric disorders or neuropathies. In this case, we present a patient with progressive memory loss, right sided weakness and central facial nerve palsy originally attributed to SLE, but later found to be due to ependymoma involving brainstem.

Case: 28 year old woman with a history of SLE and antiphospholipid syndrome presented with right facial and arm weakness and numbness, headaches, and memory loss. She was on plaquenil, but discontinued it for 6 weeks after losing her insurance. Prior to presentation, she experienced symptoms of a typical flair including fevers, fatigue, aphtous ulcers, and joint pain. She was nauseated and noticed she could not taste anything on the anterior aspect of the right side of tongue. Later she developed a right facial droop which progressed to right arm and leg weakness. She was diagnosed with Bell's palsy and prescribed prednisone and acyclovir without any improvement.

On exam, there was no fever, malar rash, oral ulcers or active arthritis. Neurologically, she had a right sided facial droop with tongue deviating to the right, decrease in hearing on the right, and decreased sensation on right side of face. She had 4/5 strength and decreased sensation in both right upper and right lower extremities. She appeared to have memory deficit.

Her labs showed only minimal elevation of the disease activity. Head CT was normal. MRI of the brain showed an irregular elongated enhancing mass centered at the level of the floor of the fourth ventricle with mass effect upon the posterior margin of the brainstem. The patient underwent surgery which confirmed the diagnosis of ependymoma histologically and had subsequent resolution of neurological symptoms.

Discussion/conclusion: SLE may present with a myriad of neurologic manifestations. One could quickly blame neurologic symptomatology on lupus in an untreated patient. However it is still important to rule out other organic causes. In this case, workup showed a surprising finding of an ependymoma which could have been missed if MRI was not done. Ependymomas are glial tumors that usually grow from the ependymal lining of the ventricular system. They account for <10% of the CNS tumors. In adults, 75% of ependymomas arise in the spinal canal, but the ependymoma in our patient arose from the level of the 4th ventricle. Presentation sometimes includes cranial nerve palsies, but it varies depending on the location. Treatment includes surgical resection, radiation therapy, and in some cases, chemotherapy.

This case once again points to an importance of systematic workup of neurological symptoms and prevention of premature closure of the diagnostic process.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Deepti R Baheti, MBBS

Acute ischemic stroke secondary to reactive thrombocytosis due to iron deficiency anemia

First Author: Deepti R Baheti, MBBS Second Author: Rupinder Singh, MD

Introduction: Literature, as early as 1965, describes reactive thrombocytosis due to iron deficiency. However the elevation in platelet count is usually mild to moderate. Extreme thrombocytosis is rare. Reactive thrombocytosis due to iron deficiency has been recognized as a rare cause of stroke, most of these cases being reported in pediatric population. This is a report of a near fatal case of acute ischemic stroke secondary to extreme reactive thrombocytosis, secondary to iron deficiency, in an otherwise healthy young man.

Case presentation: A 50 year old man presented to the emergency room within thirty minutes of developing right-sided weakness with difficulty speaking. CT scan of the head was negative for any hemorrhage. The patient was given tissue plasminogen activator (tPA). Due to worsening aphasia while on the tPA infusion, a repeat CT scan was performed which was unchanged, and therefore tPA infusion was resumed. CT angiogram revealed widely patent cerebral vessels but the supraclinoid left internal carotid artery appeared to fill retrograde. A carotid ultrasound showed a completely occluded left internal carotid artery and a thrombus in the left internal jugular vein.

An extensive work up for thrombocytosis was initiated. A 2D ECHO showed sinus tachycardia with hyperdynamic left ventricle with no evidence of intra-cardiac vegetations or thrombi. Laboratory data revealed iron deficiency with serum iron level of 21mcg/dl, iron saturation of 5.2% and TIBC of 402. Erythropoietin level was markedly elevated at 293.8, in addition to a platelet count of 5,39,000/mm3 at presentation that peaked to 11,95,000/mm3 on the 20th day of hospitalization. A peripheral smear revealed leucocytosis most consistent with a reactive process and anemia with anisopoikilocytosis and thrombocytosis. A bone marrow aspirate showed mildly hypercellular marrow with mild megakaryocytic atypia. Studies to evaluate JAK2 V617F, JAK2, Exon 12-14 mutation, BCR-ABL1 translocation t (9; 22), MPL mutation, Factor II mutation, Factor V Leiden were all negative. He was found to be heterozygous for MTHFR A1298C variant, however the MTHFR C677T variant was not identified. A radiological survey for occult infective processes leading to reactive thrombocytosis was negative. It was concluded that the thrombocytosis was secondary to iron deficiency. Intravenous iron therapy was initiated, and the patient’s platelet count normalized in a few weeks.

Discussion: Iron plays a crucial role as a cofactor for enzymes in the mitochondrial respiration chain, DNA synthesis and oxygen binding in hemoglobin and myoglobin. It is also an important regulator of thrombopoiesis. Normal iron levels are required to prevent thrombocytosis by inhibiting thrombopoiesis. In a study assaying serum level of thrombopoietin, erythropoietin, leukemia inhibitor factor, IL-6, and IL-11 in patients with iron deficiency, only elevated erythropoietin levels correlated with thrombocytosis, and this level decreased with iron replacement. Reactive thrombocytosis is usually considered benign, but reactive thrombocytosis in this patient was associated with acute ischemic stroke. Considering iron deficiency anemia as one of the risk factors for ischemic stroke and treating it promptly may be an important step to consider in preventing stroke.
A "Tear"-ible Culprit

First Author: Stephanie Chen, MD

Case: A 42-year-old man with a history of severe hypertension, chronic kidney disease (stage 3), obesity, and active tobacco use presented with one day of acute onset abdominal pain. The pain awoke him from sleep at 4 AM, starting in his lower back and then radiating to the epigastrium. It was constant, severe, associated with mild nausea and anorexia, and exacerbated lying flat. His abdomen felt distended, "like it would pop with a pin in it." Of note, he was on three anti-hypertensive medications but had required up to five medications in the past.

Upon admission, his vitals were notable for a blood pressure of 198/101 with pulse of 76. Physical exam showed mild epigastric tenderness. Labs were unremarkable. He had a non-contrast CT scan which showed moderate hazy infiltration along the dilated celiac trunk extending to the bifurcation, concerning for spontaneous celiac artery dissection. There was no bowel thickening or edema consistent with bowel ischemia. Usually the gold standard for diagnosis of dissection is a CT angiogram, but the risks outweighed the benefits given his chronic kidney disease. Therefore, the next day he underwent an abdominal ultrasound with Doppler which showed significant stenosis of the celiac artery but could not confirm dissection given the small caliber of the vessels. MRA visualized a partial occlusion of the proximal celiac trunk 1.6 cm in length with a likely focal dissection and/or mural thrombus formation.

The patient was treated for presumed celiac artery dissection with conservative management including bowel rest. His anti-hypertensive medications were up-titrated and smoking cessation recommended. The next step would have been an angiogram to evaluate the need for potential stent placement, but this was again too risky given his kidney disease. He was started on anti-coagulation to prevent thrombosis and distal embolization. Over the next few days, he continued to have a few episodes of pain correlated with blood pressure elevation which eventually resolved.

Discussion: Spontaneous, isolated visceral artery dissection is rare, especially involving the celiac artery. This patient’s risk factors included atherosclerosis, hypertension, smoking, and demographics (five times more common in males with an average age of 55). Appropriate diagnosis of this disease is essential to prevent complications such as progressive dissection, rupture of the vessel, or aneurysm dilatation. If the patient has no signs of bowel ischemia or bleeding, conservative treatment may be attempted with anti-coagulation until the dissection has improved. Otherwise, endovascular therapy (i.e. stent, thrombolitics, angioplasty) or surgery may be considered, especially if bowel infarction or arterial rupture occurs. In conclusion, visceral artery dissection should be considered in patients with unexplained severe abdominal pain.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Jyotsna Gummadi, MBBS

MEGACOLON IN THE CHEST

First Author: Jyotsna Gummadi, MD; Nagavelli N; Vaishnav M; Suleman S. MD; Raza R. MD; Williams R. MD, FACP

Introduction: Colonic interposition is an established procedure that has been used for replacement and management of both benign and malignant esophageal diseases, especially if indicated for long term. Though there is a myriad of short-term complications postoperatively, long-term complications are rare. We present a patient with a late complication of adenocarcinoma of the transposed colon after undergoing colonic interposition due to trauma to the esophagus from a gunshot wound.

Case: A 63 year old African American woman who had colonic interposition of the esophagus after a gunshot wound, presented 30 years later with shortness of breath, nausea, vomiting and difficulty swallowing for 5 days. On examination, she was noted to have distension of the anterior sternum. CT scan showed a distended colon with possible obstruction. She subsequently underwent colonic resection with gastric pull through and was found to have developed colon cancer of the stage T3N0M0 at distal end of the colonic interposition.

Discussion: The use of colonic grafts in patients with benign and malignant disease of the esophagus is a technique that has been practiced for many decades. Often times, the left colon is the segment of choice due to its anatomy, but the ascending and transverse colon can also be used. In general it is a procedure that has been well-tolerated and thus increasing in frequency. Though, as with most procedures of this magnitude there are bound to be postoperative complications. Occurrence of adenocarcinoma of the transposed colon has only been described a handful of times in the literature, yet it is something all patients who are undergoing this procedure should be screened for. Thus, colonoscopy prior to surgery, upper endoscopy with biopsy within one year of surgery and periodic surveillance is recommended as a preventative measure. The most common risk factors for malignant change in interposed segments of the colon are history of colonic polyps, colitis, and family history of colon cancer.

Conclusion: We have described a late and rare occurrence of adenocarcinoma of the transposed colon in our patient. This patient would likely have vastly benefited from the screening and surveillance recommendations pre and post operatively.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Samuel B Holzman, MD

Bedaquiline, a new weapon in an old war

First Author: Samuel B Holzman Second Author: Radhika Banka Third Author: Pratibh Prasad Four Author: Zarir F. Udwadia

Introduction: While efforts over the past twenty years have led to a plateauing of incident tuberculosis (TB) cases and have slashed associated death rates, multidrug-resistant TB (MDR-TB, defined as resistance to at least isoniazide and rifampin) and extensively drug-resistant TB (XDR-TB, defined as MDR-TB plus resistance to any fluoroquinolone and at least one of the three injectable second-line drugs, i.e. amikacin, kanamycin or capreomycin) have together presented a formidable challenge. It is now thought that MDR-TB accounts for nearly 4% of new TB cases and 20% of those previously treated. The relevance of these statistics becomes apparent when noting that treatment success rates stand at only 50-60% for MDR cases and around 40% for XDR cases. Despite the fact that nearly one third of the world’s population is thought to be TB infected, leading to over 1 million annual deaths, the 2012 FDA approval of bedaquiline marked the first new class of anti-tubercular medication to become available in over 40 years.

Case Description: Ms. PS is a 38-year-old housewife who first presented to the Chest Clinic at P.D. Hinduja National Hospital in Mumbai, India in March of 2013. She had no known past medical history and her story began in 2011 when a screening chest x-ray, as part of her student visa application to the United Arab Emirates, identified a “lesion” in her left upper lung. Asymptomatic at the time, she was placed on anti-tubercular therapy (unknown regimen) for 2 months. About 1 year later (the Fall of 2012) she developed a dry cough. A repeat chest x-ray again demonstrated left upper lobe disease, though with a high-normal IgE level, her symptoms were attributed to allergic bronchitis. Antihistamines were given without improvement. Several months later Ms. PS developed fever, fatigue and her cough became productive of copious white sputum. An acid fast bacillus (AFB) smear at that time came back positive at 3+. No mycobacterial cultures were sent, though she was started empirically on first-line TB therapy (isoniazide, rifampin, pyrazinamide and ethambutol) as well as moxifloxacin and the injectable aminoglycoside, kanamycin. Despite therapy, her symptoms worsened; she developed vomiting and began losing weight. In March of 2013 she presented to Hinduja, 2.5 months after initiation of second-line therapy. Given concern for MDR/XDR disease, additional second-line agents were empirically added (cycloserine[CS], paraaminosalicylic acid [PAS]), as well as linezolid. Final culture results showed sensitivity to only PAS, clofazimine and linezolid. With her clinical and radiologic condition worsening Janssen was approached for compassion release of bedaquiline (not currently approved in India), which was initiated in August of 2014 to a background regimen of ethambutol, capreomycin, PAS, CS and linezolid. No EKG changes or other adverse events were noted after the addition of bedaquiline and Ms. PS’s six week sputum was negative. Her cultures remain no growth to date and she has begun to gain weight.

Discussion: While there is still much to learn about bedaquiline, and we currently await phase III trials, there is no doubt this agent represents a welcome step forward in the fight against global TB. A recently published phase IIb trial showed reduced time until culture conversion with bedaquiline, though also demonstrated a small increase in all-cause mortality, a finding that has yet to be fully explained. Despite this, as rates of resistance grow, so to will our dependence on novel therapeutics. Udwadia and his group in India and Velayati in Iran, have both published case series of so called “totally drug resistant TB,” essentially strains resistant to all tested first and second-line agents, underscoring the need for further drug development, and highlighting the importance of the role bedaquiline may soon play.
Acquired Frozen Shoulder: What's the "Factor"

First Author: Mohammad Ali Syed Jafri, MD Krisda Chaiyachati MD MPH Jose Castenada MD Donna Windish MD MPH

Introduction: Acquired Hemophilia is a rare and potentially fatal bleeding disorder caused by autoantibodies against plasma coagulation factors, commonly factor VIII, with no genetic predisposition. Given the mortality associated with acquired hemophilia ranges from 8%-22%, it is important for every clinician to be aware of it.

Case Summary: The patient is an 80 year-old male with history of hypertension, hypothyroidism, and asthma who presented with left shoulder pain and easy bruising in his joints that started two days prior to evaluation. One month before, he had two similar episodes of swelling of his right knee and right arm with associated purplish appearing skin that resolved spontaneously after a few days. He denied any trauma, fever, travel, or new medication. He has no family history of bleeding disorders.

On examination, patient had normal vital signs, left frozen shoulder with absent range of motion to active or passive movements. He also had a 4x4cm hematoma on his left elbow. The remainder of his evaluation was normal.

Work up for a possible coagulopathy revealed a hemoglobin of 9.0 (baseline 12.5, 6 months prior), elevated PTT (46.3), low factor VIII level (3.1%, where <1% indicates severe hemophilia, 1-5% moderate, and 5-40% mild) and high factor VIII inhibitor level (13BU, where >5BU is a high titer). The patient had a partial response to a mixing study. ANA, RF, Hepatitis serology, FOBT, and HIV tests were all negative.

Based on the laboratory results and clinical findings, the patient was diagnosed with acquired hemophilia. He was treated with Factor Eight Inhibitor Binding Agent (FEIBA) every 12 hours for 4 days. He was also given cyclophosphamide and prednisone to complete a 5 week course. The patient’s symptoms subsequently improved within one week with an associated increase in his factor VIII levels and a decrease in factor VIII inhibitor level.

Discussion: Our patient's clinical presentation is a rare acquired condition. This autoimmune phenomenon can occur with rheumatologic disorders, post-partum, medication induced, or is idiopathic in 50% of cases. Treatment is aimed at controlling the bleeding and removing the inhibitor.

Patients presenting with a high inhibitor level require the use of FEIBA, whereas patients with low inhibitor levels can be controlled with human factor VIII concentrates. The antibodies can be eradicated by a combination of cyclophosphamide and glucocorticoids for at least five weeks. Refractory cases may need rituximab. Our case illustrates the classic presentation of acquired moderate severity hemophilia with high inhibitor level, and the appropriate response to treatment. Although this is a rare case, it highlights the importance of accurate diagnosis in combination with successful treatment.
Untreated Hepatitis C Virus infection presenting with cryoglobulinemic vasculitis and membranoproliferative glomerulonephritis

First Author: Amit A Kulkarni, MD, Rimoun Hakim M.D, Rudolf Pullmann M.D

Introduction: The prevalence of Type II or essential mixed cryoglobulinemia is estimated at approximately 1/00,000, although presence of cryoglobulins (CG) can be subclinical in a proportion of patients with chronic infections. We report a classical presentation of cryoglobulinemic vasculitis and membranoproliferative glomerulonephritis (MPGN) in a patient with chronic hepatitis C virus (HCV) infection.

Case description: A 49-year-old woman with history of intravenous drug abuse and untreated HCV infection presented with chronic fatigue, recurrent bilateral lower extremity rash, and marked joint pain with swelling. She was recently diagnosed with cryoglobulinemia after work up of her skin rash showed leukocytoclastic vasculitis on skin biopsy, but was lost to follow up. Physical examination revealed palpable purpuric rash over bilateral lower extremities. Laboratory findings were significant for elevated ESR (80 mm/hr), and renal insufficiency (creatinine=2.8 mg/dl), while her baseline creatinine was in mid 1’s three months before the admission. Urine studies showed hematuria and nephrotic range proteinuria (8 g/24h). Further testing revealed positive rheumatoid factor (RF, 1:16), undetectable C4, low CH50, low-normal C3, and marked polyclonal cryoglobulinemia. HCV RNA PCR detected high viral load (1,934,200 IU/mL). Kidney biopsy showed MPGN with mesangial sclerosis, hypercellularity, widespread duplication of glomerular basement membrane and focal crescents. Immunofluorescent staining was positive for IgM and electron microscopy showed sub-endothelial immune complex deposits and foot processes effacement.

Discussion: Cryoglobulinemia is a systemic inflammatory syndrome that leads to small-to-medium vessel vasculitis from CG-containing immune complexes. Type II or essential mixed cryoglobulinemia is largely associated with HCV and much less frequently associated with Hepatitis B, Human Immunodeficiency or Epstein-Barr viral infections. It is characterized by the presence of polyclonal IgG and monoclonal IgM or IgA. Type II cryoglobulinemia can manifest as palpable purpura, arthralgias, myalgias together known as Meltzer’s triad. The predominant organs involved are kidneys (MPGN), and nervous system (peripheral neuropathy). A disproportionately low C4 is seen in comparison to C3. CG titers correlate with the immune complex burden, but not with symptomatology. The diagnosis is confirmed by biopsy of an affected organ. Treatment of cryoglobulinemia is geared towards treating the underlying disorder. Immunosuppressants or plasmapheresis can reduce the immune complex burden and are reserved for severe consequences of cryoglobulinemia like MPGN associated with either a rapidly progressive course or nephrotic range proteinuria.

Conclusion: Even with wide availability of HCV antiviral therapy, Type II cryoglobulinemia should be considered in patients presenting with typical symptoms. This case shows detrimental long-term consequences of not treating HCV infection leading to this otherwise very preventable condition. From a clinician’s perspective, early diagnosis and treatment of HCV and awareness of the associated conditions are needed.
Splenic infarcts in a patient with sickle cell trait and recent EBV infection

First Author: Ivana Milojevic, MD Attending: John Cmar, MD

Introduction: Symptomatic seroconversion during EBV infection or infectious mononucleosis syndrome presents with a highly variable constellation of signs and symptoms reflecting polyclonal activation of B-cells. Patients with sickle cell trait are predisposed to occlusive crises in a variety of clinical settings, not necessarily related to hypoxia.

Case presentation: A previously healthy 21-year-old man with a family history of sickle cell disease presented with left flank pain and fever for several days. He was sexually active with only one female partner and denied any history of drug abuse. His vital signs were within normal limits, except for a temperature of 38.4 degrees Celsius. On exam, no lymphadenopathy, tonsillar exudate, or heart murmur were detected. The left side of his abdomen was very tender to palpation but without guarding. Laboratory data showed only mild normocytic anemia. Abdominal CT scan with oral and intravenous contrast revealed massive splenomegaly with multiple wedge-shaped splenic infarcts. Broad-spectrum antibiotics were started for presumed bacterial endocarditis, but transthoracic echocardiogram did not show vegetations, and the patient remained febrile with negative blood cultures. HIV antibody, viral hepatitis serologies, parvovirus B19 antibody, and heterophile antibody test (Mono Spot) were negative. He further developed acute kidney injury, transaminitis, worsening anemia, and mild coagulopathy. Peripheral smear showed anemia without specific morphologic abnormality. Hemoglobin electrophoresis was consistent with sickle cell trait. C-reactive protein of 128.00 mg/L (reference range <= 10.00 mg/L) and ferritin of 3,586.3 ng/mL (reference range 28.0 - 365.0 ng/mL) confirmed severe inflammatory response, but rheumatoid factor, antinuclear antibody, typical and atypical anti-neutrophil cytoplasmic antibodies, complement levels, serum and urine electrophoresis with immunofixation were all within normal limits. Lupus anticoagulant was weakly positive.

Since infectious and rheumatological etiology seemed less likely at this point, malignancy workup was pursued. Bone marrow biopsy with flow cytometry and FISH were negative. Patient underwent splenic biopsy which showed infarcted tissue without evidence of malignancy or granulomas. Eventually, EBV serologic panel and PCR results were available and suggestive of convalescent phase of infection. Fortunately, there was no splenic rupture on two subsequent abdominal ultrasound examinations performed in the setting of abdominal pain post splenic biopsy. Patient was discharged home after two weeks, being afebrile for 48 hours, and was still feeling well on two-month follow-up.

Discussion: Atypical presentation of EBV viral syndrome represents a diagnostic challenge and splenic infarcts have been reported on its spectrum, although infrequently. It seems that patients with underlying sickle cell trait are at increased risk of developing splenic infarcts, as vasocclusive crisis during EBV infection can be precipitated by splenic vascular congestion, transient hypercoagulable state, or high-grade fevers, all of which were seen in our patient, in absence of hypoxia.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Ivana Milojevic, MD

Have you heard of this bug? Emergence of Leclercia adecarboxylata.

First Author: Ivana Milojevic, MD Attending: John Cmar, MD

Introduction: Leclercia adecarboxylata is a ubiquitous gram negative rod found in the human digestive tract and skin. It shares many metabolic features with Escherichia coli. With advancement of molecular techniques, it is increasingly being recognized as a human pathogen. Infections are frequently polymicrobial, and often occur in the setting of immunocompromise and/or trauma.

Case presentation: An 86-year-old woman with rheumatoid arthritis and osteoarthritis requiring multiple surgeries presented with fever and infected pressure ulcer of the right heel. She had not received any recent immunosuppressive therapy. Two months prior, she was admitted to an outside hospital for an unspecified infection, treated with antibiotics, and subsequently spent 6 weeks in a subacute facility. Review of systems was significant for fever, right heel pain and discharge, dry cough, anorexia, weakness, and chronic urinary incontinence. She was febrile at 38.4 degrees Celsius, tachycardic to 104 beats per minute, and hypotensive with a blood pressure of 95/54 mm Hg. She did not require supplemental oxygen. Right heel exam revealed a 4.5 x 2.5 cm stage 3 pressure ulcer with purulent discharge, surrounding erythema, warmth, and tenderness to palpation. A stage 2 pressure ulcer in the sacral area was also noted. Laboratory data showed leukocytosis of 15,030 cells/mm3 (reference range 4,000 to 11,000 cells/mm3) with neutrophilia and left shift. Chest X-ray did not show any infiltrates. X-ray of the right foot did not show evidence of osteomyelitis or abnormal periosteal reaction.

She received intravenous hydration and empiric piperacillin-tazobactam and vancomycin. One of two peripheral blood cultures grew a pan-susceptible gram negative rod identified as Leclercia adecarboxylata. The organism was presumed to have originated from the heel ulcer and caused sepsis in our patient, as gram negative rods are rarely blood culture contaminants. The patient’s fever and leukocytosis resolved, and antibiotics were de-escalated to oral ciprofloxacin. Repeat blood cultures documented clearance of bacteremia. She was discharged to a subacute facility to complete 14 days of antibiotic treatment.

Discussion: Leclercia adecarboxylata was underrepresented as a pathogen since it was likely misidentified as Escherichia coli until the development of more sophisticated molecular techniques. There is a growing body of evidence supporting clinical significance of this bacterium, which was initially isolated from wounds and more recently as a cause of bacteremia and catheter associated infections. Organism is not necessarily opportunistic, as infections were also reported in immunocompetent patients, although less frequently. It is usually susceptible to different antibiotics, but extended spectrum beta-lactamase producing strains have been described in case reports. This is worrisome in the context of frequent polymicrobial infections and potential for horizontal transfer.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Nafees A Mohammed, MBBS

STEMI SECONDARY TO DIC IN THE SETTING OF PNEUMOCOCCAL SEPSIS - A TREATMENT DILEMMA

First Author: Nafees A Mohammed, MBBS Mehwash Naseem, MD Rongras Damrongwatanasuk, MD Rohit Gosain, MD Duncan Salmon, MD

Introduction: Disseminated Intravascular Coagulation (DIC) is a deleterious complication of infection causing abnormal activation of the coagulation cascade. This activation produces excessive clotting and deposition of microvascular thrombi while depleting clotting factors and predisposing to bleeding. When these microvascular thrombi accumulate within the coronary vasculature they can cause an ST Elevation MI. Treatment dilemmas arise when there is ongoing cardiac compromise and ischemia, but clinical instability and excessive risk of bleeding preclude cardiac catheterization or intervention.

Case: We report the case of a 34 year old woman with history of hypertension who presented with fevers, dyspnea, cough and sputum production. She was diagnosed with severe multilobar pneumococcal pneumonia which deteriorated into ARDS, requiring ICU admission and intubation. Within 24 hours her pneumococcal sepsis triggered the development of DIC with excessive bleeding necessitating multiple red cell and platelet transfusions. She developed worsening tachycardia and EKG changes were indicative of an inferolateral ST Elevation MI with a troponin of 11.1. Due to her excessive bleeding, ARDS and high oxygen requirements she was at high risk of rapid decompensation with any antiplatelet agents, heparin or cardiac catheterization and only conservative management could be pursued. A few weeks after transfer from ICU an elective cardiac catheterization was done demonstrating normal coronary arteries with no atherosclerotic disease. Follow up echocardiography did not show any wall motion abnormalities and subsequent EKGs showed resolution of ST elevation without q waves.

Discussion: This case illustrates the complications of DIC which may precipitate multiple organ dysfunction, and in our patient, cardiac compromise. Management of an ST elevation MI requires emergent cardiac catheterization along with the use of antiplatelet agents and antithrombotic agents but our patient’s instability precluded these interventions. Other case reports have noted DIC complicated by myocardial infarction with presentations ranging from possible Legionnaires’ disease to septic shock after amniocentesis. Intervention in some of these cases still resulted in unfavourable outcomes. Due to the possible transient nature of intracoronary microthrombi in DIC and myocardial infarction, appropriate management of DIC and its initiating factors were given priority after assessing the risks of deterioration. STEMI is a rare but possible complication of DIC. In other case reports procedural intervention has not necessarily resulted in improved outcomes, and as such, conservative management may be an effective alternative option when treating specific high risk patients.
Cryptogenic Organizing Pneumonia Presenting As Recurrent Pneumonia

Introduction: Cryptogenic organizing pneumonia (COP) is sequelae of lung injury that often mimics bacterial pneumonia.

Case Description: A 69 year-old man presented with one month of dry cough, malaise, and 7-pound weight loss. He was treated empirically for CAP with 10 days of moxifloxacin; however, he was ultimately hospitalized for fever and persistent symptoms and received additional treatment with ceftriaxone and azithromycin. His fevers improved and he was discharged on cefpodoxime and azithromycin to complete a 10-day course of antibiotics. However, he returned to the hospital with persistent cough, non-purulent sputum, low-grade fever, and severe shortness of breath. He has a history of mild COPD and a negative Quantiferon test in the past. He spends a majority of his time in rural India. He quit smoking a pipe 20 years ago. Physical exam on admission was notable for crackles at the right base and no evidence of heart failure. He did not require oxygen supplementation. Computed tomography of the chest revealed interval worsening of right middle and right lower lobe consolidations; sputum cultures and a comprehensive respiratory viral panel were negative. Bronchoalveolar lavage grew only normal respiratory flora; needle biopsies of carinal and right hilar lymph nodes revealed benign lymphoid tissue; transbronchial biopsies demonstrated focal fibroblastic foci. He received 10 days of vancomycin and piperacillin/tazobactam and 7 days of azithromycin with little improvement in symptoms. A video-assisted lung biopsy of the right middle and right lower lobes was performed, demonstrating organizing bronchopneumonia without any evidence of granulomas, necrosis, or infection. A connective tissue and rheumatoid disease work-up was negative, as were serologic tests for HIV and hepatitis C. A diagnosis of cryptogenic organizing pneumonia was made. He was started on 1 mg/kg of prednisone and had a rapid symptomatic improvement. He was discharged on a steroid taper with close pulmonary follow-up and plans to repeat imaging in several weeks.

Discussion: Cryptogenic organizing pneumonia (COP) is a rare condition of the lung in which epithelial injury is followed by “organization” or filling of the alveoli and bronchioles with loose fibroblasts in a collagen matrix. The lung architecture is preserved and an inflammatory interstitial infiltrate is often present. The mean age of onset is in the 6th decade of life, and typical symptoms often follow signs of an upper respiratory infection. Cough, mild dyspnea, and fevers are common, and diagnosis is generally delayed for 1-2 months, with most patients receiving at least one course of antibiotics for presumed pneumonia. CT imaging most frequently demonstrates patchy airspace consolidations, though ground glass and nodular infiltrates are not uncommon. If diagnosed in its early stages, COP is usually highly steroid-responsive, though a slow taper over several months is often required to prevent disease recurrence. Delay in making the diagnosis and initiating appropriate therapy has been known to increase relapse.

Conclusion: Clinicians should consider a diagnosis of COP in patients with suspected pneumonia that fails to improve despite appropriate antibiotic therapy. Timely treatment with corticosteroids is effective in most cases, though a slow taper is often required to minimize the risk of relapse.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Chintan Pankaj Patel, MD

A Clean End

Chintan Patel MD MPH, Janushe Patel MD, Kenneth Remy MD.

INTRODUCTION: Alcohol based sanitizers have become a standard part of every hospital in the United States and is mandated by the Joint Commission. The availability of these solutions also provides an easily accessible source of intentional ingestion that could be missed while in the hospital.

CASE: A 38 year old homeless male with a history of depression, prior alcohol abuse, intravenous drug abuse, and hepatitis C had been found lying down on a sidewalk and had admitted to alcohol and benzodiazepine ingestion. He was brought to the emergency department for detoxification and had an initial GCS of 15 despite being very somnolent. His initial ethyl alcohol level upon presentation was 276 mg/dl. He initially denied any suicidal ideation and was given IV hydration and multivitamins. Approximately 10 hours later, the patient was completely awake and was uncooperative with ER providers. When told he was to be discharged the patient stated that he was suicidal. Approximately ten minutes later when his nurse went to check on him, he was found to have a GCS of 3 with pinpoint pupils. Multiple doses of naloxone were given with no response and the patient was intubated for airway protection. Vital signs were within normal limits with the exception of a depressed respiratory rate. Repeat laboratory work revealed a large anion gap metabolic acidosis and respiratory acidosis. He was also found to have an osmolar gap of 35. A repeat alcohol level was sent out of concern about possible ethyl alcohol ingestion and was revealed to be elevated to 521 mg/dl nearly 18 hours after being admitted to the ER. Maryland Poison Control was contacted and dialysis was recommended given the acute change in his mental status. After 3 hours of dialysis, his alcohol level was measured at 169 mg/dl and the patient was waking up and responding to commands. The patient was extubated within 24 hours and when questioned admitted to committing suicide by drinking 3 cups of Purell that he obtained by biting through the plastic container in the ER.

DISCUSSION: Acute intoxication of highly potent ethanol-based hand sanitizers can have life-threatening consequences. Severe CNS and respiratory depression, cardiac dysrhythmias, hypotension, hypoglycemia, and severe metabolic acidosis have all been described in severe ethanol intoxication. Based on National Poison Data System (NPDS) data the incidence of intentional ingestion of ethanol-based hand sanitizers is increasing despite concerns of being an underreported intoxication. Typical treatment includes supportive treatment however dialysis has been used on severe intoxications where the patient’s neurological status was severely depressed, increasing serum osmolality, and severely elevated alcohol levels. Purell is primarily composed of 70% ethyl-alcohol with isopropyl alcohol and ethylene glycol as inactive, trace ingredients.

CONCLUSIONS: Acute ingestion of ethanol-based hand sanitizers should be considered in patients under hospital care that demonstrate acute mental status changes, especially where concerns of mental illness may play a factor. Early identification can lead to early intervention and can potentially be life saving.
Embolic stroke: Rare Presentation of Cor Triatriatum

First Author: Emma Sargsyan, MD

**Introduction:** Cor triatriatum sinistrum is one of the rarest congenital cardiac anomalies, in which the left atrium is divided into two distinct chambers by a fibromuscular membrane. While almost all patients classically present in infancy, in very rare cases the condition remains asymptomatic until adulthood. We describe an embolic stroke as the first manifestation of cor triatriatum sinistrum in an otherwise healthy 44-year-old man. The patient presented with an acute onset of throbbing headache, neck pain, dizziness and blurry vision. He had no prior history of cardiac symptoms, family history of cerebrovascular disease, nor any evidence of congenital coagulopathy. Transesophageal echocardiography (TEE) detected a thin, mobile membrane dividing the left atrium into two chambers, confirming the diagnosis of cor triatriatum.

**Case description:** An otherwise healthy 41-year old African American man presented with an acute onset of throbbing headache, dizziness, blurry vision and neck pain, that started several hours ago. The patient denied any prior history of cardiac symptoms, family history of cerebrovascular disease, nor any evidence of thrombophilia. On examination, the patient was afebrile and normotensive. His physical examination including cardiopulmonary examination was unremarkable. A chest X-ray showed no signs of heart failure and ultrasound of the carotid arteries was normal. A computerized tomography (CT) scan of the head was within normal limits but cerebral magnetic resonance imaging (MRI) revealed an infarction in the territory supplied by the right posterior cerebellar artery. A complete transthoracic echocardiogram (TTE) did not reveal any significant abnormalities. However, a subsequent transesophageal echocardiogram (TEE) clearly demonstrated a thin, mobile septum in the left atrium. The membrane was found to have a lateral attachment above the left atrial appendage and medial attachment in the mitraloaortic curtain, dividing the left atrium into two separate chambers. No other associated congenital findings were seen. Inside the left atrium there was increased echocardiographic contrast. The patient’s left atrium was enlarged. No resulting thrombi were found during the study. The surgical removal of the membrane, as well as anticoagulation treatment with warfarin, were discussed with the patient, and the latter option was chosen by him.

**Discussion:** We report the case of a 44-year-old man who presented with cardioembolic stroke. Although TTE was unable to detect any abnormalities, TEE showed a thin membrane dividing the left atrium into two chambers, consistent with cor triatriatum. Cor triatriatum is a rare congenital anomaly in which the atrium is separated into two chambers by a septated, fibromuscular membrane. It accounts for 0.1% of all congenital heart defects, with a male:female ratio of 1.5:1. The malformation has been thought to result from anomalous growth of the septum primum or regression of the embryonic common pulmonary vein. The severity of symptoms of cor triatriatum depends on the degree of obstruction formed by the size, shape and number of septations of the fibromuscular membrane as well as the resulting transmembrane flow. Untreated individuals usually die in infancy primarily due to pulmonary hypertension secondary to compromised drainage of the pulmonary veins. When cor triatriatum is the only abnormality, the clinical findings are similar to that of mitral stenosis, with development of pulmonary hypertension and subsequent right ventricular hypertrophy and atrial enlargement. Almost all cases of cor triatriatum are diagnosed in childhood and usually give rise to abnormal hemodynamics. The natural history of the condition remains indefinite, accounting for the rarity in diagnosis in the adult population. The late onset of symptoms can possibly be explained by the large septation of the membrane, allowing for an almost normal blood flow towards the mitral valve. Nevertheless, it can be assumed that directly around the aperture the propagation of the blood influx into the proximal chamber of the left atrium diminishes in the course of time. This results in hemodynamics mimicking that seen in mitral stenosis, with increased pressure inside the left atrium. This may
also explain the increased echocardiographic contrast as an indicator of greater blood echogenicity in the region of the left atrium, demonstrated with TEE. Chimowitz and colleagues illustrate the relationship between left atrial spontaneous echocardiographic contrast and stroke in patients with mitral stenosis. This condition results in stagnation of blood within the left atrium and increased risk for thrombus formation. Analogous to our case, this phenomenon may have resulted in thrombus formation in the proximal chamber of the left atrium, which leads to embolization to the posterior inferior cerebellar artery. There are very few case reports described in literature of cor triatriatum sinistrum in adults presenting with an embolic stroke which, including atrial fibrillation, may be the first manifestations of this anomaly in adult life. Although only few cor triatriatum-related strokes in previously asymptomatic individuals are referred to in the literature, almost half of these cases present with associated atrial fibrillation and/or spontaneous left atrial ECHO contrast. Our case is one of the very first to describe this anomaly in a patient who lacks any past contributory history and has remained asymptomatic through his adult life. Data in the literature is extremely scarce and no widely accepted strategy is proposed to prevent atrial fibrillation and thromboembolism in asymptomatic individuals. However, it is especially important to recognize it in adulthood because it may be surgically correctable when hemodynamically significant.
First Author: Dariush Shahsavari, MD Richard Williams, MD Ajoy Karikkineth, MD Zubair Ahmad,

**Introduction**: Acrodermatitis enteropathica is an inherited autosomal recessive disorder of jejunal zinc absorption. Acquired cases are occasionally reported in patients with malnutrition states such as alcoholism or malabsorptive states such as post-bariatric surgery. We report a case of acrodermatitis enteropathica in a 39-year-old man with history of gastric bypass surgery and alcoholism.

**Case**: A 39-year-old male with past medical history of gastric bypass surgery and chronic alcoholism was admitted for syncopal episode with urinary incontinence and also multiple episodes of bloody diarrhea. Previously, the patient underwent Roux-en-Y gastric bypass in 2008 after failed lifestyle modifications in effort to reduce body weight. Additionally in the last two and half years, the patient had abused alcohol extensively. Skin examination showed multiple patches of dry, peeling skin on both feet. On day 5 of admission lesions worsened to include both hands, extensor surfaces of the arms and around the mouth which were desquamating, erythematous and painful. Serum Zinc level 0.27 mcg/mL [0.66-1.10 mcg/mL]. Skin biopsy revealed mild psoriaform hyperplasia with broad parakeratosis. The epidermis lacked a granular layer and demonstrated spongisosis. Patient was started on a Zinc therapy (220 mg/daily) and showed gradual clearance of desquamative lesions and other symptoms on discharge.

**Discussion**: The role of zinc as an essential nutrient in human metabolism has been well known for decades. The defining symptoms of hypozincemia include a classic triad of necrolytic dermatitis, diffuse alopecia and diarrhea. It also has been implicated in delayed puberty, impaired cognition, diarrhea, alopecia, dermatitis, immune dysfunction and delayed wound healing. Our patient suffered acquired zinc deficiency due to two significant risk factors: alcoholism and gastric bypass surgery. There have been several case reports of Zinc deficiency after bariatric surgeries. 324 morbidly obese patients were reviewed retrospectively by Salle A et. al. The follow-up period was 6 months for 272 patients, 12 months for 175. 9% of patients had zinc deficiency pre-operatively but 42.5% were deficient after 1 year. Acrodermatitis enteropathica is a papulosquamous erupting rash with well demarcated borders which characteristically crusts, scales and eventually erodes and is associated with inherited and acquired Zinc deficiency.

**Conclusion**: The diagnosis of zinc deficiency requires a high index of suspicion in patients after bariatric surgery due to the large overlap in symptoms amongst nutritional deficiencies.
Systemic Lupus Erythematosus Masquerading as Ehrlichiosis.

First Author: Eugene Shenderov, Department of Internal Medicine, Johns Hopkins Bayview, Baltimore MD.

Systemic lupus erythematosus (SLE) is an autoimmune rheumatologic disorder that often presents a diagnostic challenge due to associated non-specific vague symptoms, the multitude of affected organ systems, and many mimicking diseases.

A 24-year-old previously healthy African-American man with a history of childhood asthma presented to our hospital with two months of persistent non-bloody diarrhea, nausea and vomiting, near-daily fevers, whole body migratory arthralgias, and 30 pound weight loss. He had no history of rash. He lived in a suburban community though he endorsed no animal or insect exposures. Otherwise, past medical, social, and family history were unremarkable.

On presentation, the physical examination was notable for fever of 39.3°C, tachycardia, dry mucous membranes and a non-radiating systolic murmur loudest at the base. He also had a small palpable lymph node in the left axilla that was rubbery and mobile. There was no rash or joint swelling. Labs were notable for pancytopenia, 20% bandemia, elevated ESR of 131 mm/hr and CRP of 1.55 mg/dl (0.00-0.29), elevated LDH of 800 U/L (100-190), and peripheral blood smear showing 10% atypical lymphocytes. Computed tomography of the chest, abdomen and pelvis was remarkable for lymphadenopathy in the axillary, pelvic sidewall, and bilateral inguinal areas. A transthoracic echocardiogram revealed no vegetations. An excisional inguinal lymph node biopsy showed no evidence of lymphoma. An extensive workup was notable for negative rheumatoid factor, negative blood cultures, positive ANA of >1:640, elevated gamma globulin of 2.1 (0.7-1.7), serum protein electrophoresis consistent with acute and chronic inflammation, and positive Ehrlichia chaffeensis IgG antibody (high titer of 1:1024). Given the constellation of symptoms, treatment with doxycycline was commenced for human monocytic ehrlichiosis and resulted in defervescence of fevers, subjective improvement in symptoms, and normalization of CRP. However, 4 days into the antimicrobial therapy, his fevers recurred, and he was noted to have reddish, non-purpuric lesions on his fingertips and soles, and a superficial ulcer of the posterior soft palate.

Ultimately, serologic evaluation returned highly positive anti-ds DNA (titer of >1:640), with C3 and C4 hypocomplementemia, and 2 gram/day proteinuria. Ehrlichia PCR was negative. In the third week of his inpatient stay, a renal biopsy yielded a definitive diagnosis of SLE by demonstrating histologic evidence of lupus nephritis stage III and V with full-house immunofluorescence. He was started on corticosteroid, mycophenolate mofetil, and hydroxychloroquine and improved significantly. This case illustrates the diagnostic dilemma that SLE poses. It shows the importance of being cognizant of false-positive antibody titers in the presence of active SLE-associated immune stimulation and hypergammaglobulinemia. The patient’s presentation highlights that the differential diagnosis in a patient of any gender presenting with lymphadenopathy, fever and weight loss must include autoimmune rheumatologic disorders, including lupus.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Ruchita Simoes, MD

STUCK BETWEEN A GIANT BULLA AND INTRACRANIAL HEMORRHAGE: AN INNOVATIVE SOLUTION

First Author: Ruchita Simoes, MD Co-authors: MANAM R, MSIII KRIMSKY W, MD SELINGER S, MD

Introduction: Giant bullous disease is a complication of COPD, which carries a significant increase in mortality. A bulla is considered ‘giant’ when it occupies at least 30 percent of a hemithorax. Bullectomy has been traditionally used as the treatment and procedure of choice, albeit a highly invasive one especially in these patients who often have significant co-morbidities. As an alternative, there are a few case reports of Endobronchial Valves (EBV) being deployed to treat giant bulla by isolating the affected area. We present the case of a critically ill patient who presented with intracranial hemorrhage, altered mental status and hypercarbia who successfully underwent rapid decompression of giant bulla with concomitant use of percutaneous tube decompression and endobronchial valves (a combination of procedures which, as far as we are aware, has never been attempted).

Case: A 74-year-old female with a long-standing history of COPD and sizable left apical bulla presented with sudden onset left sided weakness. CT head showed right basal ganglia hemorrhage with mass effect on right frontal horn. Chest X-ray and CT chest showed giant bulla in left upper lobe with significant mediastinal deviation towards the right. As compared to previous CT chest from 4 months ago, a significant progression of chest findings was noted. She was also found to have significant hypercarbia. Thoracic surgery was consulted and felt that bullectomy would pose a profound risk. A decision was made to use endobronchial valves in conjunction with percutaneous tube decompression of the giant bulla. Patient was taken to the operating room and the left upper lobe was isolated with bronchoscopic placement of two 7mm endobronchial valves. After confirmation of appropriate valve placement, a 5 Fr pneumothorax catheter was inserted directly into the bulla percutaneously. Arterial blood gas (ABG) showed immediate improvement in pO2 from 46.2 to 65.7 mm Hg and pCO2 from 63.6 to 43.4 mm Hg. The patient’s respiratory and mental status improved rapidly. She was extubated on post op day 2 and discharged from ICU on post op day 4. At 6 month follow-up, chest Xray showed no signs of the bulla or pneumothorax at the left lung apex.

Discussion: Endobronchial valves are unidirectional valves, which allow for air and fluid drainage from distal lung segments while preventing air reentry. While recent case series have reported the use of endobronchial valves for decompression of giant bullae in high risk surgical patients, simultaneous use of endobronchial valves and percutaneous decompression to isolate and decompress giant bullae suggests an alternative strategy and one with the potential for a more permanent solution given the opportunity to remove the valves once the affected area distal to them has healed.
MARYLAND POSTER FINALIST - CLINICAL VIGNETTE Gurkeerat Singh, MD

Cost Saving Method to Treat Loculated Parapneumonic Pleural Effusions.

First Author: Gurkeerat Singh, MD, Jessy Dhillon, MD

Introduction: Pleural infections and parapneumonic effusions commonly require drainage of infected fluid. A 2011 RCT found that intrapleural TpA, when used with DNAase can decrease length of hospital stay and need for surgery to treat these cases (Rahmaan and Davies et al. NEJM 2011). However, treatment remains off-label. Our case documents the use of these therapeutic adjuncts to treat a loculated pleural effusion in the community-hospital setting.

Case description: A 52 year old white female with a history of mild asthma presented with 1 week of right-sided focal pleurisy and bronchitic syndrome, after failing outpatient therapy with Levaquin. She was afebrile, without rigors, but with mild shortness of breath and cough. Chest CT showed a small to moderate sized right-sided pleural effusion. After 48 hours of treatment with empiric antibiotics, her pain had not resolved and the associated right-sided effusion appeared loculated. Diagnostic tap, followed by chest tube drainage placement derived little benefit, with minimal drainage. With no clinical improvement in 48hrs, and the possibility of the effusion being loculated based on chest CT, off-label use of sequential TPAse and DNAse instillation into the pleural space, per the protocol established in the RCT conducted by Rahmaan and Davies et al. (NEJM 2011) demonstrated a significant increase in chest tube drainage from 100 cc per day to 1000 cc per day with complete resolution of patient symptoms.

Discussion: This case demonstrates that the combination of intrapleural administration of alteplase and Dornase Alfa are useful in improving chest tube drainage in a newly-diagnosed loculated pleural effusion, and can safely be utilized in a community hospital setting. The use of Dnase and Tpa allowed this patient to be managed without surgery or invasive treatments, and significant cost reduction.

Conclusion: This patient’s loculated Pleural Effusion resolved with intrapleural DNAase and alteplase use as an adjunct to chest tube drainage and antibiotics. More Randomized Controlled trials need to be conducted to investigate fully the efficacy, dosing, and safety of intrapleural DNAase and alteplase in the treatment of patients with this condition.
Unmasking the Silent Infection!

First Author: Fadi Alkhatib, DO

Introduction: Cryptococcus meningitis is well described in AIDS patients. Patients with AIDS starting HAART therapy have the potential to develop immune inflammatory response syndrome, unmasking meningitis already present or paradoxically making symptoms worse.

Case presentation: A 30 year-old Mexican Male is presented with sub-acute progressive headache, nausea, and vomiting for the past week. Patient has a past medical history of HIV who was started on HAART therapy a month prior to presentation with recent CD4 count of <1. He also presented a week earlier to the ED with similar symptoms where he had a Head CT that showed Chronic maxillary sinusitis with no acute intracranial abnormality. He was discharged to follow up with PCP. Headache has been deteriorating since his visit thus presented again to our institution. Headache was in the temporal parietal region and is worse with supine position. On presentation Vital signs were stable and physical exam was normal. Due to his progressive worsening headache patient underwent lumbar puncture. Lumbar puncture CSF analysis showed colorless CSF with WBC count 6 /mm3, 0 RBC, 37% segment and 44% lymphocyte, 15% monocyte, 2% eosinophile, protein 38mg/dl, Glucose 45 mg/dl, and the pressure was 8 mmHg. Pertinent CSF labs had positive Cryptococcus antigen with 1:2048 titer. Blood Cultures were positive with Cryptococcus neoformans as well. ID was consulted and patient was started on the appropriate therapy for fungemia and Cryptococcus meningitis with improvement of his symptoms. It was thought that his symptoms were contributed by the Immune response inflammatory syndrome (IRIS) as he started HAART therapy few weeks prior to presentation.

Discussion: IRIS is a condition where the immune system begins to recover and response to a previously acquired opportunistic infection with an overwhelming inflammatory response. IRIS has two main types. The unmasking types, similar to our case, where an infection previously undiagnosed or silent is unmasked with the start of HAART therapy and body starts to respond to infection. The second type is the paradoxical type where previously treated opportunistic infection gets worse after the start of treatment of AIDS2. IRIS should be considered when symptoms or inflammatory signs occur after recent initiation, re-initiation of HAART that is associated with CD4 count increase or decrease in viral load after other causes has been ruled out1. This is mostly been reported in clinical worsening and recurrence of clinical TB and cryptococcal meningitis following initiation of therapy2.
Dasatinib toxicity manifesting as pericardial tamponade

First Author: Theodora Anagnostou, MD
Other authors: Wei Sun, MD, Lisa Weissmann, MD,

Introduction: Tyrosine Kinase Inhibitors (TKI) can lead to systemic toxicity due to differential inhibition of TK. We present herein a case of dasatinib toxicity associated with fluid retention and cardiac tamponade 7 years after drug initiation.

Case presentation: The patient is a 70 year-old male with Chronic Myeloid Leukemia (CML) well controlled on 100mg dasatinib daily for 7 years who presented with dyspnea on exertion for 2 days. On arrival to the Emergency Department he was hemodynamically stable, but tachycardic to 110 and physical exam was remarkable for leg edema. Xray revealed small bilateral effusions and bedside echocardiogram showed a large circumferential pericardial effusion with right atrial diastolic collapse consistent with tamponade physiology. The patient underwent emergent pericardiocentesis and more than 800 cc of serosanguinous fluid was drained, followed by thoracentesis. Fluid analysis was negative for malignant cells. He was subsequently diagnosed with dasatinib toxicity and the medication was held. On 1 week follow up, his BCR/ABL was undetectable and it was recommended that he resumes treatment with nilotinib after 6-12 weeks.

Discussion: Dasatinib is a second generation TKI that was approved by the FDA in 2006 for the treatment of newly diagnosed Philadelphia Chromosome positive (Ph+) CML in chronic phase, as well as Ph+ CML that is resistant or intolerant to imatinib.

Pleural effusions occur in 10-20% of patients on dasatinib 5-28 weeks after treatment initiation and the incidence increases with higher doses. Potential mechanisms include SRC-kinase inhibition in lymphocytes, but immunologic mechanisms have also been proposed. Although fluid retention has more frequently been described with imatinib, pleural effusion was more frequent with dasatinib in the DASISION trial.

Other serious side effects include bleeding, pulmonary hypertension and interstitial lung disease, while pericardial effusions occur in less than 1% of the patients. Development of severe toxicity mandates discontinuation of the drug and transition to a new medication, such as nilotinib, which belongs to the same family and is often associated with elevations in pancreatic and liver enzymes.

This is, to our knowledge, the first case report of cardiac tamponade associated with dasatinib use and occurring 7 years after initiation of treatment.
Adrenal Apoplexy: An Unusual Cause for Crisis Decision-Making

First Author: Swati Baveja, MD Additonal Authors : Nitin Trivedi , MD Dr.George Abraham ,MD ,MPH

Introduction: Tuberculosis (TB) usually affects the lungs, but virtually any other organ can be involved. Extra-pulmonary TB accounts for about 15 to 20 percent of all cases. Atypical presentations with poor yield of standard diagnostic tests leads to a significant delay in the diagnosis. We present a case of primary adrenal insufficiency with precipitation of adrenal crisis brought on by the treatment of TB.

Case Description: A 45-year-old man was seen in the hospital because of a 3-month history of abdominal distention, fatigue and weight loss. He was born in the Philippines and has been in the US for the last 6 years. He had a positive tuberculin skin test (TST) at the time of immigration, which was attributed to prior BCG vaccination. On examination he had significant abdominal distention due to free fluid. A CT scan of the abdomen revealed ascites, nodular omental thickening, mesenteric and para-aortic adenopathy, with bilateral nodular adrenal enlargement. Chest radiography did not show any abnormality. Therapeutic paracentesis revealed an exudative effusion. Acid-fast bacilli were seen on Ziehl Nelson (ZN) stain, which was subsequently confirmed by culture as Mycobacterium tuberculosis. He was discharged on isoniazid, rifampin, pyrazinamide and ethambutol. One month later, the patient returned to the hospital with fatigue, severe vomiting, loss of libido and erectile dysfunction. On examination, he had hypotension, bitemporal muscle wasting, and hyperpigmentation of his skin, oral mucosa and nails. Laboratory investigations showed hyponatremia and hyperkalemia. The basal and cosyntropin stimulated serum cortisol were 1.8 mcg/dL and 2 mcg/dL respectively. The diagnosis was made of primary adrenal insufficiency most likely due to tuberculosis with exacerbation of clinical status by rifampin. He was discharged on hydrocortisone and fludrocortisone.

Discussion: It is very important to be attuned to the effects of rifampin and other Cyp3A4 inducers in patients with tuberculosis because adrenal crisis may ensue due to accelerated cortisol metabolism in patients with untreated partial adrenal insufficiency. Furthermore, in patients already on corticosteroid replacement therapy, the dose of corticosteroid typically requires titration up when rifampin is started.
Not Your Average Case of Diabetic Heart Disease

First Author: Pooja Chitneni MD

Introduction: Diabetes is one of the fastest growing diseases in this country and the world. Metformin is the most frequently prescribed oral anti-hyperglycemic with the well-known but rare complication of lactic acidosis. The sequelae of Metformin associated lactic acidosis (MALA) can be quite severe with mortality up to 30%.

Case: A 75 yo Haitian woman with a history of hypertension and diabetes mellitus type II presented to the emergency room with nausea and vomiting. She had recently emigrated from Haiti. One week prior she established care with a primary care physician. Blood work revealed BUN/creatinine 20/1.6, blood sugar 551, and she was subsequently started on Metformin 1000 mg BID. In the ED, VS were T36.6 C, HR94, BP93/56, O2 sat 98% on RA. Labs were significant for blood sugar 250, VBG 6.98/26, bicarbonate 6, AG 40, lactate 21, creatinine 10.52, K 4.3, WBC 12.1, troponin 0.986. The electrocardiogram showed inferior ST elevation and intermittent atrial fibrillation. A bedside echo was performed which showed a preserved left ventricular function as well as right ventricular strain. Pulmonary embolus was ruled out on CT pulmonary angiogram. Cardiac catheterization showed diffuse three-vessel disease including 100% occlusion of the right coronary artery, which was thought to be chronic in nature.

During this time, the patient became acutely hypotensive. She required levophed and intubation. She had initially been started on Aspirin, Clopidogrel, and a Heparin drip, but these were discontinued once the catheterization was performed and etiology of MI was determined to be demand ischemia secondary to vasoplegic shock from metabolic acidosis in the setting of Metformin toxicity. Due to anuria, continuous veno-venous hemodialysis was started.

Upon extubation on hospital day 5, the team noted that the patient had left sided weakness. CT brain and MRI brain showed evidence of new ischemic infarcts. Given the patient’s multiple medical issues, palliative care was consulted on hospital day 6, and code status was changed to DNR/DNI. Two days later, the patient was made comfort measures only. She died on hospital day 14 from multi-organ failure.

Discussion: MALA is quite rare with an incidence of < 1 case per 100,000 treated patients. The majority of cases occur when the contraindications to Metformin use are breached – such as a decreased creatinine clearance. MALA likely occurred due to the patient starting a high dose of Metformin with resultant nausea and vomiting which further worsened the creatinine clearance. One documented complication of MALA is vasoplegic shock, a subset of distributive shock, defined by high cardiac output and low systemic vascular resistance resulting in persistent hypotension, which adds to the high mortality and difficulty with managing this syndrome. This unfortunate case illustrates a poor outcome when multiple organs are affected by vasoplegic shock.
Pseudohypoglycemia- Be careful!

First Author: Adhirath Doshi, MD, Adhirath Doshi, MD (Associate), Manoj Gupta, MD, Sai Aparna Nelakanti, MD, Nitin Trivedi, MD, FACP, Department of Medicine, St. Vincent Hospital, Worcester, MA.

Introduction: Pseudo-hypoglycemia is not a clinical syndrome, but a result of artifactually low glucose concentration due to impaired microcirculation. It is an uncommon condition, which needs to be ruled out in case of very low finger-stick blood glucose levels without clinical features of hypoglycemia.

We present a case of pseudo-hypoglycemia which emphasizes the importance of the history and clinical examination over the numbers.

Case: An 81 year old male with a history of hypercholesterolemia, ulcerative colitis, chronic anemia, depression, recurrent falls, atrial fibrillation and dementia presented to the emergency department with an unwitnessed fall at the nursing home. In the ED he was asymptomatic and denied loss of consciousness, chest pain or shortness of breath associated with the fall. His finger-stick glucose was 44mg/dl and subsequent finger-stick glucose readings ranged from 10mg/dl to 60mg/dl. He was thought to have the fall due to hypoglycemia and was immediately treated with IV dextrose, 1mg of Glucagon and a stress dose of glucocorticoids for consistently low finger-stick blood glucose levels.

On examination, the patient remained asymptomatic throughout the ED course. His vital signs were stable except for a pulse of 111/min. He was found to have cyanotic and cold fingers, despite a pulse oximetry of 97% on room air. Venous blood glucose levels were found to be in high normal – i.e., 160’s – presumably secondary to the interventions he had received in the ED based on the finger-stick values. As he was on chronic use of budesonide for the ulcerative colitis, studies for adrenal insufficiency were done and were negative. He was discharged home after being observed for 24-hours for hypoglycemia, but he remained euglycemic throughout the hospital course.

Discussion: Our patient demonstrated pseudo-hypoglycemia, likely secondary to peripheral vascular disease (PVD). True hypoglycemic episodes are generally characterized by Whipple's triad: typical symptoms of hypoglycemia with a low plasma glucose measured at the time of the symptoms and relief of these symptoms when the glucose is raised to normal; none of these criteria was present. Pseudo-hypoglycemia associated with PVD has been previously reported and is thought to be due to a prolonged glucose transit time secondary to the constriction of microcirculation in PVD and a subsequently greater than usual extraction of glucose into the peripheral tissues.

Conclusions: We report this case to increase general awareness of the potential limitations of finger-stick blood glucose measurements in patients with impaired microcirculation. Unnecessary and potential harmful measures in the response to pseudo-hypoglycemia on finger-sticks might then be avoided.
MASSACHUSETTS POSTER FINALIST - CLINICAL VIGNETTE David Edasery, MD

“Now You See It, Now You Don’t” - Cardiac Plasmocytoma with Tamponade

First Author: David Edasery MD Second Author: Michael Viray MD Third Author: Erik Holzwanger MS4 Fourth Author: Jared Selter MD Fifth Author: Paul Berard MD Dept of Internal Medicine, St. Vincent’s Medical Center, Bridgeport, CT

Introduction: Extramedullary plasmacytoma (EMP) involving the heart is extremely rare, and only 13 cases have been reported in literature. We report here a case of a patient with a history of extramedullary plasmacytoma (EMP) of the right maxillary sinus and recent diagnosis of solitary plasmacytoma of bone (SBP), who was incidentally found on transthoracic echocardiography to have a cardiac extramedullary plasmacytoma when she developed symptoms of cardiac ischemia after orthopedic surgery.

Case Description: A 57 year-old Caucasian female was evaluated in our institution for NSTEMI after undergoing an ORIF in an outside hospital for a left distal humeral fracture sustained after a fall. Her past medical history was significant for EMP involving her right maxillary sinus confirmed by biopsy 19 months prior to presentation. She had a negative work-up for systemic myeloma including bone marrow biopsy, serum and urine electrophoresis, and skeletal survey. After completing radiation therapy, a follow-up PET scan 9 months prior to admission demonstrated no new focus of activity. One month prior to admission she was found to have a biopsy confirmed solitary plasmacytoma in her right proximal tibia with an otherwise negative skeletal survey. On this admission, initial TTE revealed a large pericardial effusion without tamponade and a large mass in the endocardium of her right ventricle extending into the pericardium. Subsequent cardiac catheterization revealed normal coronary arteries with an LVEF of 60% as well as tamponade physiology prompting pericardiocentesis and removal of 850 cc of bloody fluid inside the pericardial cavity. She was started on Lenalidomide, Bortezomib and Dexamethasone with radiation treatment to her right proximal tibia. A month later, a repeat transthoracic echocardiogram showed the absence of pericardial effusion and non-visualization of the previously noted large right ventricular mass.

Conclusion: Extramedullary plasmacytomas typically demonstrate excellent disease control and long-term disease free survival with radiation therapy, but approximately 25% progress to myeloma in 5 years. Based on rare cancer network data for solitary plasmacytoma of bone, up to 75% of patient may have a monoclonal protein in urine or blood and progression to myeloma at 5 and 10 years is 51% and 72% respectively. Work-up with serum and urine protein electrophoresis, serum free light chain assay, and plasma phenotype is important to predict progression to systemic myeloma. Although cardiac involvement from EMP is extremely rare, it should be included in the differential diagnosis of a patient with known history of EMP presenting with signs of cardiac ischemia.
Meloxicam Induced Acute Kidney Injury Presenting as Nephrotic Range Proteinuria

First Author: Gunjan Garg OTHER AUTHORS: Aswanth Reddy, M.D., Akhila Ramayapally, M.D., John Littell, D.O.

**Introduction:** Non-steroidal anti-inflammatory drugs are one of the major causes of acute kidney injury (AKI). It presents as acute tubular necrosis or acute interstitial nephritis. In the US it is estimated that acute kidney injury comprises about 1% of hospital admissions. Meloxicam is an oxicam derivative with less than 1% risk of acute kidney injury. Here we present a case of meloxicam induced AKI presenting as nephrotic syndrome.

**Case:** A 56 year old woman presented with five days of progressive fever, nausea, vomiting and malaise. These symptoms were associated with decreasing urine output. She had a recent history of sinusitis treated with amoxicillin. Initial evaluation in the emergency department showed an elevated BUN of 105mg/dl and creatinine of 11.87mg/dl with severe metabolic acidosis (arterial pH of 6.84 and bicarbonate of 4 mEq/l). She was admitted to the intensive care unit for emergent dialysis. Toxicological analysis for solvents was negative. Interestingly, the urinalysis on admission showed a nephrotic range urine protein to creatinine ratio of 3.5. Retrospective review showed that she was started on meloxicam 4 weeks prior to the hospital admission. Her home medications also included hydrochlorothiazide and valsartan. She received one cycle of hemodialysis. Repeat urinalysis on the third day of hospitalization showed hematuria, granular casts and mild proteinuria. At this point, the condition was consistent with acute tubular necrosis, which was supported by granular casts in the urine. Her urine output, BUN and creatinine improved to normal.

**Discussion:** Meloxicam rarely causes acute kidney injury, and usually presents as acute tubular necrosis. Meloxicam causing nephrotic syndrome is rare, and one case has been reported so far. Our patient presented with nephrotic range proteinuria later manifesting as ATN. This has seldom been reported in literature. Also the risk increases with ACE inhibitors and diuretics, as in our patient. This case demonstrates potential toxic effects of meloxicam on renal function, albeit infrequently reported.
Kikuchi Fujimoto Disease; Out of Sight and Out of Mind?

Samaher Hashim, MD (Associate), George Abraham, MD, MPH, (Fellow)

INTRODUCTION: Kikuchi-Fujimoto disease (KD) is a self-limiting condition, characterized by benign lymphadenopathy with associated fevers and systemic symptoms. It most commonly affects adults younger than 40 years of age and of Asian descent. The etiology is unknown, although viruses and autoimmune mechanisms have been proposed. Diagnosis requires histopathologic examination and exclusion of other factors by ancillary studies.

CASE PRESENTATION: A 30 year old Indian female, who immigrated to the US 12 years ago, her last travel to India having been in 2012, presented to her primary care physician in November 2013 with arthralgias, fevers of 102°F and increasing fatigue. She was diagnosed ‘clinically’ with ‘Strep throat’ and was treated with multiple courses of antimicrobial agents with no relief. Further investigations including serologies for Lyme disease were performed, although she had no epidemiological risk factors for acquisition of disease. Antibody titers were positive without a positive Western Blot test, but she was treated with doxycycline for 21 days and had marginal relief of her symptoms for 2 weeks. Thereafter, she had a recurrence of symptoms in addition to increasing swelling and tenderness over the right side of her chin, anorexia and weight loss of 10 lbs over a two week period. She was on no medication and had no pertinent family history. Examination at admission revealed an emaciated female who was afebrile and hemodynamically stable. She was poorly communicative due to significant discomfort in her neck from a large matted mass in the right submental region, that was poorly mobile and not palpable in the floor of her mouth. The rest of her examination was essentially unremarkable; specifically, no other lymph nodes were palpable. Her laboratory work up showed the following abnormalities: WBC 2.9 (62% neutrophils, 32% lymphocytes), LDH 614, ESR 128, ALT 85, AST 131 and ALP 206. A CT of the neck revealed extensive lymphadenitis. A CT of the chest, ANA, PPD, HIV, CMV, EBV and parvovirus B19 serologies were negative. A lymph node biopsy revealed necrotizing histiocytic lymphadenitis without caseation, consistent with KD.

DISCUSSION: While the pathogenesis of Kikuchi disease is unknown, the clinical presentation, course, and histological changes suggest an immune response of T cells and histiocytes to an infectious agent. Numerous inciting agents have been proposed, including EBV, HSV6, HSV8, HIV, parvovirus B19, paramyxoviruses, parainfluenza virus, Yersinia enterocolitica, and Toxoplasma. While the disease is well-described, unless there is an index of suspicion, it can remain undiagnosed or worse, misdiagnosed for a long time, as happened in our patient.
MASSACHUSETTS POSTER FINALIST - CLINICAL VIGNETTE SAURABH JOSHI, MD

A Rare Cause of Acute Kidney Injury, Proteinuria and CKD in a Young Patient

First Author: SAURABH JOSHI, MD Second Author: Kevin Martin, MD Third Author: Hemant Magoo, MD Fourth Author: Ashish Verma, MD

Introduction: The kidney is commonly involved in amyloidosis and is invariably involved in secondary amyloidosis (SAM). We report a rare case of SAM due to chronic osteomyelitis and ‘skin popping,’ presenting as acute kidney injury (AKI).

Case: A 34 year-old Hispanic female with a remote history of IV drug abuse (IVDA) and left forearm and left below-knee amputation following a motor vehicle accident (MVA), presented with deteriorating mental status, cough and fever. She had just completed a two-week course of valacyclovir for shingles. At presentation, her vitals were normal but she was obtunded and had crackles at the lung bases. Brain imaging and lumbar puncture were negative, and she was empirically treated for a community-acquired pneumonia. Creatinine at baseline was 1.5mg/dl (CKD III of unclear etiology) but increased over the next 3-4 days to 6mg/dl. She had nephrotic range proteinuria with benign urine sediment; imaging showed normal sized kidneys without obstruction. Serum complement, ANA, ANCA, DsDNA, anti-GBM antibodies and cryoglobulins were all negative. Kidney function did not improve for a couple of weeks, and a kidney biopsy showed severe deposition of serum amyloid A protein (SAA) in all compartments of the renal parenchyma, suggesting secondary amyloidosis (SAM). Creatinine stabilized at 5mg/dl, and she was discharged home once the mental status changes, attributed to valacyclovir and narcotics, resolved. Work up for chronic inflammatory arthritis, IBD, lymphoma and other conditions known to be associated with SAM was negative. The history was reviewed with the patient at a follow-up clinic, and it turned out that she never had an MVA, but rather incremental amputations for severe chronic osteomyelitis due to ‘skin popping.’ Indeed, the IVDA-induced osteomyelitis was causative of SAM in this patient.

Discussion: Secondary amyloidosis (SAM) is characterized by extracellular tissue deposition of fibrils of SAA, an acute phase reactant. It is a nonspecific condition that can occur in a number of chronic inflammatory and hereditary conditions. Chronic skin inflammation due to ‘skin popping’ is a rare cause of SAM. Our patient’s habit led to severe chronic osteomyelitis, contributing to the pathogenesis of SAM. The rare and unexpected presentation of SAM as AKI in this patient highlights the importance of kidney biopsy in establishing an accurate diagnosis. It also highlights the importance of accurate history taking and of revisiting it when the clinical findings do not correlate. This patient’s family initially denied the true history, as they were trying to shield the patient’s young children from that information.
Plasmapheresis: A Rescue Therapy in Thyroid Storm.

First Author: Mariam Lotia, MD, Reshma Abraham, MD, Zainab Basheer, MD, Nitin Trivedi, MD.FACP, Department of Medicine, Saint Vincent Hospital, Worcester, MA

Introduction: The conventional therapy for thyroid storm consists of anti-thyroid drugs, corticosteroids, and beta-blockers. In patients who are either intolerant or fail standard treatment, extracorporeal plasmapheresis has been used for treating thyroid storm. We present a case report of thyroid storm successfully treated with plasmapheresis.

Case presentation: An 85-year-old female with a history of Graves’ disease presented with 10 days of confusion, progressive anorexia and weight loss. Review of systems was positive for watery diarrhea. She had been on methimazole for the prior 10 years, but discontinued it two weeks prior to admission for an anticipated radioactive iodine ablation. On physical examination vital signs showed a temperature of 97.7°F, pulse 110, respiratory rate 18, blood pressure 129/89, and oxygen saturation 98% on room air. Thyroid examination did not reveal lid lag, exophthalmos or any features of Graves’ disease. Cardiovascular examination demonstrated an irregularly irregular rhythm and mild pedal edema bilaterally. Labs revealed hypercalcemia (11.7 mg/dL), hypernatremia (147 mEq), and new-onset atrial fibrillation on EKG. TFTs showed suppressed TSH and elevated thyroid hormone levels (see table). Thyroid stimulating immunoglobulin was significantly elevated (657%). During hospitalization she developed an altered sensorium. A brain CT was essentially unremarkable. The diagnosis of thyroid storm was made based on the Burch-Wartofsky score of 55. She was initially treated in the ICU with conventional therapy for thyroid storm, but without clinical improvement, plasmapheresis was initiated. After two consecutive sessions of plasmapheresis, there was significant clinical and biochemical progress (see table). The patient received rectal administration of methimazole until she was able to swallow medications and then was subsequently switched to oral formulation.

<table>
<thead>
<tr>
<th></th>
<th>TSH µ/ml</th>
<th>Free T4 ng/dL</th>
<th>Total T3 ng/dL</th>
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<td>Admission</td>
<td>&lt;0.005</td>
<td>&gt;7.8</td>
<td>452</td>
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<tr>
<td>Day of ICU transfer</td>
<td>&lt;0.005</td>
<td>4.4</td>
<td>208</td>
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<tr>
<td>Post 1st session of plasmapheresis</td>
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<td>2.7</td>
<td>136</td>
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<tr>
<td>Post 2nd session of plasmapheresis</td>
<td>0.127</td>
<td>1.4</td>
<td>62</td>
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Discussion: Therapeutic plasmapheresis works as a stabilizing measure in thyroid storm by removing thyroid hormones bound to thyroxine-binding globulin. In our case dramatic clinical improvement and rapid reduction in the levels of thyroid hormone were seen following plasmapheresis. The effect of plasmapheresis lasts for 24 to 48 hours, providing a window of time for definitive therapy. Rectal methimazole was transiently used as an alternative to oral formulation with an equal clinical effect. With her excellent response to plasmapheresis, and previously published case reports, we conclude that plasmapheresis can be used as a therapeutic option for severe thyrotoxicosis.
THE UNFORGIVING TROPONIN LEAK

First Author: Lucian M Neville, MD  Second Author: Fahad Alsindi, MD  Third Author: Jennifer Collins, MD

Introduction: Acute Type A aortic dissection is a time-sensitive emergency with high mortality. Prompt identification is critical and modern diagnostic imaging has greatly expedited surgical intervention. We report an unusual case of acute Type A dissection masked by standard diagnostic imaging.

Clinical Presentation: A 54-year-old male presented to an outside hospital with severe headache associated with non-specific chest discomfort and a systolic blood pressure of 190 mmHg. Symptoms began after bending over to pick up a tool at work. A head CT in the emergency department showed no abnormality; however EKG demonstrated 1-mm ST-depressions in the lateral leads. Labs were significant for a troponin of 1.7 ng/ml and D-dimer of 773 ng/ml. CT angiogram (CTA) evaluation was negative for pulmonary embolism and aortic dissection. In this setting, a diagnosis of non-ST elevation myocardial infarction was made, a heparin drip was started, and he was transferred to our facility for coronary angiography.

In our Coronary Care Unit, he denied chest pain, but complained of worsening dyspnea. Re-examination revealed a soft diastolic murmur. An emergent transthoracic echocardiogram revealed a severely dilated ascending aorta, with severe aortic regurgitation. Transesophageal echocardiogram confirmed a large ascending aortic dissection at the sinotubular junction with severe aortic regurgitation.

Discussion: Acute Type A aortic dissection is a life-threatening cardiovascular emergency and in-hospital mortality rates approach 30%. However, this statistic is far less forgiving when diagnosis is delayed. Physical examination and plain radiographs cannot reliably exclude aortic dissection, and thus a superior screening test is needed.

CTA allows timely, non-invasive evaluation of the aortic anatomy and excellent visualization of the characteristic intimal flap. The sensitivity and specificity of CTA to diagnose dissection are reported as 90%. Although our patient exhibited some classic features of dissection, his diagnosis was delayed by an initial falsely-negative imaging study. This occurred because of improper timing between contrast injection and image capture. Premature image capture prevented the visualization of an intimal flap or false lumen, since contrast media was yet to reach the critical area of dissection. The patient subsequently underwent successful aortic root and valve replacement and has done well in outpatient follow up with no complications.

Conclusion: Acute Type A dissection is an unforgiving, life-threatening medical emergency. Despite the reported diagnostic success of CTA, aortic dissection remains an illusive diagnosis that requires diligence, meticulousness, and a high index of suspicion to consider the diagnosis.
An Enemy Returns: CSF Melanomatosis

First Author: Erin E O'Shea, DO Other Authors: Shradha Gupta, MD, Gary Keilson, MD and Tony Samaha, MD

Introduction: Melanoma and lung cancer are tumors that metastasize to the leptomeninges most frequently (23% and 11% of CSF metastasis cases respectively). A diagnosis of CSF melanomatosis foreshadows an abysmal prognosis with a cruel natural history, as witnessed in this case. Treatment options are limited, and the average survival from time of diagnosis is 8-12 weeks.

Case: A 40-year-old female presented with insidious onset of headache, neck pain, low back pain and bilateral lower extremity tingling and weakness. Her past medical history was significant for pseudotumor cerebri, obesity status post gastric bypass surgery, stage III melanoma of the neck status post excision with neck dissection and one year of interferon treatment 7 years prior, and recent diagnoses of follicular low-grade non-Hodgkin lymphoma and advanced high-grade neuroendocrine tumor of the lung.

Initial examination of the optic fundi was normal, cranial nerves and strength were intact, and reflexes were 1+ in upper extremities and bilateral patellae.

An MRI of the brain and spinal cord showed an enhancing right parietal lesion suspicious for metastatic disease and CSF carcinomatosis filling much of the CSF space of the lumbar spinal canal. Interestingly, a PET scan completed less than one month prior did not show CSF activity, and a CT brain done one week prior showed no lesion.

CSF opening pressure was 27 cmH2O. Analysis was significant for gross cloudiness, 123 WBCs, 51 RBCs, 92 lymphocytes and 1425 mg/dl protein. Neither gram stain nor culture revealed bacteria. Immunohistochemistry demonstrated tumor cells positive for Mart-1 and S-100 and negative for synaptophysin and CD79a – consistent with metastatic melanoma. Shortly thereafter severe pain and progressive lower extremity weakness developed. Along with complete lower extremities paralysis, she developed diplopia, facial droop and dysphagia.

With a negative BRAF mutation she was ineligible for BRAF-inhibitors. She was too weak to tolerate intrathecal interferon or ipilimumab. Palliation was recommended and she was discharged to hospice, where she later died.

Discussion: This patient is unusual in that she had three primary cancers by age 40, any of which could have metastasized to the leptomeninges. The pattern of her malignancies was not consistent with any known familial syndrome, she had no family history of malignancy, and she died before genetic testing was done. The case is compounded by the fact that she had completed one year of interferon, which has been associated with increased incidence of secondary malignancy. Unfortunately, treatment options for leptomeningeal melanomatosis are limited, and the course of this disease is rapid and unsparing.
Acute Cholecystitis As Initial Presentation Of Metastatic Lobular Breast Carcinoma

First Author: Alexander Adams, MD Second Author: Shahniwaz Labana, MD Third Author: Alaeddin Maeza, MD Supervisor: Zain Kulairi, MD

Introduction: About 1 in 8 U.S. women will develop invasive breast cancer over the course of her lifetime with invasive lobular carcinoma being the second most common type of invasive breast carcinoma (approximately 5-10%). Breast cancer is associated with local lymphatic spread as well as hematogenous spread and common sites of metastasis include bone, lung, liver, and brain. However, gastrointestinal, gynecologic, and peritoneum-retroperitoneum metastases are also possible and more prevalent in lobular carcinoma. Metastasis to the gallbladder however is very rare and only a few reports are available in the literature. We present a case of metastatic lobular carcinoma presenting as acute cholecystitis 6 years after management of primary cancer.

Case: An 86 year old female presented with right sided abdominal pain for one month that has gotten progressively worse. She also noted worsening diarrhea, nausea and vomiting. She has a past medical history of infiltrating lobular carcinoma of the right breast status post modified right radical mastectomy 6 years prior with lymph node biopsy staged at T3 N0(i+) MX. Abdominal exam revealed diffuse tenderness worse on the right with a positive Murphy's sign. Laboratory testing revealed a white cell count of 13.1 Thousand/mcL with 80 % neutrophil. Biochemical tests were within normal range (ALT, AST, ALP, Total Bilirubin, Amylase, lipase, Lactic acid). An abdominal ultrasound and CT were performed and showed similar findings of a contracted gallbladder containing a 0.8 cm gallstone, trace pericholecystic fluid, and a positive sonographic Murphy's sign. Surgery was consulted and the patient underwent laparoscopic cholecystectomy and the gallbladder was sent for pathology analysis. Pathology report demonstrated metastatic malignant neoplasm resembling the lobular carcinoma from the patients mastectomy 6 years prior that extended past the surgical margins. Tumor markers were positive ER and PR, and HER-2 negative similar to her breast cancer 6 years prior. Patient and her family decided to pursue comfort measures only and she was transferred to Hospice shortly thereafter. The patient passed away a day later.

Discussion: Metastatic breast cancer presenting as cholecystitis is a very rare phenomenon. Lobular histotype is the most frequent breast neoplasm associated with gallbladder metastases. As a group, invasive lobular carcinomas tend to metastasize later than invasive ductal carcinomas and spread to unusual locations such as peritoneum, meninges, and the gastrointestinal tract. Imaging is rarely diagnostic as seen in this case and neoplasm rarely presents with jaundice or acute abdomen. It usually leads to symptoms of abdominal pain, mimicking acute or chronic cholecystitis. Metastatic gallbladder involvement from a primary breast carcinoma remains rare however it appears to carry with it a very poor prognosis. Thus, abdominal pain in a patient with a previous history of breast carcinoma should raise suspicion of gallbladder metastasis.
All that looks like “Brugada” is not “Brugada” – Case series of Brugada phenocopy caused by hyponatremia

Sourabh Aggarwal, Kwabena Oware Adu-Gyamfi, Yashwant Agrawal, Devin Malik, Vishal Gupta

Brugada syndrome (BS), a life-threatening channelopathy associated with reduced inward sodium current due to dysfunctional sodium channels, is characterized by ST-segment elevation with downsloping “coved type” (type 1) or “saddle back” (type 2) pattern in V1-V3 precordial chest leads. Brugada phenocopy, a term describing conditions inducing Brugada-like pattern of electrocardiogram (EKG) manifestations in patients without true BS, is an emerging condition. We describe a case series of Brugada phenocopy with hyponatremia.

A 63 year old lady, with history of diabetes mellitus, hypertension and schizoaffective disorder, on haloperidol, presented to ER with confusion and altered mental status. She was drinking up to 12 liters of water and 4-5 beer cans every day. Physical examination, including vitals, was unremarkable except for confusion and disorganized thought process. Initial labs were significant for hyponatremia (Na 112mEq/L). EKG showed prolonged QTc (547ms) and “coved type” ST elevations in leads V1-V3. Cardiac markers were within normal limits. Electrophysiological studies and left heart catheterization were unremarkable. Her haloperidol was held and water restriction initiated. Her sodium level improved gradually with serial EKGs showing resolution of ST elevations and QTc interval returning to normal.

A 54 year old male, with history of hypertension, presented to ER complaining of lethargy, vomiting, anorexia and decreased fluid intake for 7 days. He denied any cardiovascular symptoms. Physical examination was unremarkable except for signs of dehydration. Initial labs revealed significant hyponatremia (Na 106mEq/L) with EKG showing prolonged QTc (526ms) and a “saddle back” type ST elevation in leads V2-V3. Telemetry did not show any evidence of arrhythmia. He was fluid resuscitated with gradual return of sodium level towards normal, and serial EKGs showing resolution of EKG findings with improving sodium level.

Brugada phenocopy associated with hyponatremia has been very rarely described. There have been very few isolated case reports. This, to the best of our knowledge, is first case series of Brugada phenocopy with hyponatremia. Sodium channel blockers are used to unmask and/or induce EKG-manifestations of BS in susceptible patients. Electro-physiologically, hyponatremia works similarly by decreasing electrochemical gradient and causing decreased inward current, leading to Brugada phenocopy. We believe that reduced trans-membrane gradient was responsible for Brugada phenocopy in our patient which was reversible and resolved with improvement in sodium levels and potentially trans-membrane gradient. Prognostic implications of these changes are unknown, however both our patients are doing fine till date. Management of these patients is supportive with intensive observation. Clinicians should be aware of the association of Brugada phenocopy with hyponatremia and be vigilant for diagnosis of true BS in case EKG findings fail to resolve with supportive management.
Marijuana Induced Biliary Dyskinesia

First Author: Reem Al-Mahdawi M.D., Larry McMann M.D., Tibia Al-Wardi M.D., Maliha Naseer M.D., Zayd Al-Nouri M.D., Hussam Sabbagh M.D., Sarwan Kumar M.D., Zain Kulairi M.D.

Objective: Recognize that chronic marijuana usage can be an independent risk factor for biliary dykinesia. Propose a possible mechanism based on the current literature and provide a platform for further investigation.

Case: A 19 year old female with no significant past medical history was admitted to our internal medicine service after being seen in the emergency room on two previous occasions in the prior week for abdominal pain, nausea, diarrhea, and vomiting. She had a social history significant for daily marijuana usage over the last 5 years. Work up during the first two presentations included a computed topography (CT) of the abdomen which was negative. Labs were unremarkable. She was given antiemetics, narcotic pain medication and sent home with a diagnosis of gastroenteritis.

On the day of her second discharge she returned 8 hours later with severe nausea and vomiting. The patient reported that she now had severe colicky abdominal pain. Labs and vitals were unremarkable. Physical exam was positive for diffuse abdominal pain with palpation, worse in the right upper quadrant. An upper endoscopy was done which showed gastritis. She continued to have nausea and pain despite treatment. Surgery evaluation was obtained and a hepatic biliary scan was ordered. The results demonstrated a gallbladder ejection fraction of 19%. She subsequently underwent a laparoscopic cholecystectomy and her symptoms of pain and nausea resolved.

Discussion: Biliary dyskinesia related to cannabis use has never been reported in the literature. The patient in the above case is the first suspected case. In a study in 2001 they looked at the effect of CB1 cannabinoid receptors in rat hippocampal slices and it’s effect on cholecystokinin (CCK) release. They concluded that activation of the CB1 receptors in the brain lead to less release of CCK which could contribute to learning and memory deficits. Many studies in the literature have pointed that cannabinoid receptor activation in the gut have lead to a decrease in peristalsis. We hypothesize that cannabinoid receptors in the gut inhibit CCK release and lead to biliary dyskinesia.

Conclusion: Cannabis use and it’s effects on the gastrointestinal system have focused primarily on it’s anti peristaltic properties in the gut. Research and prevalence on the biliary dykinesia associated with cannabis has not been studied. This observation and hypothesis leads the way for a possible case series and further study.
A Patient saved his own life-- A curious case of chest pain: Negative Dobutamine SPECT rMPI ending up with CABG due to triple vessels disease.

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Introduction: The stress test helps to diagnose coronary artery disease. Sensitivities and specificities for stress tests are often reported as being between 70% and 90%. Patients with positive tests are more likely to have their results verified with further testing, while those with negative tests are rarely referred for subsequent studies. We present a case of 54-year-old male presented with chest pain, had negative stress test but was found to have 3 vessel diseases and ended up with CABG.

Case: A 54-year-old male with a history of smoking, hyperlipidemia and a family history of early CHD; presented with recurrent episodes of left side chest pain for the last 3 weeks, episodes last more than 20 min, 6/10 in severity, pressure in nature, radiate to the left jaw and left arm, aggravated by exertion, partially relieved by sublingual nitroglycerine and sometimes associated with palpitations, SOB and dizziness. He had a negative stress test 3 years ago for similar pain. EKG showed no evidence of ischemia, 3 sets of troponins were < 0.010. Dobutamine stress SPECT rMPI done before discharge was normal. The patient insisted to have a cardiac catheterization and was found to have diffuse 50% area of stenosis in the left circumflex coronary, severe 80% stenosis at the proximal part of the LAD and total occlusion at the proximal part of the RCA. The patient underwent CABG of 3 vessels.

Discussion: Stress tests detect lesions that are greater than 70%. The performance of dobutamine SPECT rMPI (radionuclide myocardial perfusion imaging) for the diagnosis of CHD was evaluated in a review of 1014 patients from 20 studies. The sensitivity for detecting the presence of CHD in patients with one, two and three vessel disease was 84, 95, and 100 percent respectively. But if an individual has multiple 50% blocked arteries, you’re going to miss that on a stress test, yet that individual is likely at significant risk for a future cardiac event. Sometimes, it appears that flipping a coin would be a more sensitive mechanism for detecting CAD than relying on a stress test. In the CASS (Coronary Artery Surgery Study) population, the prevalence of CHD in this group is 89% but the false negative rate of the exercise stress test is 65%. Results of the CASS study regarding the exercise stress test could be applied to the dobutamine SPECT rMPI.
Familial Occipital Neuralgia; Role of the sodium channels in pathogenesis

Introduction: Occipital neuralgia (ON), also known as C2 neuralgia, or Arnold’s neuralgia, is a medical condition characterized by chronic pain in the upper neck, back of the head and behind the eyes.

ON is diagnosed when the patient meet the following International Headache Society (HIS) Criteria; (1) Paroxysmal stabbing pain, with or without persistent aching between paroxysms, in the distribution of the greater, lesser or third occipital nerves; (2) Tenderness over the affected nerve; (3) Pain is eased temporarily by local anaesthetic block of the nerve; (4) Pain from the alantoaxial or upper zygapophseal joints or from tender trigger points in the neck muscles or their insertions should be ruled out.

We present a case of hereditary ON which present in a young female inherited from her mother with onset of occurrence around the same age.

Case: A 27-year-old female with no significant medical history presented with episodes of severe intermittent headache over the past 3 weeks. The pain is electric and stabbing in nature, 10/10 in severity, lasted 10-15 seconds, located in the right occipital region and radiates to the right scalp and cheek. Her first episode happened while she was brushing her teeth and since then she continued to have frequent attacks of headaches.

Family history was significant for a history of ON in her mother around the same age that was treated with gabapentin with complete resolution of symptoms subsequently.

Physical exam was unremarkable except for tenderness over the right occipital region of the scalp. Computed Topography of the head and neck, Magnetic Resonance Imaging of the brain and venous system were normal. Patient was started on carbamazepine and gabapentin and she had mild relief. A greater occipital nerve block was performed on the second day of admission, which provided complete resolution of her symptoms. She was discharged home on carbamazepine and has been symptom free thereafter.

Discussion: Many reports in the literature described familial cases of cranial nerves neuralgia with familial trigeminal neuralgia being the most common. On the contrary familial ON was only reported twice.

Sodium channels play a major role in the pathogenesis of neuropathic pain since it causes derangement in the pain threshold. For example, the gain-of-function mutation of one particular sodium channel, Nav1.7, causes inherited erythromelalgia. This Nav1.7 mutation results in relatively large responses to small, sub-threshold depolarization.

We hypothesize that a mutation of the sodium channels is causing the familial ON specially if we know that these patients will respond well to sodium channel blockers like carbamazepine.

Conclusion: Further investigation of these cases may provide a better understanding of the sodium channels role in the pathogenesis of ON and lead the way to a permanent cure in the future.
A Rare Malignancy with Comorbid Hematologic Disorder

A 51 year-old Chinese male with chronic sinusitis presented to the hospital with fever, altered mental status, and persistent left-sided hemifacial pain despite having recently completed a course of antibiotics for presumptive sinusitis. On arrival to the ER, he was febrile, tachycardic, and hypotensive. His exam was significant for visible deformation of the left midface, redundant tissue in the left nostril, and a penetrating ulcer through the hard palate, as well as cervical lymphadenopathy, hepatosplenomegaly, jaundice, and confusion. His labs were notable for pancytopenia, acute kidney injury, and hyperbilirubinemia. His ferritin level was higher than the upper limit of detection, and his soluble interleukin 2 receptor (IL-2R) level was also elevated. Hepatitis serologies were negative, though he was found to be Epstein-Barr virus (EBV)-positive with a significant viral load. Imaging confirmed the presence of a nasal mass, as well as multiple fluorodeoxyglucose (FDG)-avid lesions throughout his brain and abdomen. A biopsy helped confirm the diagnosis of extranodal nasal natural killer (NK)/T-cell lymphoma. No bone marrow involvement was noted, but diffuse hemophagocytosis was present. Chemotherapy and radiation were planned, but he expired shortly thereafter due to multiorgan failure.

Extranodal nasal NK/T-cell lymphoma is a rare EBV-associated malignancy. It classically presents as a destructive nasal mass in East Asian males who are 50 or older. It can masquerade as chronic sinusitis, resulting in delayed diagnosis, and is a particularly aggressive malignancy with a propensity for local extension, widespread metastasis, and rapid progression. Secondary hemophagocytic lymphohistiocytosis (HLH) can sometimes be co-morbid in such patients.
Dysphagia Lusoria: an elusive diagnosis

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Dysphagia lusoria is a condition that causes difficulty swallowing and is often misdiagnosed or missed on initial examination. The symptoms are attributed to an aberrant right subclavian artery that has a retroesophageal course leading to vascular compression of the esophagus.

We present a case of dysphagia lusoria (with images) discovered in a 62 year-old female with coronary artery disease and gastritis complaining of chronic nausea and chest pain. Despite an extensive medical workup, including three esophagogastroduodenoscopies and computed tomography scans of the thorax, abdomen and pelvis, magnetic resonance angiography of the abdomen and multiple echocardiograms, the cause of her symptoms remained elusive. Prior to her diagnosis, she had a total of twelve emergency department visits and five hospitalizations before dysphagia lusoria was discovered by coronary computed tomography. Her coronary computed tomography revealed an anomalous origin of the left coronary artery from the right coronary cusp with a retroaortic course in addition to the left aortic arch exhibiting an aberrant right subclavian artery. She refused surgical intervention and elected for a conservative approach to management.

Certain medical comorbidities, including gastritis, coronary artery disease, angina and esophageal spasm, can often mask or mimic this condition leading to a delay in diagnosis and treatment. Typically, surgical treatment is the only curative option but symptoms can be controlled by specific dietary modifications, the use of proton pump inhibitors and anti-anginal medication. Dysphagia lusoria is an uncommon anomaly and even rarer cause of symptoms, however, when symptomatic and occurring in conjunction with similar presenting conditions, it can create a diagnostic and treatment challenge.
An animal bacterium in the human heart – a case of native valve endocarditis caused by *Staphylococcus simulans* in an immunocompetent patient

First Author: Christopher M Begley, DO, Akshay Amaraneni, MD, Andrew J Whipple, DO

*Staphylococcus simulans* is an infrequent colonizer of the human skin. It is a coagulase negative *Staphylococcus* that is known to cause infection in humans. Most cases of this bacterium causing infection are skin and soft tissue infections but rarely this can present as endocarditis. Risk factors for colonization are exposure to animals as this is typically colonized in sheep, cattle and domestic animals. We report a case of *S. simulans* endocarditis in a patient who did not report a history of exposure to animals.

A 73-year-old man presented to the emergency department with subjective fevers and malaise. Past medical history was significant for non-ischemic cardiomyopathy and a recently treated urinary tract infection (UTI). Vitals were stable. On physical exam, a 3/6 systolic murmur with radiation to the axilla was appreciated that was not reported previously. Initial laboratory data revealed no leukocytosis, but a urinalysis was suggestive of a urinary tract infection. Blood cultures were obtained, and the patient was initiated on oral antibiotics for presumed UTI and placed in observation. Within 12 hours, 2/2 sets of blood cultures were positive for gram-positive cocci in clusters and ultimately speciated to show *S. simulans* susceptible to Vancomycin. The patient was placed on intravenous Vancomycin. The patient underwent transesophageal echocardiography (TEE), which showed a partially flail posterior mitral leaflet, moderate to severe mitral regurgitation, a highly mobile mass consistent with a torn chordae tendon and a small mobile vegetation on the aortic valve measuring 0.88 cm. The patient was evaluated by cardiothoracic surgery, and due to the fact that he was compensated and hemodynamically stable the decision was made to treat the patient with six weeks of intravenous vancomycin prior to evaluation for mitral valve repair.

*S. simulans* is an uncommon coagulase negative *Staphylococcus* and is found in animals with infrequent human involvement. It causes mastitis in animals but can also lead to skin and soft tissue infections in humans. In our research, we were able to find four other cases of endocarditis caused by *S. simulans*. Typically, coagulase negative *Staphylococci* are considered to be contaminants of blood cultures. However, in the right clinical setting (positive urine cultures and multiple positive blood cultures) it should be taken seriously. This bacterium should be treated similar to any coagulase negative staphyloccocal infection. We elected to continue the patient on Vancomycin following discharge to a rehab facility for six weeks. The importance of this case comes from the recognition of coagulase negative *Staphylococcus* as a cause of endocarditis and bacteremia and should be diagnosed and treated appropriately.
Benign Metastasis: An Existing Contradiction

First Author: Abeer A Berry, DO Associate Second Author: Lohit Garg, MD Associate

Benign uterine leiomyomas are common pelvic tumors in females. They are differentiated from malignant masses based on histologic findings. Some benign leiomyomas may be mistaken for malignancies when they possess the capability to disseminate to other areas of the body. Benign metastasizing leiomyomas (BML) is a rare condition where leiomyoma nodules are present in distant body locations. We describe a case of BML in a fairly healthy female of reproductive age.

A 48-year-old female with a medical history of asthma, uterine leiomyomas and an ovarian cystectomy presented to the emergency center complaining of intermittent lower abdominal pain. A CT abdomen and pelvis revealed diverticulitis. Incidental findings of numerous, bilateral lung nodules measuring up to 8 mm, worrisome for malignancy were noted. Patient was referred to the pulmonary nodule clinic following discharge. During her visit, patient discussed that she was previously diagnosed with asthma but rarely required her inhaler in the past. She also admitted to increased frequency of rescue inhaler use recently as well as the development of a non-productive cough and increased dyspnea on exertion. Physical exam revealed normal findings. CT chest with contrast re-demonstrated the numerous nodules with no significant change in size. Pulmonary function tests revealed a moderate to severe, reversible airway obstruction consistent with asthma. Labs revealed a mild anemia and an elevated ESR. The remainder of the testing including a rheumatologic and hypersensitivity pneumonitis workup was negative. CT chest one year later revealed an increase in nodule sizes and some cavitation. A fiber-optic bronchoscopy with bronchoalveolar lavage was nondiagnostic with negative cytology and cultures. A CT-guided biopsy of a nodule demonstrated smooth muscle mesenchymal lesion consistent with BML. Given patient's relative proximity to reaching menopause, decision was made to monitor patient and repeat CT within 6 months. Repeat CT did not show disease progression and decision was made to avoid surgery and hormone suppression.

BML is a rare diagnosis that most commonly metastasizes to the lungs. It occurs in women of reproductive age. The process of dissemination is not confirmed but theories include vascular or lymphatic distribution and many indicate the spread may be iatrogenic since most case reports discuss women with a previous history of gynecologic surgery, as noted with our patient. The disease is usually asymptomatic but may present with symptoms including cough and dyspnea. Surveillance is adequate with incidental findings but oophorectomy and medical management to reduce serum estrogen levels are treatment options in those who present with symptomatic disease. It is imperative for clinicians to be aware of this rare diagnosis in female patients of reproductive age in order to avoid unnecessary workup, allow for appropriate management and disclaim concerns for malignancy.
Kikuchi-Fujimoto disease, or histiocytic necrotizing lymphadenitis, is a benign, self-limiting disease of unknown etiology more prevalent among Asians. The symptoms of fever, night sweats, cervical lymphadenopathy seen in this disorder mimic lymphoma so awareness is essential.

Case: A 37-year-old Asian lady with no past medical history presented with bilateral tender posterior cervical lymphadenopathy and intermittent fevers for three months. She noted chills, headache and fatigue but no cough, night sweats or weight loss. Initially she responded to Tylenol and ibuprofen, but the symptoms relapsed. She received a course of Augmentin for pharyngitis but did not improve. Subsequently, on developing dysphagia a second course of Augmentin with a Medrol dose pack was prescribed. CBC revealed neutropenia of 300/mm³, lymphopenia of 700/mm³, platelet count of 147 thousand/mm³, hemoglobin of 11.2 gm/dL. Lactate dehydrogenase was elevated, with normal ALT, AST, ESR and C-reactive protein. Mantoux test, antinuclear antibody, rheumatoid factor, HIV, EBV and CMV were negative. An excisional biopsy of the right cervical lymph node revealed Kikuchi disease. The patient’s symptoms resolved and labs improved with high dose steroids.

Discussion: Clinical presentation of KFD closely resembles that of hematologic malignancy. Clues to differentiate this benign condition were the normal ESR, platelet and RBC levels in the face of neutropenia, and lymphopenia. Although spontaneous recovery occurs over several months, steroids have been used to help shorten the course.
Shear stress - a case of microangiopathic hemolytic anemia and thrombocytopenia secondary to idiopathic pulmonary arterial hypertension

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Idiopathic pulmonary arterial hypertension (IPAH) is a rare and often fatal disease. IPAH can lead to a number of complications including multi-organ failure. Hematologic sequela is a rare manifestation of IPAH and its correlation with disease outcomes is poorly understood. We present a 31 year-old woman with IPAH, who developed refractory thrombocytopenia and microangiopathic hemolytic anemia (MAHA).

A 31 year-old woman with a three-year history of IPAH was admitted with acute onset of hemoptysis and hypoxic respiratory failure. Her IPAH was managed with a continuous epoprostenol infusion through a central venous access device. She was found to be thrombocytopenic (29,000) and anemic (9.5 mg/dL). She also had a supratherapeutic INR (5.6) due to her vitamin K antagonist. Her coagulopathy was reversed with vitamin K. Computed Tomography (CT) angiography of the chest was negative for pulmonary embolism but noted bilateral infiltrates. Levofloxacin was initiated for *Mycoplasma pneumoniae* pneumonia with positive IgM titer. Further work-up included direct anti-globulin testing, cold agglutinin antibody, supercoombs, PNH flow, ADAMST13, ANA, beta2 Glycoprotein, anti-cardiolipin antibody, acute hepatitis panel and HIV, which were all negative. Her haptoglobin was low, LDH was high and bilirubin was elevated. A bone marrow biopsy showed hyperplasia without atypical cells. Transthoracic echocardiogram showed severe progression of her pulmonary hypertension with pulmonary systolic pressure estimated to be 114 mmHg. Despite an exhaustive work-up and multiple blood product transfusions, she showed signs of multi-organ dysfunction. The patient’s thrombocytopenia was not thought to be related to her IPAH. However, it did not improve despite systemic steroid or IV Immunoglobulin therapy. The patient was transferred to a tertiary care center with a working diagnosis of severe progressive pulmonary hypertension with resulting microangiopathic hemolytic anemia and associated thrombocytopenia. Ultimately, she went into acute right-sided cardiac failure and shock leading to cardiac arrest. Resuscitative measures were unsuccessful and the patient died. A full autopsy was declined at time of death.

This case illustrates the significance and prognostic implications of hematologic abnormalities in IPAH. There have been six case reports suggesting an association between IPAH, thrombocytopenia, and MAHA. Similar to our efforts, these patients were worked up extensively to exclude other potential etiologies. Lung biopsies in reported cases showed plexiform lesions within the pulmonary vasculature presumed to cause mechanical destruction of red blood cells and platelets. These lesions are representative of endothelial cell proliferation and intimal remodeling predominately seen in severe subtypes of PAH. Further studies are necessary to validate the association of hematologic complications and increased disease severity of IPAH.
Where is That Blood Coming From? And Why? Pseudohemoptysis as Presentation of Acute Human Immunodeficiency Virus Infection

First Author: Kelly Downey, MD Leonard Johnson, MD FACP

Introduction: Expectoration of blood or bloody secretion can often be clinically challenging to diagnose. Acute HIV has a broad array of signs and symptoms, ranging from asymptomatic to classic acute viral syndrome (constitutional symptoms, myalgias, adenopathy). While cytopenias are well described with acute viral infections, there is rarely concomitant spontaneous bleeding. We present a case of apparent upper airway bleeding as the initial presentation of acute retrovirus infection.

Case: A 23 year old man with a history of asthma and cerebral aneurysm presented with a several day history of subjective fever, generalized myalgias, sore throat and diarrhea. One day prior to presentation, he developed copious expectoration of bloody secretions. He described a draining sensation in the back of his throat followed by spitting up approximately 50 mL of blood multiple times but denied vomiting or cough. Physical exam showed cervical adenopathy, enlarged, erythematous tonsils and splenomegaly. Initial workup showed a new leukopenia, thrombocytopenia, and monocytosis. Monospot test, rapid influenza and blood cultures were negative and there was no coagulopathy. Contrast CT of the thorax was unremarkable and CT of the neck demonstrated enlarged cervical nodes with tonsillar enlargement. Bedside video exam showed enlarged tonsils with visible vessels but no active bleeding. HIV antibody was indeterminate (positive p24 antigen, negative HIV-1/2 antibodies). The patient improved with supportive care. Follow-up testing revealed an HIV RNA of 510,000 copies/mL. One week later, his bloody expectorations resolved and leukocyte and platelet counts had normalized.

Conclusion: The manifestations of acute HIV infection are widely variable and bloody expectoration is not described as a presenting symptoms. Hemorrhagic tonsillitis should be added to the range of syndromes associated with acute HIV infection.
Minocycline-induced hyperpigmentation of aorta and aortic valve

First Author: E. Ethan Ebner, DO Second Authors: Christopher Begley, DO Alphonse Delucia, MD

Minocycline-induced hyperpigmentation is an unusual but well described phenomenon occurring after prolonged courses of this tetracycline antibiotic. We describe a 56 year old male on minocycline therapy admitted originally with embolic CVA, found to have an aortic fibroadenoma. He underwent open heart surgery for fibroadenoma removal, during which he was found to have a blue, hyperpigmented aortic valve and aorta. Given that on initial intake he was also found to have hyperpigmented blue fingernails, these phenomena was attributed to prolonged minocycline therapy (see pictures).

A 56 year old male presented for evaluation of increasing confusion and memory loss, found to have multiple cerebrovascular non-hemorrhagic lacunar and pontine infarcts on CT. A 2D transthoracic echocardiogram was performed, which showed a 1cm fibroelastoma on the non-coronary aortic cusp. This fibroelastoma was thought to be the source of embolic cerebrovascular events. Due to this finding combined with progressive coronary artery disease, the patient was taken to the operating room for open excision of the fibroelastoma and coronary artery bypass grafting. During the operation the patient was noted incidentally to have a blue/gray discoloration of his aorta and aortic valve leaflets. To the casual observer this had the appearance of an aortic dissection, but on further examination the aorta was otherwise normal. Given that the patient also had the more commonly described finding of blue fingernails, the aortic finding were consistent with minocycline-induced hyperpigmentation.

Minocycline is a tetracycline antibiotic that is most commonly used to treat acne vulgaris, sometimes with years of suppressive therapy. A well-documented but unusual side effect of minocycline is a striking blue hyperpigmentation of various tissues. It occurs most commonly in the skin, lips, teeth, gingiva, conjunctiva, and sclera (1), yet has been documented in cardiac tissues (3,4,5,6). There are three types of hyperpigmentation patterns seen with minocycline therapy. The first consists of blue-gray pigmentation in areas of previous inflammation, such as facial acne scars. The second type occurs when metabolites of minocycline are deposited in the skin of the forearms and shins (1,2). The third type is also called “dirty skin syndrome,” consisting of brown discoloration in sun-exposed areas. The fourth type is also due to melanin overproduction, but occurs in scar tissue (1,2).

Our patient chose to continue his minocycline therapy due to the beneficial effects on his skin condition, and the relatively limited visible side effects. There have been no reported consequences of aortic hyperpigmentation in the literature. Given the histological deposition of minocycline metabolite deposits, this phenomenon may theoretically affect intimal tensile strength. This case demonstrates an unusual cardiac sequelae of minocycline therapy, and prompts a useful review of the more commonly seen discoloration of dermatological tissues.
MICHIGAN POSTER FINALIST - CLINICAL VIGNETTE John Samuel Fleming, DO

Morphea: A rare dermatologic finding that may signal the presence of other autoimmune conditions

First Author: John Fleming, DO Sandeep Patri, MD Brian Hays, DO

Introduction: Morphea also known as localized scleroderma is an idiopathic inflammatory connective tissue disorder characterized by inflammation and sclerosis of the skin. The incidence is approximately 3 per 100,000 people. It more commonly affects Caucasians and females. Approximately 30% of patients with Morphea also have other autoimmune syndromes or connective tissue disorders. There are four types of Morphea: circumscribed, deep, generalized, and linear morphea. Circumscribed is the most common form in the adult. It presents as single or multiple plaques often oval or round in shape. We are reporting an interesting case of morphea.

Case Report: We describe the case of a 67 year old African American female who presented with burning mouth pain, severe fatigue, and dryness with itching of her eyes and mouth. She also complained of an itchy rash present for 2 years for which she had been prescribed multiple antifungal and OTC creams which provided no relief. Examination revealed a hyperpigmented velvety rash over the chest, beneath the breasts, and in the intertriginous areas of her groin consistent with plaque type morphea. She also had another oval macular lesion on her right posterior arm. Most of her major presenting symptoms were the result of folate deficiency secondary to poor oral intake and chronic alcohol abuse. These symptoms resolved with vitamin supplementation. Our patient exhibited sicca symptoms consistent with Sjogrens syndrome and was found to be positive for ANA(1:640), Anti SS-A(81) and SS-B(18), and Scl-70(84).

Discussion: The presentation of morphea in our patient was notable for several reasons. It is less commonly seen in African Americans. Recent studies have shown marked delays in the diagnosis of morphea which is most responsive to treatment during the early active stage. Our patient did already have one lesion in the inactive stage at the time of diagnosis with post-inflammatory hyperpigmentation which is typically unresponsive to treatment. She also had Sicca symptoms, oral ulcerations due to vitamin deficiencies, and multiple positive auto antibodies confounding the clinical picture. Positive SCL 70 is highly specific for systemic sclerosis of which she did not exhibit any symptoms. Anti SS-A and SS-B were also positive which together with sicca symptoms was highly suggestive of Sjogrens syndrome. This patient is being worked up for possible undifferentiated connective tissue disease in our rheumatology clinic. Morphea is an uncommon dermatologic autoimmune condition. When it is discovered it should be treated promptly and further diagnostic testing should be performed to elucidate other possible autoimmune conditions that may be contributing to a patient’s symptoms.
Managing A Case Of Limbic Encephalitis

First Author: Adam Forman, MD Feras Bashir MD, Gaurav Chand DO

Introduction: Limbic encephalitis is a rare paraneoplastic syndrome associated with small cell lung cancer that presents with rapidly progressive focal neurologic deficits. Anterograde amnesia is a hallmark of this condition.

Case Presentation: A 53 year old female presented to the ED with worsening cough. Chest x-ray revealed a left upper lobe mass, which was biopsied with a diagnosis of small cell carcinoma. The patient was started on chemotherapy with Cisplatin and Etoposide. Two weeks later, the patient presented to her oncologist with severe anterograde amnesia and psychosis. MRI is obtained shows bilateral enhancement of the temporal lobes not consistent with metastatic disease. Lumbar puncture shows normal cellularity, mildly increased protein, and normal glucose. On suspicion for Limbic Encephelitis, samples of CSF were sent to Mayo Clinic for analysis. Results came back positive for Anti-Hu Antibodies, diagnostic for limbic encephalitis. The patient improved with chemotherapy. Rixtuximab was consider but withheld has the patient's status declined. She was eventually transferred to hospice care.

Discussion: Paraneoplastic neurologic syndromes occur in less than 0.01% of cancers, mostly small cell carcinoma. However, they are likely under-diagnosed. Many times a diagnosis of limbic encephalitis can precede a diagnosis of malignancy. Treatment is based on small case reports and not standardized. The goal is to reduce tumor burden and therefore immunogenic response. Rituxan has been showed to lead to improvement by depleting circulating B-Cells and decreasing immune response. A high degree of suspicion is needed to establish a diagnosis. Small cell carcinomas of the lung with paraneoplastic syndromes have a better prognosis than those without.
MICHIGAN POSTER FINALIST - CLINICAL VIGNETTE Ayman Founas, DO

A Rare Case of Encephalopathy Induced by Metronidazole

First Author: Ayman Founas, DO Second Author: Jaimin Patel, DO Third Author: Jacqueline Moore, DO Fourth Author: Niluka Weerakoon, MD Fifth Author: Wilma Agnello-Dimitrijevic, MD

Introduction: Metronidazole is an antibiotic used for its anaerobic coverage. Known side effects include headache, nausea, dry mouth and metallic taste. Less frequent side effects include vomiting, diarrhea, weakness, dizziness, rash, dysuria, vertigo, paresthesias, and neutropenia. Case reports have described rare neurologic toxicities including encephalopathy, seizures and peripheral neuropathy with metronidazole. We present a case of reversible encephalopathy related to metronidazole toxicity.

Case Presentation: A 70-year-old Caucasian woman presented with dysarthria and confusion. Relevant past medical history included transient ischemic attack and recurrent intra-abdominal abscesses with fistula formation requiring chronic antibiotic therapy. She was discharged from the hospital four weeks prior with intravenous metronidazole and ceftaroline secondary to an intra-abdominal infection. Neurological examination revealed dysarthria with decreased deep tendon reflexes bilaterally. Computed tomography and magnetic resonance imaging (MRI) of the brain without contrast did not reveal any acute process. Over the next eight days, her dysarthria markedly worsened and she developed diplopia. Electromyography and acetylcholine receptor antibodies were negative. A repeat MRI of the brain with and without contrast was performed eight days after presentation because a second neurology opinion was requested. Imaging displayed hyperintense signals in the bilateral dentate nuclei and involvement of the splenium of the corpus callosum consistent with metronidazole-induced encephalopathy (MIE). Metronidazole was immediately discontinued and the patient had a gradual reversal of symptoms.

Discussion: Imaging findings of metronidazole-induced encephalopathy have displayed hyperintense signals in the bilateral dentate nuclei and splenium of the corpus callosum. Lesions are described as non-enhancing, hyperintense on T2-weighted and fluid-attenuated inversion recovery images. Rapid discontinuation of the drug has been shown to lead to resolution of neurologic symptoms when there are no other identifiable culprits. In our case, metronidazole was given for 44 days with a cumulative dose of 66g intravenous and orally. The duration of treatment is shown to be variable before cerebellar symptoms manifest and doses range from 25g to 110g. Proposed pathophysiology of metronidazole-induced encephalopathy includes a reversible process of axonal swelling with increased water content. Other considerations include incorporation of metronidazole into a thiamine analogue, which inhibits phosphorylation of thiamine. This leads to reduction of thiamine absorption in the gut causing neurotoxicity. The differential diagnosis included cerebrovascular accident, myasthenia gravis, Wernicke’s encephalopathy, methyl bromide intoxication, maple syrup urine disease, enteroviral encephalomyelitis and finally drug-induced encephalopathy. Her clinical history, MRI findings, and resolution of symptoms upon discontinuation of metronidazole made us favor MIE as a diagnosis. Metronidazole is a vastly used antibiotic and it is the role of the astute physician to keep MIE in the differential diagnosis of patients presenting with an acute neurologic dysfunction.
Asymptomatic Colonic Ulceration in an Immunocompromised Patient

First Author: Lohit Garg, MD Abeer Berry, DO Treta Purohit, MD

Histoplasmosis is an endemic mycosis prevalent in areas of upper Mississippi and Ohio river valleys. Histoplasmosis most commonly causes infection of the lungs but occasionally can infect other organs prominently in immunocompromised patient.

A 51-year-old Laotian female with a PMH significant for systemic lupus erythematosus on steroids and mycophenolate mofetil, ESRD on hemodialysis presented for a routine screening colonoscopy for being above 50 years of age. Patient was completely asymptomatic denying constitutional, respiratory or gastrointestinal related symptoms. Physical exam was unremarkable. Patient underwent a colonoscopy that revealed a submucosal and ulcerated 3 centimeter mass in the distal ascending colon that was biopsied. CT of the abdomen revealed abnormal wall thickening of the ascending colon consistent with infectious colitis. The biopsy revealed granulomatous inflammation and ulceration of the colonic mucosa with Grocott’s methenamine silver stain revealed Histoplasma. There was no evidence of other organ involvement. She was treated for isolated gastrointestinal histoplasmosis with itraconazole once daily for 6 month duration. Repeat colonoscopy was done after 6 month of anti-fungals and showed normal colonic mucosa.

Disseminated histoplasmosis can involve several systems including the gastrointestinal, skin and central nervous system. At autopsy, about 70 percent of patients with disseminated histoplasmosis have gastrointestinal manifestations. Clinically, however, history and physical exam are typically benign leading to only 10 percent of the cases actually being identified. H. capsulatum gastrointestinal lesions consist of ulcerations or polypoid masses most commonly located in the ileocecal region due to abundance of lymphoid tissue. These lesions are usually misdiagnosed as Crohn’s disease, ulcerative colitis or malignancy. It is important for clinicians to have a high suspicion for histoplasmosis as an etiology especially when the patient is febrile, immunocompromised, from an endemic region or with a history of possible exposure to H. capsulatum. Misdiagnosing the lesion as inflammatory bowel disease will result in incorrect initiation of harmful cytotoxic agents and possible dissemination of histoplasmosis.
Azithromycin-Induced Torsade de Pointes: A Rare but Real Risk

First Author: Jon T Golenbiewski, DO Second Author: Rami Khoury-Abdulla, MD

Azithromycin is one of the most commonly prescribed antibiotics, accounting for more than 51 million prescriptions in 2013 alone. While generally safe and effective, it has been associated with QT interval prolongation. A prolonged QT interval places one at increased risk for developing a potentially fatal arrhythmia known as torsade de pointes.

A 65 year old female presented with a chief complaint of fatigue and progressive, non-productive cough of 3 weeks duration. She had no past cardiac history. Family history was negative for QT prolongation, arrhythmia and sudden cardiac death. Physical exam revealed diffuse, bilateral rales with occasional wheezes. Vitals showed the patient to be hypoxemic, tachycardic and tachypneic. A chest x-ray showed diffuse left sided airspace disease and a focal right upper lung opacity. She was started on ceftriaxone and intravenous azithromycin for presumed community acquired pneumonia.

The patient developed a run of polymorphic ventricular tachycardia consistent with torsade de pointes approximately 12 hours after receiving antibiotics. An EKG revealed a prolonged QTc of 604, elevated from a baseline of 526 on presentation. Magnesium was administered immediately. A stat electrolyte panel revealed no abnormalities other than a minimally decreased potassium. Shortly after, the patient developed sustained torsade and cardiac arrest. CPR was initiated. Spontaneous return of circulation was achieved after a cycle of chest compressions with defibrillation. Azithromycin was immediately discontinued. The patient was treated for pulmonary tuberculosis, supported by CT findings of a 3.8 cm left lower lobe cavitation and positive sputum AFB smear and culture. Daily EKG’s were obtained, in addition to ongoing medication review and careful electrolyte monitoring. The QT interval remained prolonged at a baseline of 530 throughout the course of stay. The patient had a lengthy hospitalization but ultimately made a full recovery.

This case emphasizes the important implications of prescribing QT prolonging agents. Despite receiving only one dose of azithromycin, a widely prescribed drug, the patient developed a potentially deadly arrhythmia. Identification of QT prolonging risk factors is paramount to preventing this deadly complication. Age, female gender, hypokalemia and a prolonged baseline QT interval placed our patient at an increased risk for QT prolongation and potential cardiovascular death. Alternative agents and QT surveillance should be considered in such patients, as well as correction of modifiable risk factors.
A Rare Case of Recurrent Isolated Sleep Paralysis

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Introduction: Isolated Sleep paralysis is a phenomenon in which a person, either falling asleep or awakening, temporarily experiences an inability to move, speak or react. It has two major classifications Isolated Sleep Paralysis(ISP) and Recurrent isolated sleep paralysis(RISP). Hypnagogic and hypnopompic visions are symptoms commonly experienced during episodes of sleep paralysis. Sleep paralysis has been linked to disorders such as narcolepsy, migraines, anxiety disorders, and obstructive sleep apnea; however, it can also occur in isolation. We are presenting this case because the prevalence of cases with RISP as seen in our patient is thought to be uncommon.

Case: Patient is a 54 year old gentleman with a past history of OSA (non compliant with CPAP), daytime fatigue, HTN and tobacco abuse who presented for inability to move for 20 minutes after awakening. He mentioned this has been going on for the last 3 months with a total of 7 episodes. He denied visual or auditory hallucinations. Although one of his stated complaints was excessive daytime sleepiness, his Epworth Sleepiness Scale score was only 8/24. His average nocturnal sleep time was around 5-6 hours with occasional daytime naps. He denied any history of Psychiatric disorders, Narcolepsy, Cataplexy or RLS. He denied any alcohol or recreational drug use. He denied any family history of sleep or psychiatric illnesses. Examination revealed an obese male in no distress. Blood pressure was 200/101 mm Hg; pulse was 80 beats/min and regular; height was 5 feet 11 inches; and weight was 270 pounds. Upper airway exam revealed a patent upper airway with intact tonsils. Neck circumference was close to 20 inches. Cardiopulmonary exam revealed no abnormalities. He was alert and fully oriented with proper thought process. Affect was slightly anxious. Basic Lab-work and CT scan of the head on admission was inconclusive. Since this is a diagnosis of exclusion and symptomology patient was diagnosed with RISP. Patient was advised to keep a sleep diary to record events and started on Citalopram and Alprazolam. He was to follow up with a Sleep specialist and advised to be compliant with CPAP, which did reduce his frequency and duration of ISP eventually.

Discussion: Since we ruled out other possible conditions the pathogenesis in our patient was mostly likely due to noncompliance with CPAP. Treatment of sleep paralysis is aimed at whatever causes it to occur. Sleep deprivation, underlying psychiatric disorders(Anxiety, Bipolar, PTSD)and conditions such as OSA are most common causes, which can be controlled with medications. Serotonergic agents may reduce the frequency of episodes. Sleep specialist or psychiatry consultation is recommended.
'Recognising these signs will save lives'...Classical signs of a catastrophic syndrome

First Author: HAMZA HASHMI, MD Mimi Emig, MD Zubair Afzal, MD

Ehlers Danlos Syndrome (EDS) type IV is a rare connective tissue disorder that affects skin, visceral and vascular tissue. Diagnosis is often difficult and delayed given absence of hallmark features of typical EDS. Early recognition of characteristic skin findings may help identify serious and potentially fatal complications.

A 19 years old male with no significant past medical history except for a recent spontaneous sigmoid perforation five months prior to admission presented with sudden onset of lower abdominal pain. Initial CT abdomen showed left sided retroperitoneal hematoma. Despite stable initial vitals and labs, the patient continued to have worsening abdominal pain, developed hemodynamic instability and eventually had pulseless electrical activity arrest. Repeat labs revealed precipitous drop in hemoglobin and rise in serum lactate level. Repeat CT abdomen showed bilateral retroperitoneal hematomas.

Patient was aggressively resuscitated with blood and plasma products. Emergent abdominal Angiogram revealed 23 mm aneurysmal dilatation in infrarenal abdominal aorta. An IR guided intra aortic inflatable balloon was placed to secure hemostasis but before an aortic stent graft could be advanced the tissue paper thin friable vessel wall started disintegrating. As aorta was considered non salvageable at this point, the patient was made comfort care and passed away within 12 hours of admission. Autopsy revealed typical facies with protruding eyes, thin nose and lips and sunken cheeks; a translucent skin with prominent veins and transmural dissection of abdominal aorta. Genetic testing revealed classical COL 3A1 missense mutation.

Given the absence of distinct features of hyperextensible skin and hypermobile joints commonly seen in other types of EDS, diagnosis is often difficult and delayed in a particular case of vascular EDS. Knowledge of characteristic findings of an acrogeric facial appearance, easy bruising and thin skin with prominent veins is a helpful tool for early diagnosis and appropriate management of subsequent fatal complications. In the absence of specific treatment options, medical intervention should be focused on symptomatic and prophylactic measures. Bowel perforation is managed with a conservative approach and minimally invasive endovascular therapy is usually recommended for arterial rupture. IUDs are contraindicated in young females and pregnant women are advised against spontaneous vaginal delivery. After a positive test for one family member, all family members need genetic as well reproductive counseling by a clinical geneticist.
A rare and interesting cause of Recurrent Pancreatitis

First Author: Narayan K C, MBBS Siddhartha Yadav, MBBS

Recurrent acute pancreatitis is often encountered in clinical practice which commonly results from alcohol abuse or gallstones but, at times, it may not be very clear. In such cases further investigations may be required to discern the underlying etiology.

A 26 year old female presented with abdominal pain for 7 days. Her past medical history was significant for two prior episode of pancreatitis in the past 2 months without any identifiable cause which resolved with conservative treatment. She denied any history of alcohol abuse or family history of pancreatitis. On physical examination, she had significant abdominal tenderness. Complete blood count, electrolyte panel, lipid panel, renal function tests and liver function tests were unremarkable. Her lipase was 4090 U at presentation. US abdomen did not show any gallstone. MRCP was positive for acute pancreatitis changes without any signs of pancreatic necrosis, cyst or anatomic changes like divisum. Serum IgG levels were normal. Endoscopic Ultrasound was suggestive of resolving pancreatitis without any sign of biliary sludge or stone. She underwent upper gastro-intestinal endoscopy which was unremarkable. However, biopsy from the duodenal mucosa returned positive for celiac disease. Serum transglutamase was 108.2 units. She was then treated with strict gluten free diet. After initiation of gluten free diet her tTG levels have normalized. She has not had any further episodes of recurrences of pancreatitis.

Celiac disease is a common and treatable condition that can present with atypical symptoms. One such rare presentation of celiac disease is recurrent acute pancreatitis. Studies have shown a two to three fold increase in risk of pancreatitis with celiac disease. This has been attributed to immunopathogenetic mechanisms which have not been clearly understood at this time. This case highlights that celiac disease should be considered in the etiology of the recurrent pancreatitis when the etiology is not very clear.
Common Variable Immunodeficiency Complicated by a Lymphoproliferative Disorder

Hypogammaglobulinemia can have different etiologies. It could be caused by medication or associated with an underlying lymphoproliferative disorder. Common variable immunodeficiency (CVID) is a primary immunodeficiency disorder characterized by impaired B cell and T cell dysfunction and defective immunoglobulin production. There is an increased risk of malignancies in patients with CVID, non-Hodgkin’s lymphomas being the most common. Increased awareness and cancer surveillance is very important in these patient populations.

A 72-year-old gentleman who was diagnosed with CVID ten years earlier was referred to our immunology clinic by his allergist for further evaluation and to help determine if immune globulin replacement therapy was needed. On presentation, he had no complaints except for occasional fatigue and nocturnal fevers. His physical exam was normal. Blood work showed mild leukocytosis with neutrophils, lymphocytes and monocytes all increased. His previous laboratory results were reviewed and were normal, other than extremely low IgG, IgM and IgA levels and mild eosinophilia that had no explanation. He had stopped prior intravenous immunoglobulin therapy about eight years ago after his “titers improved” and because of a rash. Given the high concern for malignancy in this population and his unexplained fever, further studies were performed. He still had hypogammaglobulinemia. Flow cytometry showed an aberrant CD4 positive T-cell population suggestive of a T-cell lymphoproliferative disorder. Flow cytometry in 2004 was normal. He was referred to hematology/oncology for further evaluation. A bone marrow biopsy confirmed the finding of an aberrant T-cell population similar to the one detected in his blood but with no other evidence of lymphoma or bone marrow lymphocytosis. He was advised to resume IVIG replacement therapy and follow up closely with the oncologist.

Hypogammaglobulinemia does not always indicate a diagnosis of CVID. Clinical and laboratory criteria have been defined for this condition. Further studies should always be carried out in these patients. This case illustrates the importance of close monitoring in these patients for the possible later development of a malignancy.
Hyperkalemia: to treat or not to treat?

First Author: Arya Lalithakumari, MBBS second authors: Shyam Ganti MBBS, Vivek Variar MD

A 93 year old patient was admitted for dizziness from anemia. She had a history of mastocytosis and had associated thrombocytosis for which she was on angrelide. Admission work up revealed potassium level of 6.4 which prompted treatment with calcium gluconate, insulin and dextrose. However there were no EKG changes of hyperkalemia. The kidney functions were normal and she was not on potassium supplements. It was then noticed that her platelet count was 678,000. In presence of marked thrombocytosis, a request was placed for measuring plasma potassium and serum potassium from a freshly collected sample. This resulted in serum potassium of 5.9 with a plasma potassium of only 5, thus proving an example of spuriously high potassium values.

Pseudohyperkalemia is considered to be present when the plasma potassium differs from serum potassium by more than 0.4 mmol/L. Pseudohyperkalemia has been described in the presence of thrombocytosis. The pathology is considered to be in vitro release of potassium from activated platelets. But patients are often misdiagnosed with hyperkalemia and are inappropriately treated with medications and invasive measures including dialysis for persistently high serum potassium. The recognition of normal potassium in the plasma prevented us from treating our patient for an incorrectly high potassium value during the following admissions. The need to check a plasma potassium level instead of a serum potassium level in thrombocytosis must be emphasized among clinicians not only since it is of cost benefit from avoiding overtreatment and hospital admissions but also because it prevents patient harm with inappropriate treatment of a normal potassium level.
Coexistent Xanthogranulomatous Pyelonephritis and Renal Cell Carcinoma

First Author: Andrea Landon, DO Andrea Landon, DO, Amir Koldor MSIII, Aaron Roberts, MD, Mark Schauer, MD, FACP

Introduction: Xanthogranulomatous Pyelonephritis (XGP) is a rare inflammatory process in which renal parenchyma is replaced by lipid-laden macrophages (xanthoma cells). It is frequently mistaken for renal cell carcinoma (RCC) due to similarities in clinical presentation, laboratory results and radiological findings. Confirmatory diagnosis is based on histopathological examination. We present an interesting case of coexisting XGP and RCC.

Case Description: DS, a 73-year-old woman, presented with three months of worsening, sharp, left-sided flank pain radiating throughout her abdomen associated with anorexia, nausea, constipation, a 10 pound weight loss, night sweats and a new abdominal mass. Laboratory investigations showed leukocytosis and hemoglobin of 5.5. Urinalysis results were +1 proteins, +2 ketones, +3 leukocyte esterase, +1 hemoglobin, 48 RBCs, and >180 WBCs. CT abdomen/pelvis revealed several intraabdominal abscesses, an obstructing staghorn calculi in the left kidney, and a heterogeneously enhancing mass in the upper pole of the left kidney concerning for RCC. Multiple Jaxton-Pratt (JP) drains were placed and empiric antibiotics were started. Abscess fluid cultures grew Proteus Mirabilis. One week later, she underwent a left radical nephrectomy with an abdominal washout after no significant improvement with medical management. She tolerated the surgery well and was discharged home a few days later. Final pathology showed clear cell RCC and granulomatous pyelonephritis.

Discussion: XGP is a form of chronic pyelonephritis associated with chronic urinary tract obstruction and infection. It commonly presents diffusely, but focal infections are seen, as in this case. Patients are typically middle-aged women presenting with fever, flank pain, weight loss and urinary tract symptoms. The most common pathogens found on urine culture at diagnosis are E. coli and P. mirabilis. Most cases involve a single kidney and treatment involves antibiotics in combination with a partial or total nephrectomy. RCC, the seventh most common cancer in the United States, has a slight male predominance and most patients present in the sixth or seventh decade of life. Risk factors are smoking, obesity and hypertension. Prior to routine use of radiological imaging, patients typically presented with a triad of hematuria, flank pain and a palpable abdominal mass. As imaging frequency has increased, over half of all patients are now diagnosed incidentally. Prognosis is indirectly related to how early the patient is diagnosed. To date, at least 10 case reports have shown coexisting XGP and RCC. Although it remains unknown whether one predisposes to the other, it is important to consider their coexistence and provide appropriate and timely treatment to ensure the best prognosis for the patient.
Idiopathic Occipital Neuralgia a Rare Cause of Debilitating Headache

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Introduction: Occipital neuralgia is usually defined as paroxysmal stabbing pain in the greater or lesser occipital nerve distribution. Although there is no published data to suggest the incidence of occipital neuralgia (ON), it is generally considered a very rare cause of headache.

Objective: We are reporting a case of occipital neuralgia. Learning objectives of this case are 1. Identify the presentation of occipital neuralgia 2. Judicious use of diagnostic tools and treatment

Case: A 27-year-old female presented to the ER with episodes of severe intermittent headache over the past 3 weeks. Prior to her presentation at admission she reported 2 episodes of intermittent pain on the right occipital region. She promptly followed with her primary care physician who prescribed her oral steroids. The two weeks following the initial episodes were symptom free.

On the day of admission she was watching television when she experienced a recurrence of the 10/10 right sided occipital headache with radiation over her vertex. Initial vital signs were unremarkable, however, physical exam was significant for tenderness over the right occipital region of the scalp. Labs were within normal limits. MRI did not reveal any abnormality. A consultation to neurology was obtained and the patient was started on carbamazepine, gabapentin and narcotics, which provided little relief. The patient’s distribution of pain in the greater occipital area in addition to ruling out secondary causes of headache made ON the likely diagnosis. Pain management was consulted and greater occipital nerve block was performed which provided complete resolution of her symptoms. She was discharged home with carbamazepine the following morning and continued to be symptom free at follow up.

Discussion: ON is a rare cause of headache that has no published data on incidence. Since this is a rare disorder there is limited evidence in the literature to support the full understanding of its physiology and treatment.

Currently, the diagnosis is made by history, characteristics described in the International Headache Society, exclusion of referred pain by CT/MRI and anesthetic block of the occipital nerve. Patients with severe symptoms can continue to have a debilitating headache despite conservative management. The best treatment in the acute setting is the same intervention for diagnosis, which is an occipital nerve block. Patients with recurrent ON symptoms despite steroid injections benefit from botulinium injections and pulsed radiofrequency.

Conclusion: This case illustrates the detailed diagnostic evaluation and the need for high suspicion by the primary physicians to consider ON. It is often challenging to diagnose, yet it is critical to do so as early diagnosis and treatment can maximize recovery.
A Case of Cervical Manipulation Causing Stroke & Exploring its Biomechanics.

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Introduction: Manipulation of the cervical spine has been considered an effective treatment modality by alternative healers, predominately chiropractors. The risk of having trauma to the vertebral-basilar system resulting in a stroke is of major concern.

Objective: We present a case of vertebral artery dissection after cervical manipulation. Learning objectives for this case are 1. Recognize characteristic clinical scenario for vertebral artery dissection after cervical manipulation 2. Judicious prescribing habits for cervical manipulation.

Case: A 43-year-old female presents to the emergency room with left sided upper and lower extremity weakness after cervical manipulation. She had been having occipital headaches and neck discomfort over the preceding 3 days. On the morning of admission she visited a chiropractor where they performed cervical manipulation. Later that afternoon, while driving her vehicle she developed vertigo. She then attempted to ambulate to her front door when she got profoundly weak and paralyzed on her left side.

In the Emergency Department her blood pressure was 227/139, remainder of her vital signs were within normal limits. On Physical exam she had hemiparesis on the left side of her body. Given her focal neurological deficits a stroke was suspected, Computed Topography (CT) of the brain without contrast was ordered and was unremarkable. Tissue plasminogen activator was administered in the emergency room.

CT angiography was later performed to localize the lesion and it demonstrated a vertebral artery dissection on the right side. It was decided that the patient would benefit from endovascular intervention and was transferred to an institution in the local area for the procedure.

Discussion: The internist should always be vigilant of possible vertebral artery dissection in a young patient presenting with vertigo or weakness after cervical manipulation. Since this is a rare entity and many practitioners are unaware of this complication, there can be oversight in obtaining a proper history of cervical manipulation. Arterial dissection due to cervical manipulation is rare. Studies suggest that 1 in 2,000,000 cervical manipulations results in a dissection in the vertebral-basilar system.
Catastrophic antiphospholipid syndrome following bariatric surgery!!

First Author: Talin Nemri, MD Rudin Gjeka, MD Kavyashri Kodlipet Jagadeesh, MD Jandark Yuseif, MD Zain Kulairi, MD

Introduction: Catastrophic antiphospholipid syndrome (CAPS) is a rare but potentially life-threatening condition characterized by diffuse vascular thrombosis, leading to multiple organ failure developing over a short period of time in the presence of positive antiphospholipid antibodies (aPL).

We present a middle age female with CAPS who survived after treatment with anticoagulation plasma therapy and intravenous corticosteroid

Case: A 56-year old female with history of antiphospholipid syndrome presented with severe weakness one week after having a bariatric surgery. On evaluation her vital signs were significant for blood pressure of 150/90 mmHg and heart rate of 90 beat/minute. Systemic examination was noncontributory.

Initial laboratory results were significant for creatinine 1.4 mg/dl, platelets 99000/mm3 and Hemoglobin 9.8 mg/dl. In the next few days blood pressure start increasing to 200/110 mmHg, creatinine went up to 5 mg/dl, platelets dropped to 55000/mm3 and hemoglobin dropped to 7.1mg/dl. Patient also developed severe pleural effusion and non-sustained ventricular tachycardia. Kidney biopsy showed thrombotic microangiopathy. Serological testing showed a high titer of anti-phospholipids, anticardiolipin antibody and positive anti-ß2 glycoprotein-I antibody.

Based on the above findings, catastrophic antiphospholipid syndrome was diagnosed. Patient was started on anticoagulation, plasma exchange, hemodialysis and glucocorticoids. In few days her platelets count, hemoglobin as well as her shortness of breath improved. She was sent home on dialysis, after two months kidney functions improved significantly and patient didn’t require dialysis anymore.

Discussion: CAPS a severe form of antiphospholipid syndrome, developing in about 1% of cases of classic antiphospholipid syndrome was first described in 1992. Criteria for diagnosing CAPS include: (1) Evidence of involvement of three or more organs, systems and/or tissues; (2) Development of manifestations simultaneously in less than a week; (3) Confirmation of histopathology of small vessel occlusion in at least one organ or tissue; (4) Laboratory confirmation of the presence of antiphospholipid antibodies (Lupus anticoagulant and anticardiolipin antibodies).

Our patient met all the criteria for diagnosis since she had 3 organs involved (Kidney, Heart and bone marrow), all developed in less than a week, with biopsy of the kidney showing thrombotic microangiopathy, and she had positive antiphospholipid antibodies. We attribute her recent bariatric surgery as a precipitating factor of her CAPS. Surgery is the second most common precipitating factor following infection. Other factors include oral anticoagulation withdrawal/low INR, medications, obstetric complications, neoplasia, and SLE flare. Treatment guidelines for CAPS include a combination of anticoagulants (AC), corticosteroids (CS), intravenous immunoglobulins (IVIG), plasma exchange (PE), and cyclophosphamide. However, new therapeutic modalities have emerged for the treatment of CAPS, especially in cases of refractory CAPS. These treatment modalities include rituximab, defibrotide, and eculizumab.
Epigastric pain in cirrhotic patient caused by primary gastrointestinal aspergillosis: case report & literature review

Otavio Pereira Rodrigues, MD; Estela Mogrovejo, MD; Norka Quillatupa, MD

**Background:** Primary gastrointestinal aspergillosis is extremely rare. Aspergillosis most frequently occurs in the lungs or sinuses after inhalation of spores. However, conidia are not only inhaled but also ingested, and isolated aspergillosis of the gastrointestinal tract has been described in few case reports. The major risk factor for primary gastrointestinal involvement is an underlying severely immunocompromised state such as long term corticosteroid use, transplantation, AIDS and chemotherapeutic toxicity altering normal gastrointestinal immunity to allow Aspergillus entry by disrupting mucosal barriers. Aspergillosis involving the digestive tract in immunocompetent patients has rarely been reported.

**Case:** A 74-year-old male with alcoholic liver cirrhosis, portal hypertension, esophageal varices, gastropathy, peptic ulcer disease and diabetes mellitus presented with a 3 day history of epigastric pain and nausea. Physical examination showed epigastric tenderness. An EGD revealed a 1 cm non-bleeding cratered ulcer in the duodenal bulb and a 3 cm non-bleeding cratered ulcer in the duodenal sweep. Biopsies were taken. GMS stain revealed the presence of aspergillus invading the tissue and immunohistochemical stain for *Helicobacter pylori* was negative. Computed tomography of the sinuses and chest radiography were normal and HIV was negative. The patient was treated with oral voriconazole for 6 weeks. An EGD control showed healed duodenal bulb and sweep ulcers. Control biopsies were negative.

**Comment:** Aspergillosis is almost exclusively considered a pulmonary disease with secondary hematogenous dissemination in immunocompromised patients. However recent reports reveal pulmonary aspergillosis in immunocompetent patients, describing associations with other conditions as influenza, pneumonia, COPD, sepsis, liver failure, diabetes, alcoholism, chronic granulomatous disease and surgery. In this setting, the reported patient had primary gastrointestinal aspergillosis, was not immunocompromised but had a history of diabetes and alcohol intake which might have played an important role in the development of duodenal aspergillosis.
Acute Thrombocytopenia from Severe Hepatitis C Viremia

Chronic or untreated Hepatitis C infection may cause thrombocytopenia through a number of mechanisms. These include hyper-splenism from portal hypertension, decreased liver thrombopoietin production, or bone marrow suppression from the virus itself. Historically, the severity of thrombocytopenia increased in parallel with the development of extensive fibrosis or cirrhosis. Here we present a case showcasing the simple degree of viremia to be primarily responsible for acute changes in platelet counts.

Our patient is a 47 year old female with Hepatitis C that was diagnosed 14 years ago. She was initially treated with peg-interferon mono-therapy. Though she responded well, insurance issues precluded her from further therapy after only 6 months. She was then seen to have pancytopenia, with platelets ranging from 50-100 K/uL, and hemoglobin ranging from 6 to 10 g/dL.

She later developed end-stage renal disease from membrano-proliferative glomerulonephritis. As part of a renal transplant workup two years ago, the liver was evaluated by imaging and there was no evidence of cirrhosis. Liver biopsies were also performed, showing only minimal peri-portal fibrosis. In addition, her Hepatitis C viral load at that time recorded as 313,000 IU/mL. In the absence of cirrhosis, Gastroenterology was unable to explain her thrombocytopenia.

Now, two years later, the patient awoke to find gingival bleeding and mild vaginal bleeding. Labs found an acute drop in platelets to just 6 K/uL (from 84 K/uL two months prior). The etiology of the drop was not immediately clear. It was noted that the patient’s hepatitis C viral load now measured greater than 69,000,000 IU/mL. Immediate treatment for this was delayed because of the severe cytopenias. With transfusions, her hemoglobin stabilized. Her platelet counts, however, could not be sustained despite multiple transfusions. Bone marrow biopsy was pursued, which found hypo-cellular marrow with diminished tri-lineage hematopoiesis. There was no evidence of myelodysplasia, acute leukemia, or plasma cell neoplasm. Anti-phospholipid syndrome work-up was also negative.

The patient was started on steroids, and had some improvement in her platelet count to 50 K/uL. She was discharged with close follow up with Hepatology, who decided to start sofosbuvir and simeprevir for treatment of her viremia. After five weeks of therapy, the patient’s hepatitis C viral count improved to less than 43 IU/mL. Simultaneously, her platelet count improved to 121 K/uL, and anemia improved as well.

The management of thrombocytopenia attributed to hepatitis C viral load is evolving as newer agents become available for use. Though used historically, interferon may worsen platelet counts if used to address Hepatitis C viremia. Though our case illustrates the complexity of acutely managing thrombocytopenia due to high Hepatitis C viral loads, it also highlights the ability of such cases to quickly respond to treatment. We submit this case as an outline for future encounters.
UFO: Unidentified Foreign Object Causing Retroperitoneal Abscess

First Author: Tarun Sharma  Second Author: Joel T. Fishbain MD, FACP

Background: Foreign body ingestion may be an underreported event with gastrointestinal perforation being a very uncommon occurrence (estimated ~1%). Acute abdominal symptoms may develop and the object is typically identified at the time of surgery. Severe abdominal pain and/or presence of an abscess generally requires surgical intervention.

Case report: A 62 year old Vietnamese male with past medical history of hypertension and gout presented with a 2-3 day history of acute severe midepigastric abdominal pain radiating to his back. He was afebrile with a normal examination except for significant midepigastric tenderness to palpation, guarding and fullness. His admission white blood count was 23,000. A CT scan of the abdomen revealed 9.9 x 4.9 x 6.5 cm fluid collection inferior to the pancreas and in the retroperitoneal space (mesenteric root). A non-metallic 3 cm linear foreign body was seen within the abscess cavity and exterior to the small bowel lumen. A CT guided drain was placed and E. coli grew from cultures. The patient had marked improvement and was discharged on oral antibiotic therapy.

Discussion: Foreign body ingestion normally results in no symptoms with eventual passage of the object. The peak incidence of such ingestions is 6 months to 6 years age. In adults, presence of dentures is the most common risk factor for foreign body ingestion. Sharp objects such as chicken bones and fish bones rarely result in perforation with subsequent abscess formation. Though surgical intervention is typically performed for object removal, non-operative conservative management can be undertaken for patients with minimal symptoms of peritonitis. A conservative approach was taken with our patient due to object’s location and surrounding inflammatory process, increasing his surgical risk. The patient responded to antibiotic therapy after CT guided drainage. Repeat CT 1 month later showed more linear densities as the patient’s diet had remained unchanged. This case exemplifies medical management of foreign body GI tract perforation.
Acute Aortic Regurgitation in a Dialysis Patient

First Author: Travis Tagami Second Author: Rami Khoury Abdulla Third Author: Nicole Marijanovich

Despite advances and widespread availability of medical technology, a good history and physical examination remain the cornerstone of a comprehensive medical evaluation. We are presenting a case where examination skills were able to make the diagnosis and guide further diagnostic and therapeutic interventions.

A 45 year old male with a history of dialysis-dependent end stage renal disease presented to the emergency room with chest pain and associated shortness of breath. He described a pressure-like, retrosternal chest pain that was worse with exertion and progressing over the last two weeks. Echocardiography three months prior to admission showed left ventricular wall thickening and dilated atria with no other abnormalities. Upon physical exam on current admission his vital signs were stable. He was noted to have scattered crackles at the bases of his lungs and a new diastolic murmur. A chest x-ray showed mild pulmonary edema and he was found to have an elevated troponin with no ischemic changes on EKG. A cardiac ultrasound was performed which showed severe aortic regurgitation with a 3.1 x 1.2 cm mass attached to the left coronary leaflet moving in and out of the left ventricle. He was immediately taken for surgery where the vegetation was removed and a mechanical aortic valve was inserted. Tissue cultures were obtained and a diagnosis of culture negative endocarditis was made. He recovered well from surgery and he was discharged from the hospital with a four week course of antibiotics. At two week follow up, there was remarkable improvement in his symptoms.

This case illustrates the importance of early recognition of aortic regurgitation. Without close attention to physical exam findings of a new murmur and subsequent evaluation with echocardiogram, this diagnosis could easily have been missed or delayed leading to severe complications.
An Unusual Presentation of Malignant Melanoma

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Introduction: Melanoma, a type of skin cancer that originates from uncontrolled growth of pigment cells called melanocytes. It is known to metastasize to skin, brain, lung and rarely to the ovaries. It is the fifth most common cancer in men and seventh in women. Up to 90% of melanomas are cutaneous in origin and are called melanoma of known primary (MKP); however, those discovered secondary to metastasis to lymph nodes or visceral organs without any primary site are called melanoma of unknown primary (MUP).

Case Description: A 38-year-old premenopausal woman presents with a chief complaint of “abdominal bloating and lumbar pain.” Initial abdominal and chest x-ray showed stool within the colon and a 4-cm mass in the right lower lobe respectively. Subsequently a computer tomography (CT) of the chest, abdomen, and pelvis was done and it re-confirmed the pulmonary mass, presence of liver lesions, large amount of ascitic fluid as well as left pelvic mass likely to be ovarian in nature. Paracentesis and CT-guided biopsy of the lung were performed. Ascitic fluid was negative for malignant cells; however, the lung biopsy showed the presence of metastatic undifferentiated carcinoma of indeterminate origin. In addition to the biopsy, CA-125 levels were elevated to 1,036 units/mL and thus the working diagnosis was ovarian cancer. Upon gynecological evaluation, the patient underwent exploratory laparotomy, modified radical hysterectomy with bilateral salpingo-oophorectomy and tumor debulking surgery. Postoperative recovery was uneventful. Moreover, pathology of surgical specimen revealed presence of metastatic melanoma involving bilateral ovarian surfaces, peri-adnexal soft tissue, tubal and uterine serosa, pelvic peritoneum, lesser omentum, peripancreatic and adipose tissue. In addition, right lung and right neck lymph node excision was also positive for metastatic melanoma.

Furthermore, magnetic resonance imaging (MRI) of the brain was performed which showed numerous metastatic lesions; the largest one present in the right parietal region. Genetic analysis identified alterations in BRAF V600E gene and TERT promoter region, as a result was treated with Dabrafenib. Patient responded well to both the chemotherapy and whole brain radiation. The patient is still alive and improving clinically.

Conclusions: Metastasis of malignant melanoma to the ovaries can mimic a primary ovarian cancer, like in our case, thus posing a diagnostic challenge. Ovarian involvement by metastatic malignant melanoma is relatively rare and only 77 cases are reported in literature, this being the 78th case. Moreover, this is the first reported case of melanoma of unknown primary that presented with metastatic lesions to both visceral organs and lymph nodes.
Neuromyelitis Optica mimicking stroke

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Introduction Neuromyelitis optica (NMO or Devic disease) is an inflammatory disease of central nervous system in the spectrum of demyelinating diseases like multiple sclerosis (MS) characterized by bilateral optic neuropathy and cervical myelopathy. Traditionally considered a variant of multiple sclerosis, NMO is now recognized as a distinct clinical entity based on unique immunologic features. The discovery of a disease-specific serum NMO-IgG antibody that selectively binds aquaporin-4 (AQP4) has led to increased understanding of a diverse spectrum of disorders.

Case Description We describe a 61 year old right handed woman who presented with progressive right sided weakness over 2 days. She had remote history of legal blindness of unknown etiology and was never worked up in past. Initial exam revealed light perception without movement perception, fixed pupils, and optic disc pallor extending beyond the disc, decreased right arm and right leg strength (3/5). CBC, CMP, CRP, ANA, PPD, Troponins, EKG, bilateral carotid duplex ultrasound and MRI brain without contrast were unremarkable. MRI cervical and thoracic spine without contrast showed patchy enhancement and expanded spinal cord from C1-C2 through C7-T1 and patchy enhancement at T9-T10. Lumbar puncture showed clear, colorless CSF with high glucose, protein, IgG-2 oligoclonal bands and later a positive NMO/AQP4-IgG. Patient met diagnostic criteria for NMO with optic neuritis, cervical neuropathy extending through at least 3 vertebral segments on MRI and MRI brain without changes for MS. She was started on solumedrol 1gm q24 for 5 days which improved her weakness symptoms. She was transitioned to PO prednisone and azathioprine for 4-6 months with outpatient neurology follow up.

Discussion NMO is rare disease and early diagnosis very crucial for timely management and to prevent catastrophic complications. Internists should have index of suspicion for NMO in appropriate clinical settings. Acute attacks and relapses of NMO are generally treated with intravenous glucocorticoids followed soon by plasmapheresis for refractory or progressive symptoms. For prevention of recurrent attacks, treatment with systemic immunosuppression is the mainstay. However, there are no controlled trials evaluating the treatment of NMO, and recommendations are primarily supported by data from observational studies and by the clinical experience of experts. Mortality rates are high in NMO, most frequently secondary to neurogenic respiratory failure, which occurs with extension of cervical lesions into the brainstem or from primary brainstem lesions.
Severe Cholestatic Jaundice from an Unanticipated Diagnosis

First Author: Andrew Whipple, D.O., Timothy Schubert, D.O., Steve Abshagen, P.A.-C

**Introduction:** Primary (AL) amyloidosis is characterized by abnormal immunoglobulin light chains with subsequent organ deposition and dysfunction. Up to 70% of systemic amyloid cases demonstrate hepatic involvement, and typical findings include hepatomegaly and elevated alkaline phosphatase. However, severe intrahepatic cholestasis with clinical jaundice is a rare finding seen in less than 5% of cases, and carries a particularly poor prognosis. We present a patient with painless jaundice from severe intrahepatic cholestasis who was found to have AL amyloidosis.

**Case Description:** A 72 year old female presented with a 2 month history of progressive pruritis, jaundice, and diarrhea. She also admitted to fatigue and a 30 pound weight loss over the preceding 6 months but otherwise denied abdominal pain, melena, or alcohol use. Initial labs were remarkable for total bilirubin 11.3 mg/dl, alkaline phosphatase 479 U/L, and liver enzymes twice the upper limit of normal. Ultrasound demonstrated increased echogenicity of the liver, a 1.3 centimeter sludgeball in the gallbladder, and no biliary dilatation. Hepatobiliary scan and endoscopic ultrasound were both unremarkable. Liver biopsy subsequently revealed amyloidosis with amorphous, eosinophilic deposits predominately within the portal areas, surrounding and compressing the bile ducts and intra-hepatic blood vessels. Further laboratory workup resulted in a final diagnosis of AL amyloidosis.

**Discussion:** Hepatic involvement in AL amyloidosis is common, however overall clinical manifestations from this are mild or often absent. In two published series of primary AL-type amyloidosis, Kyle et al reported the incidence of elevated serum total bilirubin levels (greater than 2 times upper limit of normal) were between 4 and 8%. Cholestatic jaundice is infrequent and considered to be a pre-terminal sign of hepatic amyloidosis. In fact, analysis by Gertz et al suggested an elevated total bilirubin > 3mg/dl correlated with an average 1.8 month life expectancy, and 80% of reported patients died within 6 months after the onset of clinical jaundice. Physiologic cholestasis is related to direct compression of intrahepatic bile ducts by amyloid deposits in the portal area and sinusoidal space. A low threshold for liver biopsy at the onset of suspicion for amyloidosis can provide early diagnosis so that aggressive treatment, or appropriate palliative options can be offered. Our patient serves as a reminder of the variable presentations of amyloidosis and that it should be considered in the differential diagnosis of severe intrahepatic cholestasis.
Expanding the Differential Diagnosis for Painless Jaundice

First Author: Andrew Whipple, D.O., Christopher Begley, D.O., Akshay Amaraneni, M.D.

**Introduction:** Bouveret’s syndrome refers to gastroduodenal obstruction from gallstone impaction which occurs in the setting of a cholecystoduodenal fistula. Depending upon the exact location and size of the gallstone, a variety of clinical manifestations are possible. We describe a case of Bouveret’s syndrome with the unique presenting symptom of painless jaundice.

**Case Description:** A 62 year-old female presented with a 3 week history of increasing jaundice, fatigue, and nausea with an associated 15 pound weight loss. The patient denied abdominal pain and abdominal examination was unremarkable. Initial laboratory studies were significant for total bilirubin 9.3 mg/dl, alkaline phosphatase 477 U/L, aspartate aminotransferase 95 U/L, and alanine aminotransferase 111 U/L. Initial ultrasound revealed intrahepatic and extrahepatic biliary dilatation. Magnetic resonance cholangiopancreatography (MRCP) showed a suspected calculus located in the proximal portion of the duodenum with surrounding soft tissue thickening. Endoscopic gastroduodenoscopy (EGD) confirmed a large gallstone in the duodenal bulb which occupied the entire lumen and partially protruded through the pylorus. As this was unable to be removed endoscopically, the patient underwent gastrostomy and removal of a 3.3cm gallstone. No fistulous tract was appreciated intraoperatively and is considered to have closed spontaneously. Subsequently, the patient was treated supportively and discharged home on post-operative day 7 with resolution of her symptoms and normalization of her laboratory values.

**Discussion:** Bouveret’s syndrome was first reported in 1896 and remains an uncommon variant of gallstone ileus, for which it comprises only 1-3% of cases. While a wide variety of presenting symptoms have been reported, to our knowledge no case of Bouveret’s syndrome has presented as painless jaundice, which in this case was a result of external CBD compression. The largest review was published in 2006 by Cappell and Davis where they describe 128 cases. The most common presenting symptoms were nausea, vomiting, abdominal pain, hematemesis, and weight loss. Less commonly, patients reported an absence of abdominal pain in 29% and Jaundice in less than 2% of cases. The mean age of patients at diagnosis was 74, and had a female predominance of nearly a 2:1 ratio. As in our case, EGD reveals gastric outlet obstruction in almost all cases; however the source of obstructive process can be identified only 69% of the time. While EGD is useful diagnostically, endoscopic gallstone retrieval is usually not possible due to the size of the gallstone. Thus, treatment of the obstructive process most often requires gastrotomy or enterolithotomy and is 90% successful.
Peripheral neuropathy as a manifestation of Kikuchi-Fujimoto disease, a rare presentation of a rare disease.

First Author: Juraj Zahatnansky, MD Christina Lang, MD Karthik Kannegolla, MD Rakshita Chandrashekar, MD Richard Roach, MD

Case description: We present the case of a 30-year-old man with chief complaints of numbness and a progressively worsening burning sensation in his extremities over the course of one month. His other symptoms included polydipsia, vomiting, chills, and weight loss. Physical examination revealed no cervical lymphadenopathy, but profound paraesthesia of hands and feet. With the patient’s smoking history and diagnosis of SIADH per initial labs, a CT of his chest was performed to look for possible lung malignancy. The study revealed left axillary lymphadenopathy that ultimately led to diagnosis of Kikuchi-Fujimoto disease following an excisional biopsy of one of the lymph nodes.

The patient also underwent extensive evaluation for possible infectious and rheumatologic causes of his symptoms, all of which were unrevealing. Cerebrospinal fluid analysis, bone marrow and skin biopsies were all normal. Neurological evaluation, including MRI of the head and spine, was also negative except for EMG, indicative of mild bilateral demyelinating sensorimotor polyneuropathy of the lower extremities. A lower extremity angiogram did not show signs of vasculitis/narrowing and a toxicology screen was also negative.

Discussion: Kikuchi-Fujimoto disease or Kikuchi histiocytic necrotizing lymphadenitis is a benign, self-limited disease of unknown etiology that commonly presents with cervical lymphadenopathy and fever in younger women. Neurological symptoms including peripheral neuropathy have been reported in the literature, but are a rare presentation of this rare disease. This is what prompted continuation of the patient’s work-up even after the diagnosis was made with the biopsy. It is the purpose of this case report to add to the body of evidence and by it raise awareness of peripheral neuropathy as one of the possible presenting symptoms of Kikuchi-Fujimoto disease. To our knowledge, there are no reports of SIADH being associated with the disease, which would certainly make this case a unique one. However, the patient was started on carbamazepine for neuropathic pain two weeks prior to being admitted to the hospital. Since there are reports of carbamazepine causing SIADH, this is a more likely explanation. Serendipitously, it was the SIADH which helped to make the diagnosis.
A Recurrent Broken Heart

Stress-induced cardiomyopathy, also referred to as Broken Heart Syndrome, is a relatively rare condition affecting approximately 1-2% of patients presenting with acute coronary syndrome. It is almost exclusively seen in postmenopausal women with documented low recurrence rates.

A 91-year-old Cambodian woman with a medical history significant for cholangitis with subsequent ampulla of Vater sphincterotomy and cholecystectomy presented to the emergency department with generalized weakness, abdominal pain, and fever. A preliminary diagnosis of cholangitis was made and she was initiated on antibiotics. An endoscopic retrograde cholangiopancreatography (ERCP) revealed choledocholithiasis and focal non-obstructing stenosis of the right main hepatic duct. She underwent successful stone removal and dilation of the stenosis without procedural complication. Over the following day, her abdominal pain and hyperbilirubinemia persisted. Physical examination revealed a new cardiac murmur; transthoracic echocardiogram demonstrated an ejection fraction of 74% without appreciable regional wall abnormalities. Continuing symptoms prompted repeat ERCP with stenting of the right hepatic duct stenosis. Initially, the patient demonstrated clinical improvement but the following day she developed chest pain and shortness of breath. An electrocardiogram showed ST changes and serum troponin was mildly elevated raising concern for possible ischemia. Repeat transthoracic echocardiogram, just two days after the first echocardiogram, demonstrated left ventricular enlargement with an ejection fraction of 36% and new regional wall motion abnormalities. The patient was transferred to the intensive care unit for further care. Severe coronary artery atherosclerosis was noted on angiography, but coronary perfusion was judged to be TIMI grade III indicating full perfusion; this led to the diagnosis of stress-induced cardiomyopathy. Interestingly, upon further chart review, the patient developed stress-induced cardiomyopathy approximately six years prior following previous ERCP. At that time, her left ventricular ejection fraction decreased to 35% but subsequently improved to 65% within one month. Unfortunately, during her current hospital stay, the patient died secondary to cardiogenic and septic shock.

This case highlights the importance of further evaluation of suspected acute coronary syndrome to delineate between myocardial infarction and other possible diagnoses. Up to 10% of patients with a history of stress-induced cardiomyopathy can experience a recurrence, though this generally occurs within the ensuing four years. Furthermore, the identification of Broken Heart Syndrome is crucial as the treatment can potentially differ from standard care for myocardial ischemia since the condition is thought to be a result of catecholamine excess. Ultimately, treatment of the underlying cause is key to managing this transient disorder.
MINNESOTA POSTER FINALIST - CLINICAL VIGNETTE Stanislav Henkin, MD

Got milk? High fat dairy diet causing severe reversible elevation of LDL-C

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Introduction: Coronary artery disease is one of the leading causes of morbidity and mortality in the United States. New lipid guidelines suggest initiating high-intensity statin for individuals with LDL > 190 mg/dL for primary prevention of coronary artery disease.

Case Discussion: A 59 year-old woman with a history of hypertension and hyperglycemia presented to the Endocrinology Clinic for further evaluation of diabetes mellitus in the setting of fatigue and weight loss. The patient was previously diagnosed with “mild diabetes” at the age of 8 and advised to avoid carbohydrates. She started on metformin 4 months prior to presentation. On review of symptoms, she reported 30 pound weight loss in the past 6 months. In order to regain weight while avoiding hyperglycemia, the patient had been following a high-fat low-carbohydrate dairy diet. Family history was positive for early-onset diabetes mellitus in several first degree relatives. Physical examination was unremarkable. Laboratory evaluation was significant for hemoglobin A1c 6.3%, fasting glucose 110 mg/dL, C-peptide 0.9 ng/mL (normal for prevailing glucose concentrations), total cholesterol 379, triglycerides 60, HDL-C 85 mg/dL, and LDL-C 282 mg/dL. Genetic testing was positive for missense defect in the glucokinase gene, consistent with maturity onset diabetes in the young, type 2. The patient was seen by a dietician, who suggested that she switch from a high-fat dairy diet to unsaturated food sources and increase her caloric intake to 1800-2000 calories per day. After incorporating these changes for 3 months, the patient’s LDL-C decreased to 109 mg/dL, she was able to regain several pounds with symptomatic improvement of fatigue, and her metformin was discontinued.

Discussion: Maturity onset diabetes in the young (MODY) is a heterogenous disorder characterized by non-insulin dependent diabetes most commonly caused by impaired glucose sensing by the b cells resulting in a shift of glucose-insulin coupling to the right. This results in a higher than normal glucose threshold required for initiation of insulin secretion. Consequently, patients develop mild hyperglycemia, often controllable with diet alone, and not associated with vascular complications.

In an attempt to control the mild hyperglycemia, this patient strictly avoided carbohydrates while consuming excess saturated fat with resultant severe dyslipidemia. While The American College of Cardiology/American Heart Association (ACC/AHA) guidelines would suggest that a patient with an LDL-C >190 mg/dL be initiated on high-intensity stain, modest dietary intervention in this patient was extremely efficacious with a reduction in LDL-C of >50% and also helpful in managing her MODY. Research suggests that lowering intake of saturated fats from 14-15% to 5-6% of total calories can lower LDL by 11-13 mg/dL (~11%). This case underlies the importance of detailed dietary history as part of a complete cardiovascular evaluation.
Renal colic unveiling underlying lymphoma

First Author: Thanh Phan Ho, MD Syed Ahsan Rizvi, MD

Introduction: Renal stones are increasing in the general population, and this has been partly attributed to changes in diet and body size. In rarer instances, renal stones are precipitated by hypercalcemia secondary to underlying illness. In the ambulatory population, hyperparathyroidism is the most common etiology of hypercalcemia. In the hospital setting, however, hypercalcemia is most commonly observed as the result of malignancy.

Case Description: 21-year-old male with unremarkable medical history presented with sudden onset left lower quadrant pain to local student health clinic and subsequently transferred to our institution for hospital admission. No other associated symptoms or constitutional symptoms such as fever, chills, or weight loss. Patient was afebrile and hemodynamically stable; his physical exam was unremarkable and without palpable lymphadenopathy. Laboratory results were notable for hemoglobin 9.5, MCV 87.0, potassium 3.5, calcium 13.0, creatinine 2.8, BUN 31, uric acid 9.1; additional work up including LDH, HCG, AFP, TSH were within normal limits. CT abdomen/pelvis showed massive lymphadenopathy throughout the chest, abdomen and pelvis; 1.2 cm partially calcified pulmonary nodule in the right middle lobe; 4 mm renal stone in the left ureterovesical junction resulting in obstruction of the left ureter and moderate pyelocaliectasis. Patient passed renal stone during hospital course uneventfully, with resolution of pain. Stone analysis revealed 90% calcium phosphate and 10% calcium carbonate. He was started on allopurinol for tumor lysis syndrome prophylaxis, with reduction of uric acid level to normal limits. Hypercalcemia responded to fluid hydration and calcitonin; his creatinine improved as well. His normocytic anemia remained stable. Patient underwent mediastinoscopy with lymph node biopsy which demonstrated B-cell lymphoma, unclassifiable, with features intermediate between diffuse large B-cell lymphoma and Hodgkin lymphoma. He was discharged, to follow up with Hematology clinic for further management.

Discussion: This case presents a new diagnosis of lymphoma in an otherwise healthy young individual without B symptoms or remarkable physical exam findings who presented with renal colic. The patient had a calcium stone, consistent with his hypercalcemia which responded to fluid hydration and calcitonin. Hypercalcemia is seen with both Hodgkin and non-Hodgkin lymphoma. Lymphoma-associated hypercalcemia is most often mediated by the vitamin D pathway involving dysregulated calcitriol production and increased intestinal calcium absorption, though humoral hypercalcemia of malignancy mediated by parathyroid hormone-related protein may also play a role. While data regarding the clinical impact of hypercalcemia in lymphoma is scarce, patients with hypercalcemia of malignancy are usually symptomatic. Renal colic, specifically, is an unusual clinical presentation at diagnosis of lymphoma. But as we show here, it is a symptom which warrants the attention of clinicians for further investigation of potential underlying malignancy.
Renal failure and nephromegaly manifesting from progressive CLL

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Learning Objectives

1. Recognize the differential diagnosis for renal failure in the CLL population, always exclude obstruction
2. Know the common processes resulting in nephromegaly
3. Understand CLL renal invasion is common, but not frequently associated with renal failure

Case Description: A 74-year-old woman with a history of CLL under observation presented to the outpatient clinic with three months of progressive functional decline. Examination revealed an ill appearing patient with normal vital signs, and stable axillary adenopathy. Laboratory evaluation showed a white blood cell count of 30 k/uL with an absolute lymphocyte count of 24 k/uL (increased from 8 k/uL three months prior). Other laboratory studies revealed a creatinine of 5.6 (increased from 1.4 three months prior), BUN of 98, bicarbonate of 19, and a potassium of 4.6. She was admitted to the hospital for further evaluation.

A CT abdomen showed no evidence of hydronephrosis, but did reveal a 50% increase in kidney size compared to a previous study from 5 years prior. A urinalysis showed 10 RBC/hpf of which >25% were dysmorphic and a predicted 24 hour protein of 2.5 grams. Despite intravenous hydration she remained oliguric without improvement in her serum creatinine. Given suspicion for a glomerular process she underwent a renal biopsy and was started on empiric steroids. The biopsy revealed diffuse infiltration of the interstitial parenchyma by neoplastic small lymphoid cells without evidence of vasculitis. Electron microscopy revealed preserved podocyte foot processes and no thickening or focal deposition along the basement membrane.

The patient improved with steroids and initiated immunochemotherapy appropriate for her renal function under the guise of her hematologist for progressive CLL. Following three cycles her creatinine has stabilized at 1.7.

Discussion: The differential diagnosis of renal failure in the CLL patient population is broad encompassing a higher frequency of extrarenal obstruction due to pelvic lymphadenopathy as well as intrinsic causes including membranous nephropathy, minimal change disease (higher in T cell CLL), type 1 cryoglobulinemia, and less commonly leukemic infiltration of the renal parenchyma. This case illustrates the importance of incorporating careful review of imaging studies into the clinical context of a patient’s presentation. Bilateral nephromegaly in an adult can be seen in polycystic kidney disease, distal obstruction, early diabetes mellitus, sarcoidosis, rare hereditary disorders such as Von Hippel-Lindau and nephroblastomatosis, as well as infiltrative disorders such as IgG4 disease or lymphoma/leukemias.

Renal infiltration in CLL is highly prevalent in autopsy studies (60-90%), but uncommonly associated with renal dysfunction. Immunochemotherapy such as anti-CD20 agents and non-renally eliminated drugs such as chlorambucil have anti-leukemic efficacy and can reverse renal dysfunction when attributed to CLL parenchymal infiltration.
Moans without Stones: A Case of Spontaneous Renal Artery Dissection

First Author: Hannah C Nordhues, MD

Spontaneous renal artery dissection (SRAD) is a rare entity, which has a prevalence of 0.036—0.05% of dissections in large angiographic studies. It is most commonly associated with underlying vascular or connective tissue disorders such as Fibromuscular Dysplasia, Marfan’s Syndrome, or Ehlers-Danlos. Other associations include malignant hypertension and severe physical exertion. Its clinical manifestations range from asymptomatic renal infarction to severe abdominal pain, nausea, headache, hematuria, and hypertension.

We present a case of a previously healthy 41 year old male who presented to his local emergency department with five hours of constant right-sided abdominal and flank pain with associated nausea. He was evaluated for presumed cholelithiasis and nephrolithiasis with unremarkable initial studies. He was dismissed with pain medication and instructions for outpatient abdominal ultrasound. The following morning his abdominal ultrasound was normal. He re-presented to the ED where a CT scan with IV contrast revealed a wedge shaped infarct of the right kidney. His pain continued to progress requiring transfer to another facility for further management.

During transport to our facility he became hypertensive to 171/101 mmHg. His creatinine remained stable at 1.0 and he was initiated on Lisinopril 5 mg daily. CT angiogram revealed a thrombosed dissection in a second order branch of the right renal artery. In the setting of the acute thrombosis, imaging could not rule out fibromuscular dysplasia.

No surgical intervention was undertaken and after 24 hours he was transitioned from Heparin to Clopidogrel. His pain improved, his renal function remained stable, and his blood pressure was well controlled. His treatment consisted of Clopidogrel 75 mg daily for three months, and then Aspirin 325 mg daily for 1 year following his event.

Due to concern for possible fibromuscular dysplasia as an underlying etiology for renal artery dissection, a carotid artery ultrasound was performed and was normal. His CT angiogram at 6 weeks showed interval improvement of the thrombus and infarction with only minimal renal scarring and partial recanalization of the artery. Although fibromuscular dysplasia statistically is the most likely cause of spontaneous renal artery dissection, all other visualized vessels in the abdomen appear unaffected. At the six week follow-up, his hypertension had completely resolved and no longer requires medical management.

Although SRAD is considered extremely rare, one study reported 35 symptomatic cases over 40 years at a single institution. SRAD has a wide variety of clinical presentations. Asymptomatic, or mild, self-resolving SRAD may lead to an underestimate of this condition’s true prevalence. Prognosis is good with appropriate intervention, however early recognition remains key. In atypical cases of abdominal and flank pain, SRAD should be considered in the differential diagnosis.
Lupus There It Is: Atypical Presentation of Lupus in the Setting of Concomitant Plasmodium Infection

First Author: Kelly M Pennington, MD Christine Tran Ruth Bates, MD Prashant Sharma, MD, FACP

Introduction: Several case-series have shown that systemic infections can lead to earlier presentation or recognition of systemic lupus erythematosus (SLE). In these circumstances, patients can present with non-specific signs and symptoms, making diagnosis challenging. Here, we present a previously healthy patient whose first presentation of nephrotic syndrome was in the setting of concomitant Plasmodium infection.

Case Presentation: A previously healthy 18 year-old female presented to the emergency department with a two-month history of chronic nausea, dysphagia, and a 40-pound weight loss. Ten-weeks prior to admission, the patient had a month long visit to India; she did not receive immunizations or anti-parasite prophylaxis. While in India, she developed nightly fevers with nausea and vomiting and was symptomatically treated at a local hospital with unknown medications. Her fevers resolved; however, she remained chronically nauseated with episodic non-bloody, non-biliary emesis.

Physical examination showed an afebrile African female with diffuse abdominal tenderness without rebound or splenomegaly. No edema, joint tenderness/erythema or skin rashes were appreciated. Other systemic examination was normal.

Laboratory studies were positive for microcytic anemia, elevated creatinine with nephrotic range proteinuria, hematuria with dysmorphic red blood cells, and pyuria. Initial work-up for infectious, autoimmune, and malignant causes were negative except a weakly positive ANA, weak cold and warm agglutinins, and low C3/C4. Anti-dsDNA and anti-phospholipid antibodies were negative. Initial peripheral blood smears were non-revealing. On the third malaria smear, a few Plasmodium species were identified, however not enough to speciate accurately. Despite aggressive IV hydration, her creatinine remained elevated. A renal biopsy revealed crescentic and necrotizing lesions with focal mesangial hypercellularity. Immunofluorescence studies demonstrated global granular capillary loop reactivity and tubular basement membrane deposits with interstitial immunoglobulin deposits. These histologic findings were consistent with lupus nephritis. She was started on high dose parenteral steroid and transitioned to oral steroid for lupus nephritis. She was also treated with primaquine and Malarone (Atovaquone/proguanil) for possible Plasmodium vivax infection. At 1-week follow-up, her creatinine remained stable and her appetite had improved.

Discussion: Our patient had no symptomology of SLE and had a non-specific antibody work-up; however, her renal biopsy was diagnostic for lupus nephritis. Great consideration was given to the possibility of tropical nephrotic syndrome secondary to Plasmodium infection; however, renal biopsy was not consistent with previously described histo-pathologic findings of malaria nephropathy. Our case illustrates that SLE can present in the setting of systemic infections demonstrating the importance of maintaining a broad differential diagnosis.
MINNESOTA POSTER FINALIST - CLINICAL VIGNETTE Korosh Sharain, MD

But, The ANCA is Positive!

First Author: Korosh Sharain, MD  Other Authors: Cyril Varghese, MD, Clement Michet, MD

CASE: A 62-year-old man with a history of type 2 diabetes presented to his local emergency department with a worsening rash over his distal extremities. He described an unintentional 50-pound weight loss and fatigue over the previous 6 months along with red-colored urine for the prior 3 weeks. He denied any shortness of breath, nausea, abdominal pain, or fevers. Physical exam was notable for a known aortic regurgitation murmur and a bilateral upper and lower distal extremity hemorrhagic bullous rash. Labs were significant for an anemia to 10.3 g/dL, leukocytosis to 15.9x10^9/L, and thrombocytopenia to 27x10^9/L. His creatinine was elevated to 10.7 mg/dL from a baseline of 0.7 mg/dL and he was admitted for hemodialysis. Further workup demonstrated schistocytes on blood smear, hypoalbuminemia, positive c-antineutrophil cytoplasmic antibody (c-ANCA) and proteinase 3 (PR3) antibodies, hypocomplementemia, and a positive rheumatoid factor. His presentation was concerning for vasculitis, therefore, he was started on one gram of intravenous methylprednisolone. Unfortunately, his anemia and thrombocytopenia worsened and his rash continued to spread proximally. He was then transferred to our facility for plasma exchange. Upon transfer, his blood cultures from the outside hospital grew gram positive cocci in chains and he was started on broad spectrum antibiotics. A subsequent echocardiogram demonstrated supra-centimeter aortic and mitral valve vegetations. A Panorex was negative. He also developed acute mental status changes and brain imaging was consistent with multiple acute and subacute septic emboli. He required urgent aortic and mitral valve replacements along with ceftriaxone for 6 weeks for Streptococcus mitis native valve endocarditis.

DISCUSSION: This case highlights the importance of understanding the differential diagnosis of ANCA positivity. Antineutrophil cytoplasmic antibodies are important markers for small vessel vasculitides; however, prolonged infections including HIV, TB, and subacute bacterial endocarditis (SBE) can exhibit a false positive ANCA and mimic vasculitis clinically, presenting a diagnostic and treatment challenge. Small case series demonstrate that ANCA-positive SBE is often associated with hypocomplementemia and a positive rheumatoid. Additionally, almost all cases of ANCA-positive SBE are c-ANCA and PR3 positive but p-ANCA and myeloperoxidase (MPO) negative. Also, ANCA-positive SBE has higher morbidity and mortality compared to endocarditis without a positive ANCA, possibly due to delayed identification and inappropriate initial treatment. Therefore, when vasculitis is considered, infection must be ruled-out since immunosuppression could lead to dire consequences in an infected patient.
Recurrent Spontaneous bilateral pneumothorax with thin walled cavities: A case that leads to the scalp

First Author: Alan M Sugrue, MBBCh Other Authors: Chris Stephenson MD, Luke Hafdahl MD

Spontaneous bilateral pneumothorax is a rare and life threatening condition. It is often associated with underlying lung disease or malignancy, either primary or metastatic. A 75 year old male presented to the emergency department complaining of shortness of breath, haemoptysis and chest discomfort for 3 weeks. He also described decreased weight loss of approximately 20 lbs over three months. He had a past medical history significant for removal of an angiosarcoma from his scalp in April this year. He also had bladder cancer s/p TURBT in 2013, prostate cancer s/p prostatectomy in 1995, Type 2 Diabetes, COPD. He denied any infective symptomatology and review of systems was negative. He had a significant smoking history of 83-pack year history.

His laboratory values on admission were within normal limits apart from a normocytic anaemia (Hb 10.5). On physical examining he was tachypneic with a respiratory rate of 30. Auscultation of the lung showed decreased breath sounds of the right sided with hyperresonant percussion note. He had no palpable lymphadenopathy; on his scalp he had a large incision from his recently removed angiosarcoma.

Chest x-ray showed a right-sided pneumothorax with some cavitating lesions. While transferred to the interventional radiology (IR) suite for a right chest drain, he become progressively more short of breath, and was subsequently diagnosed with a new spontaneous left sided pneumothorax and had to have two pigtail chest drains inserted on both the right and left side. While in the IR he also underwent a right lung biopsy of one of the cavitating lesion.

His biopsy came with a diagnosis of metastatic angiosarcoma, with the primary lesion been from his scalp. He was commenced on weekly taxane therapy. His hospital course was complicated by multiple recurrences of a left sided pneumothorax, which we treated with a Heimlich valve (one way valve) attached to his left sided chest drain, which enabled him to be discharged. Angiosarcoma are a rare soft tissue sarcoma (2% of all sarcomas), they are highly malignant and are of vascular or lymphatic epithelial origin. Angiosarcoma of the scalp has a predilection for pulmonary metastasis, classically known to form thin walled cavities. The reason behind pneumothoracies remains obscure.. Prognosis is poor with survival at 20% over two years with metastatic disease. Treatment is with taxanes based therapy, with newer agents Pazopanib showing promise.

The case highlights the rarely described association between metastatic angiosarcoma and spontaneous pneumothorax, as well as the classically described thin wall cavities. It is extremely rare to develop bilateral spontaneous pneumothoraces and it can be difficult to manage recurrent spontaneous pneumothoracies in an ambulatory setting. Through the use of a Heimlich valve we are able to treat any further recurrent pneumothoracies, while enabling him to return home, providing both benefits for the patient and health care system.
Pneumonia Masquerading as a Rash

Cyril Varghese, MD, Korosh Sharain, MD, Matthew Koster, MD, and Clement Michet Jr., MD

Introduction: Mycoplasma pneumonia is a community-acquired infection that usually presents as an upper respiratory tract infection. A constellation of cough, pharyngitis with atypical dermatological and/or mucosal findings should prompt Mycoplasma antibody testing, even if a chest X-ray is negative. In addition, having repeated pneumonias as a child or teenager should prompt testing for immunological disorders.

Case: A 34-year-old man developed a sore throat and productive cough followed by a one-week history of generalized rash, subjective fevers, injected eyes and intense myalgias. He did not report any sick contacts or recent travels outside the United States. The patient reported to an urgent care center with these symptoms two days later and was given a Medrol dose pack. His symptoms persisted, so he presented to the hospital for further evaluation two weeks after developing symptoms. His past medical history was significant for six episodes of pneumonia requiring hospitalization since childhood. Social history was significant for regular marijuana use. On presentation, the patient was vitally normal and stable with a diffuse morbilliform rash over his face, torso and extremities. He had conjunctival injection and crackles at bilateral lung bases. He did not have any oral ulcers or tonsillar exudates. CBC was significant for leukocytosis (WBC: 23.4X10^9/L with a left shift). However, infectious workup was negative for Anaplasma, Ehrlichia, ASO, Lyme ELISA, RMSF AB, GAS PCR, HIV, Babesia, Adenovirus, CMV, EBV, and measles virus and negative blood cultures. Rheumatological workup was negative for ANA, rheumatoid factor, PR3, CCP AB, SSA/SSB, Sm AB, Scl 70, Jo 1 AB, Myeloperoxidase. Chest X-ray did not show focal consolidation. However, his constellation of symptoms, including cough with sore throat, injected cornea and atypical rash, prompted Mycoplasma pneumonia IgM and IgG antibody testing, both of which were positive. His history of recurrent pneumonia in childhood and early adulthood warranted further investigation with Complement levels, including C1q, C2, C3 and C4, all of which were low. The patient was discharged on oral doxycycline and showed remarkable improvement of symptoms.

Discussion: Mycoplasma pneumonia usually presents as a self-limiting upper respiratory tract infection that has evolved into pneumonia, with the typical diffuse reticular interstitial findings on chest X-ray. In rare cases, Mycoplasma pneumonia can present with other manifestations including morbilliform rash or mucositis involving the eyes, genital, anal or oral mucosa. Although “walking pneumonia” is a common presentation among young adults, having had repeated bouts of pneumonia during childhood or young adulthood warrants further investigation. Dysregulation of complement activity can predispose patients to autoimmune or infective process. Our patient had a mixed complement deficiency. In general, deficiencies of the early components of the complement pathway (C1q, C2 and C3) result in autoimmune disorders like SLE. On the other hand, deficiencies in late complement components (C3-9) lead to recurrent infections.
Hypophosphatemia Masquerading as Meningitis

L W Aldred, MD M McCauley, MD J Pickett J O Knight M I Ullah, MD

Introduction: The differential diagnosis for altered mental status is vast, including drug overdose, meningitis, intracranial lesions, and electrolyte abnormalities. Herein we report a case of severe hypophosphatemia masked by a potential diagnosis of meningitis.

Case Description: A 68-year-old white female with rheumatoid arthritis and osteoporosis presented to the emergency department after responders found her unresponsive on the floor of her bathroom. Initially, she was obtunded and unable to provide any history. However, emergency physicians administered naloxone with some response. After patient was awake, she complained of headache, photophobia, and “pirates attack[ing] [her] ship.” Pertinent physical exam findings included tachycardia, photophobia, and a fentanyl patch on her right chest. Investigative studies revealed a WBC count of 21.4 TH/cmm, as well as a urine drug screen positive for benzodiazepines, opiates, and barbiturates. Other blood chemical levels drawn were as follows: acetaminophen <15 mcg/mL, salicylate <1 mg/dL, and alcohol <10 mg/dL. Non-contrasted CT head showed no acute intracranial abnormality. Initial differential diagnosis included polypharmacy as well sepsis secondary to meningitis. We attempted lumbar puncture, but CSF was unable to be obtained. We initiated ceftriaxone, vancomycin, and ampicillin as empiric coverage for meningitis. One day after admission, she had a brief episode of witnessed seizure activity, which resolved with lorazepam. She remained confused 24 hours later with new onset bilateral vertical nystagmus. We ordered a complete electrolyte panel, which revealed a serum phosphorus of 0.6 mg/dL and a drop in serum calcium to 7.7 mg/dL. A parathyroid hormone level was found to be elevated at 278.3 pg/mL. IV phosphorous was given and the patient’s mental status rapidly improved. Blood and urine cultures demonstrated no growth, and we discontinued her antibiotics with no adverse events.

Further chart review showed that the patient had recently received an intravenous infusion of zoledronic acid for osteoporosis 3 days prior to admission.

Discussion: This patient’s clinical presentation can be explained by her recent infusion of zoledronic acid. Bisphosphonates cause mild to severe hypophosphatemia which can lead to metabolic encephalopathy. A broad spectrum of neurological symptoms may be associated with severe phosphatemia ranging from mild irritability and paresthesia to more severe manifestations such as delirium, generalized seizures, and coma. In summary, in patients who meet SIRS criteria with altered mental status and no obvious source, meningitis cannot be overlooked. However, it is prudent to keep electrolyte abnormalities in the differential diagnosis in the face of high suspicion for meningitis.

References:

Physiologic Paraspinal masses in a patient with Hemoglobin C Disease

First Author: Doris K Hansen, MD; Clark Henegan MD, John Lam MD and Vince Herrin MD

Introduction: Extramedullary hematopoiesis (EMH) refers to the growth of hematopoietic tissue outside of the bone marrow. EMH is a physiologic response to chronic anemia secondary to myeloproliferative disorders or hemoglobinopathies. It is localized to the liver and spleen in 95% of cases; however, it may also develop in paravertebral areas, especially the posterior mediastinum.

Here, we report a case where a patient was noted to have multiple paraspinal masses on imaging which, upon biopsy, were found to be areas of EMH leading to a further diagnostic evaluation.

Case Report: A 73-year-old African American man was admitted for resection of an atypical lipomatous tumor of the left thigh. On admission, he underwent Computerized Tomography (CT) of the Chest, Abdomen and Pelvis to follow up a pre-operative Chest X-ray (CXR) concerning for hilar lymphadenopathy. CT was notable for multiple paraspinal masses affecting the thoracic (T) spine at T8, T9 and T10 as well as a spleen status post a prior partial resection. Biopsy of a paraspinal mass was performed with pathology notable for extramedullary hematopoiesis concerning for a myeloproliferative neoplasm versus a hemoglobinopathy.

Due to the patient’s underlying dementia, an extensive prior medical history was unable to be obtained. He did, however, report a prior abdominal surgery after being “kicked by a mule.” Physical exam demonstrated a midline abdominal vertical scar but no evidence of hepatosplenomegaly. He did not have any palpable masses affecting the thoracic spine or any neurological deficits. Labs demonstrated a normocytic anemia.

Patient declined a bone marrow biopsy. Hemoglobin electrophoresis was consistent with Hemoglobin C Disease.

Discussion: In addition to the liver and spleen, paravertebral areas may be associated with EMH. Any paravertebral mass consistent with EMH should prompt a clinician to consider an underlying hemoglobinopathy in addition to myeloproliferative neoplasms. EMH is common in patients with thalassemia and myeloproliferative disorders. However, only one literature case in Pubmed reports a patient with Hemoglobin C disease and paravertebral EMH. Patients with Hemoglobin C Disease are usually asymptomatic, have a mild degree of anemia with hemolysis and splenomegaly.

Paraspinal extramedullary hematopoiesis may cause a variety of neurological symptoms depending on size, location and if there is impingement of the spinal cord or nerve roots. More than 80% of patients remain asymptomatic and the masses are typically discovered incidentally by radiologic imaging. Early diagnosis is essential to rule out malignant processes of the posterior mediastinum.
Extracorporeal Membrane Oxygenation for Electrical Storm as a Complication of Acute Myocardial Infarction

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Introduction: Cardiogenic shock and refractory ventricular tachycardia are known complications of acute myocardial infarction that are associated with a high mortality rate. Treatment of these sequelae is challenging, and prompt intervention is paramount to promote good outcomes. When cardiogenic shock or ventricular tachycardias are refractory despite appropriate revascularization, mechanical circulatory support is an appropriate treatment.

Case Description: A 36-year-old African-American female presented with acute onset of chest pain, and initial electrocardiogram (ECG) demonstrated an acute anterior ST-elevation myocardial infarction. She was referred for emergent coronary angiography, which revealed complete occlusion of the proximal left anterior descending (LAD) coronary artery and occlusion of two distal branches of the first obtuse marginal coronary artery. The patient underwent emergent percutaneous coronary intervention with manual aspiration thrombectomy in the LAD and deployment of a bare-metal stent in the proximal LAD. Due to persistent hypotension throughout the procedure, a dopamine infusion was initiated and an intra-aortic balloon pump was placed for support. Over the next 24 hours she reported no chest pain, but serial ECGs demonstrated an evolving anterior infarct pattern and transthoracic echocardiography showed depressed left ventricular systolic function with anterior and apical hypokinesis. 24 hours after admission, she developed ventricular tachycardia which was refractory to multiple direct-current synchronized cardioversions as well as to dual anti-arrhythmic therapy with amiodarone and lidocaine. She was then upgraded to full mechanical circulatory support with veno-arterial extracorporeal membrane oxygenation (ECMO). During 96 hours of ECMO support, she suffered no further hypotension or ventricular arrhythmia. She was successfully weaned from ECMO and treated with standard medical management of acute coronary syndrome prior to being discharged home on hospital day #10.

Discussion: Mortality remains over 40% amongst patients who develop cardiogenic shock as a complication of acute myocardial infarction, despite recent improvement brought about by widespread implementation of early revascularization techniques. Cardiogenic shock due to electrical instability presents a particularly difficult clinical scenario when ventricular arrhythmias are refractory to anti-arrhythmic therapy. Under such circumstances, temporary full cardiopulmonary support with veno-arterial ECMO has been used in some cases as a bridge to recovery of myocardial function. These initial reports of success with ECMO support, taken in conjunction with the failure of the intra-aortic balloon pump to confer a mortality benefit as shown in the IABP SHOCK II trial, demonstrate the need for further, more powerful clinical studies to determine whether ECMO may reduce mortality in cardiogenic shock complicating acute myocardial infarction. Demonstration of such a mortality benefit would represent arguably the most momentous development since percutaneous coronary intervention.

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MISSOURI POSTER FINALIST - CLINICAL VIGNETTE Cristina Ipatii, MD

FINDING "NEO"

Cristina Ipatii MD, Sadashiv Santosh MD, Alexandre Lacasse MD Department of Internal Medicine, St Mary's Health Center, St Louis MO

Anti-N-methyl-D-aspartate (NMDA) receptor antibody encephalitis mostly affects children and young females. It presents as an acute and rapidly progressive psychosis leading to encephalopathy and possibly death. An occult neoplasm can be present, a teratoma in most cases.

A 20 year-old African American female presented with subacute psychosis unresponsive to antipsychotic treatment. Three weeks preceding presentation, she had significant agitation with insomnia and new onset grand mal seizure with transient lower extremity weakness. Then, rapid disintegration of language, decreased responsiveness, mutism, dyskinesia with catatonic features were observed. On examination, patient was confused, nonverbal, restless with catatonic posturing and non-tracking fixed gaze. Hyperreflexia and myoclonus of the lower extremities were present. Brain magnetic resonance imaging (MRI) was unrevealing. Cerebral spinal fluid (CSF) analysis showed lymphocytic pleocytosis and monoclonal gammopathy. Infectious, vascular and toxic causes were not found. Electroencephalogram showed generalized slowing with occasional seizure activity. Both serum and CSF anti-NMDA receptor antibodies were positive. Pulse dose corticosteroid and immunoglobulins were initiated, followed by plasmapheresis. Rituximab was then initiated given lack of clinical improvement. Ultrasound, computed tomography (CT) and MRI of the pelvis, chest CT and spinal MRI did not reveal an occult teratoma. Unilateral oophorectomy failed to detect one as well. Egg harvesting followed by second oophorectomy have been considered. To date, complete neurological recovery has been achieved.

Acute and rapidly progressive psychosis followed by encephalopathy should raise suspicion for both infectious and non-infectious encephalitis including anti-NMDA receptor encephalitis. High index of suspicion in the correct clinical scenario should prompt treatment initiation prior to confirmatory testing. Further interventions should be pursued to find an occult teratoma. If not found or removed, then long term immunosuppression and periodic imaging are indicated.
Hidden over the counter risk: Omeprazole induced acute interstitial nephritis!

Maryam Gbadamosi-Akindele M.D, Adegboyega Olayode M.D, Nathan Birch,M.D.

Case: We present the case of a 74 year old male who was admitted with acute kidney injury found on routine basic metabolic panel (BMP). Serum creatinine was 5.8 mg/dl, increased from a baseline of 1.6 mg/dl. Past medical history was significant for hypogammaglobulinemia and gastroesophageal reflux disease (GERD). Significant diagnostic studies included proteinuria, a fractional excretion of sodium of 5.35% and a renal ultrasound showing elevated resistive indices. The patient was hospitalized for one day while he was hydrated with fluids. BMP 4 days after discharge again showed an increased creatinine of 5.6mg/dl. He was readmitted with laboratory findings significant for hematuria, eosinophiluria, pyuria and eosinophilia which were consistent with acute interstitial nephritis (AIN). Further in depth history revealed that the patient recently started taking omeprazole which he purchased over the counter for the treatment of GERD. Review of literature revealed that omeprazole is an etiology of AIN, thus it was discontinued. Follow up BMP nine days after discontinuation showed a decline in serum creatinine to 2.8 mg/dl. Subsequent creatinine at one month and six months were 2.6mg/dl and 1.8mg/dl respectively. A diagnosis of omeprazole induced AIN was made on the basis of the decline in serum creatinine after omeprazole was discontinued.

Discussion: Omeprazole is a common over the counter medication used in the treatment of GERD. AIN is an adverse effect of omeprazole that is rare and not well recognized. Clinical presentation varies with only a few patients presenting with the classic triad of fever, rash and eosinophilia. Laboratory findings include hemeaturia, proteinuria, eosinophiluria and pyuria. Diagnosis is usually made clinically but can be confirmed with renal biopsy. The exact pathophysiology of omeprazole induced acute interstitial nephritis is unknown. The literature suggests that patients with an underlying immunological abnormality such as our patient may be at increased risk. The treatment is to discontinue omeprazole. The use of glucocorticoids is controversial; nonetheless, it is commonly used in the treatment of omeprazole induced AIN.

Conclusion: Physicians should be cognizant of omeprazole induced AIN since omeprazole is a common over the counter medication. This case highlights the importance of a thorough review of over the counter medications which patients may not voluntarily disclose on routine history.

References:
NEBRASKA POSTER FINALIST - CLINICAL VIGNETTE Rajesh Kunadharaju, MBBS

A Rare Case Of Sarcoidosis Presenting As ARDS And Maculopapular Rash

First Author: Rajesh Kunadharaju, MBBS Second author: Sriharsha Tella.

Sarcoidosis is a multisystem inflammatory disease that is characterized by non-caseating granulomas on pathology. It involves the skin in about 25% of cases, most common lesions being erythema nodosum, maculopapular eruptions, subcutaneous nodules and lupus pernio. Lung involvement occurs in over 90% of patients with sarcoidosis and classically manifests as bilateral hilar adenopathy although it can present in a variety of ways. We describe a rare initial presentation of sarcoidosis as acute respiratory distress syndrome (ARDS) and maculopapular eruptions.

CASE: A 55-year-old Caucasian male with a past medical history of sleep apnea, multiple back surgeries and hypogonadism presented to the emergency room (ER) for 10 days of worsening shortness of breath that coincided with new onset maculopapular rash that started from his penis. Rash was non-itchy, painless and was initially noted in his penis that spread to his torso. He had no recent traveling overseas except for being in Mexico for 3 weeks’ vacation 8 months ago, no animal contact, no recent changes at home or relocating and he had not lived on a farmland. He has had the same partner for 8 months with no new sexual contact. In the ER, patient was tachypneic and hypoxic with O2 saturation of 79% on ambient air. PaO2/FiO2 ratio was 186mmHg and chest radiograph and CT showed bilateral interstitial infiltrates with normal BNP and echo consistent with an ARDS picture. Bronchoalveolar lavage did not show any evidence of infection including viral, bacterial, PCP, acid fast bacilli, fungi, or malignancy. Alveolar hemorrhage was not noted. Skin biopsy came back as consistent with sarcoidosis. Patient was treated with supportive measures and was started on prednisone with improvement of symptoms. He was discharged home on 2 liters of oxygen. Upon outpatient follow up, rash had subsided and he had much improved.

DISCUSSION: The initial presentation and natural course of sarcoidosis can vary greatly. Lung involvement is common but the development of ARDS as a manifestation of sarcoidosis has not been well documented with only one case report in the literature. Our patient met the diagnostic criteria for ARDS and the diagnostic tests performed did not reveal any other causes. This case outlines a rare but potentially fatal presentation of sarcoidosis as ARDS. The importance of this report is primarily related to the possibility that sarcoidosis may present as ARDS which, in the absence of an appropriate diagnosis and treatment, could potentially be fatal. As far as we are aware, there has only been one case report of acute life threatening pulmonary sarcoidosis presenting with ARDS.
NEVADA POSTER FINALIST - CLINICAL VIGNETTE Pannaga G Malalur, MD

Neurotoxicity of High Dose Intrathecal Gadolinium for CT Myelogram

First Author: Pannaga G Malalur, MD Second Author: Peter C. Rajacic, MD Third Author: Samir Patel, MD

**Introduction** There is a small but growing body of literature regarding the administration of low-dose intrathecal gadolinium for various indications of contrast enhanced myelography and cisternography. Although currently an off-label use, there is active discussion to gain FDA approval for such procedures. A few case reports have noted adverse effects with accidental administration of high-dose intrathecal gadolinium.

**Case Description** We report a 70 year-old male with past medical history significant for multiple spinal surgeries who presented with altered mental status and bilateral hearing loss following a CT myelogram using intentional administration of high-dose (12 cc) intrathecal gadolinium. Intrathecal gadolinium and CT myelogram were utilized due to documented iodine allergy and presence of spinal hardware, respectively. Lumbar puncture revealed elevated protein. MRI of lumbar spine without contrast showed fluid collection in L4-5 region and diffuse hyper-density in the CSF. High dose IV dexamethasone, IV fluids, IV antibiotics and acyclovir were started. Further workup ruled out infectious and aseptic meningitis, infectious encephalopathy, encephalitis, and hypothyroidism. Repeat L-spine MRI displayed resolution of the fluid collection and diffuse hyper-density. Also, repeat lumbar puncture noted a downtrend of protein. The patient’s symptoms resolved prior to discharge. The most likely etiology was an adverse reaction to high-dose intrathecal gadolinium.

**Discussion** Limited experience in animal studies, case reports and human studies have demonstrated the short and long term safety of administration of low dose (0.5 – 1 cc) intrathecal gadolinium in the lumbar spine. However, the overall general safety has not been fully established and dosing guidelines are ambiguous. The few case reports examining adverse reactions to higher doses suggest that supportive therapy such as IV fluids, in combination with IV steroids and CSF drainage, is beneficial. The fact that our patient improved with supportive treatment, IV steroids, and two lumbar punctures reinforces the utility of this treatment. To our knowledge, this is the highest dose of intrathecal gadolinium intentionally administered to a patient. Also as far as we can determine, this is the first reported case where intrathecal gadolinium was used in a CT myelogram. It is unclear if serum/CSF levels of gadolinium correlate with symptoms and if measuring the same would have clinical or prognostic value. Our case in question may point to the eventual determination of protocols for patients who cannot use iodinated contrast and cannot undergo MRI studies; and also to suggest treatment for patients developing symptoms after gadolinium administration.
An Unusual Cause for Left Ventricular Systolic Dysfunction: A Problem with Packing

First Author: Susil Sivaraman, MD Co-Authors: Swetal Patel MD, Eyas Chakfeh MD, Susanth Sivaraman MD, Anthony Salem MD

Introduction: Heart Failure is a common medical condition affecting approximately 5.7 million Americans. The most common causes for systolic heart failure in developed countries are ischemia, hypertension, and valvular heart diseases. However, various other causes of heart failure are often missed or overlooked. Our evaluation led to a diagnosis of a rare congenital cause for heart failure.

Case Description: A 59 year old Caucasian male with a past medical history of COPD, hypertension, dyslipidemia, and frequent premature ventricular contractions presented with complaints of shortness of breath and pedal edema. Physical examination showed an obese elderly male in acute respiratory distress. He was afebrile with a pulse of 50 beats/minute, respiratory rate of 26/minute, BP of 180/105, and saturation of 96 % on 2L nasal cannula. Other findings included an elevated JVP, bilateral basilar crackles, and bilateral 2+ pedal edema. Electrocardiography showed bradycardia with trigemy and frequent PVC’s. There were no ST changes. Echocardiogram demonstrated global left ventricular hypokinesia, an ejection fraction of about 45-55%, and no valvular or septal defects. He underwent a left heart catheterization, left ventriculography, and a coronary angiography. The ventriculography confirmed an LV ejection fraction of 40%. Coronary angiography showed non-flow limiting, non-obstructive coronaries. All investigations failed to identify the cause of his left ventricular dysfunction. The patient was labeled with “non-ischemic cardiomyopathy” and managed with standard heart failure medications.

He was admitted to our hospital six months later with worsening dyspnea on exertion. Contrast echocardiogram showed a worsening ejection fraction of 30%. The contrast was found penetrating the left ventricular myocardium revealing recesses in the left ventricular apex. This is pathognomonic of a rare congenital cardiac condition known as “non-compaction cardiomyopathy”.

He was placed on maximum medical therapy, and planned for ICD placement due to the increased risk of ventricular arrhythmia and sudden cardiac death. His first degree relatives were also screened for NCCM.

Discussion: This case emphasizes the importance of re-evaluating a patient, and keeping an open mind to even the rarest of conditions. Non-compaction cardiomyopathy (NCCM) is a rare congenital condition (prevalence estimated at 0.05%-0.24%), that occurs from an arrest of normal myocardial compaction during embryonic development. This results in increased trabeculations and intertrabecular recesses within the myocardium. Diagnosis is primarily based on morphological findings of NCCM. There is no specific management for NCCM; patients should be treated for heart failure, arrhythmias, and thromboembolic events per standard guidelines. NCCM has also been tied to many different gene mutations. Therefore, the Heart Failure Society of America recommends echocardiographic screening of all first degree relatives.
NEW HAMPSHIRE POSTER FINALIST - CLINICAL VIGNETTE Khushboo Shah, MD

Jehovah’s Witness with a Triple-Hit: Beta-Thalassemia Trait + Paroxysmal Nocturnal Hemoglobinuria (PNH) + Chronic Myeloid Leukemia (CML)

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Introduction: Paroxysmal Nocturnal Hemoglobinuria (PNH) is a benign hematopoetic clonal stem cell disorder characterized by a somatic mutation of the PIGA gene that renders these cells prone to hemolysis. This mutation alone however, is insufficient to account for the clonal dominance necessary for clinically apparent PNH. While immune mechanisms have been thought to mediate clonal selection of PNH cells several reports have postulated the idea of a second, driver mutation that would provide a strong survival advantage for PNH to become clinically apparent. Here we report a case of a Jehovah’s Witness with Beta-Thalassemia Trait who was diagnosed with Paroxysmal Nocturnal Hemoglobinuria (PNH) and a year later was discovered to have Chronic Myeloid Leukemia (CML). His religious aversion to blood products added additional complexity to his already challenging case.

Case Presentation: A 52-year old male Jehovah’s witness with a past medical history of Beta-Thalassemia trait presented with a several week history of significant fatigue and jaundice. His CBC was notable for a profound microcytic anemia (Hb 5.9) with a normal differential. Hemolysis labs were positive with a negative Coomb’s test. Blood flow cytometry revealed deficiency of glycosylphosphotidylinositol anchor (GPI-A) bound proteins on ~50% of erythrocyte & lymphocyte populations consistent with PNH. Treatment with Eculizumab, a humanized monoclonal antibody targeting C5 terminal complement activation, was initiated. The initial response to treatment was dramatic with significant improvement of his hemolysis markers. About 1 year into treatment, the patient complained of returning fatigue. Labs were remarkable for a persistently elevated reticulocyte count of >20%, progressive thrombocytosis of >1,000,000 with a rising leukocytosis. Bone marrow biopsy revealed the presence of Philadelphia (Ph) chromosome and BCR-ABL translocation by RT-PCR and FISH, confirming the diagnosis of a superimposed chronic myeloid leukemia (CML). Treatment with Imatinib, a tyrosine-kinase inhibitor, was initiated and after just 6-8 months, both the BCR-ABL/ABL ratio and PNH clone population were no longer detectable. Eculizumab therapy was stopped and the PNH clone remained undetectable on all subsequent testing. Remarkably, all of his cell lines are within normal range and he averted requiring any blood product transfusions since his initial diagnosis.

Discussion: Does the patient have two separate clones, one harboring the PIGA mutation and another harboring the BCR-ABL translocation, or was there just one clone with both mutations present? This question was particularly important for a Jehovah’s witness who would not accept transfusion support and may be dependent on a CML clone for normal erythropoiesis in the 2-clone scenario.

While there is no direct evidence to support either theory, we suspect there was just one clonal stem cell harboring both the PIGA mutation and BCR-ABL translocation. The hypothesis supported by coinciding improvement in the patient’s CML disease with Imatinib with the disappearance of the patient’s PNH clones. In fact, the patient was able to stop taking Eculizumab with no recurrence of PNH almost 4 years
later. It’s unclear if the original PNH clone found at first presentation harbored a yet indolent BCR-ABL mutation or if a BCR-ABL mutated clone provoked the PIG-A mutation responsible for development of PNH.

The case highlights a uniquely challenging situation for a Jehovah’s witness faced with three simultaneous blood disorders: CML, PNH & underlying Beta-Thalassemia Trait. This is an extremely uncommon event that to our knowledge has never been reported before. Further studies are required to clarify the pathogenetic relationship between CML and PNH.
AORTICO-LEFT ATRIAL FISTULA: A RARE COMPLICATION OF INFECTIVE ENDOCARDITIS

First Author: Martin Miguel I Amor, MD Abhinav Agrawal MD, Deepa Iyer MD, Marc Cohen MD

INTRODUCTION: Paravalvular aortic root abscess with intracardiac fistula formation is an exceedingly rare complication of infective endocarditis. This complication places patients at increased risk for congestive heart failure, heart block and death.

CASE DESCRIPTION: A 68-year-old Bosnian female with prior aortic valve replacement with a bioprosthetic valve for aortic regurgitation was admitted for worsening shortness of breath, fever and lethargy. She was recently on a vacation in Bosnia, where she fell ill and was hospitalized for 1 month for sepsis and renal failure. She had an extensive past medical history, pertinent for coronary artery disease, s/p PCI and stenting, diastolic congestive heart failure, atrial fibrillation, chronic kidney disease, systemic hypertension, multiple prior cerebrovascular accidents and chronic UTI. In the ED, she became markedly hypotensive and hypoxic. She was intubated and started on dopamine infusion. A bedside transthoracic echocardiogram revealed a paravalvular leak around the bioprosthetic valve, raising concern for an aortic root abscess. EKG revealed atrial fibrillation with low voltage QRS, without evidence of bundle branch blocks or conduction delays. The patient developed septic shock and was started on broad spectrum antibiotic therapy and pressor support. A transesophageal echocardiogram revealed an extensive aortic root abscess. The abscess had ruptured into the left atrium, with a fistula connecting the aortic root to the left atrial cavity. The abscess was located around the bioprosthetic aortic valve which had a large vegetation and severe paravalvular aortic regurgitation. She became hemodynamically unstable during the procedure and was brought to the operating room for emergent surgery. She underwent homograft aortic root replacement, VSD repair and ligation of the aortico-left atrial fistula. Two sets of blood cultures grew Enterococcus faecalis. Postoperatively, she developed worsening septic shock, requiring multiple pressors, disseminated intravascular coagulation, and anuria, requiring CVVHD. She eventually expired 5 days later.

DISCUSSION: Intracardiac fistula formation is a rare and particularly problematic complication of periannular spread of infective endocarditis, with high mortality despite adequate therapy. In prosthetic valves, this process usually begins on the prosthesis cuff, and often extends outside the valvular apparatus, resulting in valvular dehiscence, abscess formation, and myocardial involvement. Operative treatment remains the cornerstone of management. Surgical treatment involves removal of all infected tissue including annular elements, followed by reconstruction of the annulus for safe anchoring of a valve conduit. Early rather than delayed surgical intervention has been shown to improve survival. In our patient, a delay in the diagnosis, which in turn led to a delay in surgical intervention, contributed to the poor outcome. This case illustrates that a high index of suspicion, prompt diagnosis by echocardiography, and early rather than delayed surgical intervention, are crucial to improving treatment outcomes for this rare condition.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Anteneh Birru, MD

Idiopathic thromboembolism and occult malignancy

First Author: Anteneh Birru Second Authors: Daniel Goldsmith, MD. Emily Chen, MD

Introduction The association between venous thromboembolism (VTE) and occult malignancy was well established more than a century ago. Studies report a 10% malignancy incidence in patients with idiopathic VTE who were followed over two years. However, there are no clear clinical guidelines on evaluation of patients with idiopathic VTE for occult malignancy.

Case Presentation A 56 year old African American male with a history of hypertension, diabetes mellitus, and hyperlipidemia, presented with complaints of left leg pain and swelling for three days. He denied any trauma, shortness of breath, chest pain, palpitations, fever, chills, abdominal pain, recent travel and prior similar events. He reported involuntary weight loss of 10 lb over the last three months. Vital signs were temperature 98.8 F, pulse 90 bpm, respiration 16/min, oxygen saturation 99%, and blood pressure 117/77 mmHg. The left lower extremity showed diffuse swelling below the knee and was tender to palpation. Laboratory evaluation showed hemoglobin of 6.9 mg/dL, hematocrit 22.3%, WBC 11 and platelets 294. Doppler image of the lower extremities revealed extensive acute deep vein thrombosis in the left proximal to distal femoral, popliteal, and tibial veins. Subsequently, the patient underwent inferior vena cava filter placement due to the low hemoglobin. Iron studies for anemia showed iron deficiency. The patient was transfused 2 units of PRBC’s. On day 2 of admission, CT of chest, abdomen, and pelvis images revealed pulmonary embolism and a 7.8 x 7.9 x 8.6 cm right colon mass. On day 4, colonoscopy showed a polyp and a 3mm apple core lesion in the right colon. Later, the patient underwent right hemicolectomy and pathology reported invasive, moderately differentiated adenocarcinoma of the colon without metastasis. Further adjuvant chemotherapy wasn’t initiated due to tumor stage (T2NO). The patient was started on heparin and bridged to warfarin. Given an early and thorough investigation for an idiopathic thromboembolic event, an occult malignancy was revealed and treated early.

Discussion A first episode of idiopathic VTE may herald an occult malignancy. There is still some uncertainty whether screening for malignancy improves prognosis in such a patient group. However, early detection of occult malignancy has a positive association with increased treatment possibilities and survival. VTE patients should be investigated for age and risk factor appropriate malignancies, and all red flag abnormalities must be fully evaluated. In our case, even if the CT scan had not revealed a mass, the patient would have been appropriate for an early colonoscopy because of the anemia.

Learning point Until there are clear clinical guidelines available for evaluation of occult malignancy in idiopathic VTE patients, it is important for clinicians to diligently look for occult malignancy with thorough medical history, physical examination, directed laboratory tests and imaging.
Anti-N-methyl-D-aspartate receptor (NMDAR) encephalitis associated with ovarian teratoma: a challenging diagnosis

First Author: Ria D'Souza Second Authors: Julius Salamera, Stephen Sachs, Sonia FNU, Naresh Joshi

Anti-NMDAR encephalitis is a paraneoplastic encephalitis associated with anti-NMDAR antibodies, first reported in 1997. It is most commonly seen in young women with ovarian teratoma, as well as in men and children. Some of the characteristic clinical features include bizarre dyskinesia, epileptic seizures, hypoventilation, neuropsychiatric manifestations, and decreased level of consciousness.

A 25-year old French woman with no medical or psychiatric history was brought in from Newark Liberty International Airport due to acute mental status changes. She was travelling with her boyfriend and younger sister from Belgium to United States for a leisure trip. The patient was noted to be acutely agitated on the plane, evidenced by incoherence of speech, and attempting to open the cockpit door. On arrival, she exhibited bizarre behavior with uncoordinated movements. As per patient’s boyfriend, there was no history of alcohol or substance abuse. Urine drug screen, alcohol, and ammonia level were negative. Psychotropic medications did not improve her mental well-being. A CT scan as well as MRI of brain did not show any acute pathology. A diagnostic lumbar puncture has CSF lymphocytic pleiocytosis, with normal opening pressure, glucose, and protein. EEG revealed mild, diffuse slowing. Empiric acyclovir was initiated pending CSF work-up. Blood, urine, and CSF cultures were negative. Fungal, viral, and acid fast bacilli culture were also negative. Cytology has no malignant cells. Patient clinically deteriorated with acute urinary retention, and acute hypoxic respiratory failure from aspiration pneumonia. A CT scan of the chest, abdomen, and pelvis disclosed multilobar consolidation, and distended urinary bladder up to umbilicus. CSF studies including PCR for HSV 1/2, West Nile virus, Lyme, VDRL, 14-3-3 protein, myelin basic protein, oligoclonal bands, and cryptococcal antigen were negative. HIV antibody, interferon gamma release assay, and ANA were also negative. She was started on high dose steroids due to concern for autoimmune encephalitis, which was then tapered with modest improvement. A repeat CT of the abdomen and pelvis revealed a left ovarian mass suggestive of ovarian teratoma with positive serum anti-NMDAR antibodies on CSF. She underwent resection of ovarian teratoma, with concurrent intravenous immunoglobulin therapy. Currently, the patient has improved neurologically following a trial of rituximab and cyclophosphamide.

Anti-NMDAR encephalitis and its association with ovarian teratoma in young women is still a relatively unknown diagnosis. The diversity of symptoms frequently results in misdiagnosis as a psychiatric, infectious or toxicological process. Emergency physicians and Internists must consider the diagnosis when a young female patient presents with acute mental status changes, dyskinesia, and new onset seizures, in whom toxicological and infectious etiology has been ruled out. Treatment includes resection of ovarian tumor and immunotherapy. Avoiding diagnostic delay will result in early initiation of immunotherapy and tumor resection, which has been associated with improved outcomes.
Indolent DRESS Syndrome: The Calm Before The Storm

First Author: Mufaddal Q Dahodwala, MD Second Author: David J Ross, MD

We present a case of Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) that highlights the potential harm of seemingly benign environmental insults in a patient whose immune milieu is heightened.

A 29 year-old South Asian woman with asthma, eczema, and back pain presented to the ICU after three weeks of progressive fever, profuse watery diarrhea, and rash. She ingested oysters two days prior to symptom onset, and while others in her party suffered 24-hour GI upset, her symptoms progressed. Home medications included oral contraceptives, albuterol, NSAIDs, and herbal supplements. Her exam was notable for fever, anasarca, normal buccal mucosa, no significant adenopathy, tachycardia, and generalized morbilliform papular rash over trunk and all extremities, with sparing of palms and soles. Admission labs were notable for leukocytosis, monocytosis, and depleted electrolytes. Skin biopsy showed perivascular lymphocyte-predominant inflammation with dermal edema. During her admission, her fevers and abdominal pain progressed. A broad diagnostic workup was largely negative, except for positive serum Strongyloides antibodies, positive antitransglutaminase, and positive HTLV screen and antibody. Her liver function deteriorated, with peak AST 2136, ALT 1304, and MELD 26. Serum IgE peaked at 20,827, and she developed peripheral eosinophilia. Liver biopsy suggested acute hepatitis or drug-reaction. Serum EBV, hepatitis panel, and HHV-6 PCR were negative. She was diagnosed with DRESS, presumably secondary to chronic NSAID or herbal supplement use followed by a subsequent trigger exposure to oysters or antibiotics. She was treated with IVIG and IV steroids, after which she defervesced, her rash nearly resolved, her liver tests normalized, and her anasarca improved. Notably, she later received ketorolac for abdominal pain during the admission. The next morning, her rash returned, now involving oral mucosa, and progressed to 100% BSA. Repeat skin biopsy was suggestive of SJS/TEN. She was transferred to a burn center, where she developed Pseudomonal sepsis, and passed away four days later.

This tragic case highlights the nefarious potential of a DRESS reaction, even when initially indolent. Culprit exposures are difficult to identify, and in this case while NSAIDs and herbal supplements are more likely given that symptoms usually begin 2-6 weeks after an exposure, we will likely never know. Current recommendations support early systemic steroids, though no randomized clinical trial data exist investigating long-term outcomes with this strategy. In this case, given the positive Strongyloides tests, it was critical to rule out infection before starting steroids, as symptoms can often look similar. Finally, this is a unique case given that the patient suffered from both DRESS and SJS/TEN in a short time period, two separate clinical entities that may not have been related to a single exposure, given the fast time course and distinct histopathologic characteristics.
Human Granulocytic Anaplasmosis in the Setting of a Hunting Injury

First Author: Joseph DeRose, DO

Human Granulocytic Anaplasmosis is a traditionally tick borne illness characterized by non-specific symptoms. Most cases occur in spring/summer in the Northeastern and northern Midwest US.

63 year old man with medical history of HIV on ART, presented to EO-VAMC with a complaint of cyclic fevers, chills, and diarrhea. Symptoms began with generalized weakness one week prior to presentation. Patient revealed he was a hunter and experienced trauma to his hand while butchering a deer. Diarrhea began four days prior to presentation with multiple bowel movements associated with lack of appetite, abdominal discomfort and nausea. He denied vomiting, hematemesis, sick contacts, changes in diet, shortness of breath, recent travel or known tick exposure. On physical exam patient was tachycardic, ill-appearing and over short period of time became hemodynamically unstable and was admitted to MICU. Initial labs were significant for thrombocytopenia, coagulopathy and transaminitis. He was fluid resuscitated and Infectious Disease service was consulted. He was started on broad spectrum antibiotics given his recent hunting injury and possible tick exposure. The patient’s clinical status improved throughout his hospital stay and he was discharged on Azithromycin, Atovoquone and Doxycycline. The patient returned to ID clinic two weeks after discharge and reported complete resolution of symptoms. Titers at that time revealed (+) IgM against HGA and re-examination of the peripheral smear revealed intraleukocytic morulae characteristic of Erlichia/Anaplasmosis infection. Given patient’s history of trauma while butchering a deer, timeline of symptoms and positive Anaplasmosis serology, diagnosis of HGA with transmission via handling of infected butchered deer meat was made.

This case illustrates an uncommon mode of HGA transmission and emphasizes value of obtaining thorough history. Although the mode of transmission in this case is rare, the disease is common to the northeast US and recognition, prompt treatment is necessary to prevent complications.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Prerna Dogra, MBBS

DRAMATIC RESPONSE TO INFLIXIMAB IN REFRACTORY NEUROSARCOIDOSIS COMPLICATED BY CRYPTOCOCCAL MENINGITIS

First Author: PRERNA DOGRA PARAG CHEVLI, ROBIN PAUDEL, SAURAV SUMAN, VALENTIN MARIAN

INTRODUCTION: Neurologic involvement occurs in approximately 5% of patients with sarcoidosis. Corticosteroids are considered first line agents for treatment but patients who deteriorate despite aggressive corticosteroid treatment, cannot tolerate corticosteroids, or have a primary contraindication to corticosteroids may benefit from alternative immunosuppressive therapies. We report a case of refractory neurosarcoidosis complicated with cryptococcal meningitis that showed dramatic improvement in clinical and radiological manifestation after treatment with Infliximab.

DESCRIPTION: A 44 year old African American female presented with two weeks of progressive left sided hearing loss and facial droop associated with gait imbalance. MRI of brain showed ring enhancing lesions and CT scan of the chest was significant for bilateral hilar lymphadenopathy. After extensive work up including biopsy of right lung showing non-caseating granulomas and excluding other granulomatous inflammatory, infectious and malignant etiologies, patient was given a diagnosis of pulmonary and neurosarcoidosis. She was started on treatment with prednisone and discharged. After two weeks, she presented with lethargy and fever of 102 F. MRI of brain showed improving brain lesions but lumbar puncture was significant for positive Indian Ink stain and elevated Cryptococcal Antigen (CAg) titers. She was started on stress dose hydrocortisone along with two weeks of induction therapy with Amphotericin and Flucytosine. Due to failure to improve after 10 days, induction therapy was continued for another four weeks along with serial lumbar puncture every 48 hours. After four weeks of induction therapy, there was no improvement along with persistently high CAg titers and opening pressures. MRI of Brain was performed which showed unfavorable progression of brain lesions and it was believed that patient had worsening of neurosarcoidosis along with cryptococcal meningitis leading to failure in improvement. It was decided to start treatment with Infliximab infusion. After first dose of Infliximab, slight improvement in mental status was noted with decreasing CAg. Following second and third infliximab infusion patient showed dramatic improvement in mental status along with resolving meningitis. A repeat MRI of brain revealed significant improvement along with resolution of lesions in multiple areas. The induction therapy was completed and maintenance therapy with fluconazole was started. Patient was then discharged with outpatient infliximab infusions.

DISCUSSION: This case represents the difficulty in managing neurosarcoidosis especially in patients where the course is complicated with life threatening opportunistic infection. Intriguing is the fact that our patient improved dramatically with Anti-TNF-alpha therapy, including cryptococcal meningitis which was refractory to anti-fungal therapy alone thus reinforcing the existence of an immune relation between sarcoidosis and cryptococcosis. Clinicians should be vigilant about this association and the fact that treatment of sarcoidosis may improve immune-response against cryptoccocus.
Charcoal Heart - Cardiac Metastasis of Malignant Melanoma

Malignant melanoma (MM) is a neoplasm with one of the most unpredictable biological behaviors, including cardiac involvement. Most cases of cardiac metastasis are clinically silent and are rarely identified ante-mortem. However, when they do manifest patients often present with life threatening non-specific cardiac morbidities including heart failure, pericardial effusions, outflow tract obstructions, or arrhythmias. Here we present a case of cardiac metastasis of MM.

The patient is a 64-year-old Caucasian female with history of MM of the right lateral chest wall that was status-post wide excision with adjunctive post-operative immunotherapy in 1994. The patient now presented to the hospital 8 years later with complaints of increasing dyspnea on exertion and chest discomfort for 5 days. During the patients initial hospitalization she underwent computed tomography (CT) of the chest to rule out pulmonary embolism and was incidentally found to have a large pericardial effusion consistent with tamponade, confirmed by echocardiogram. The patient received pericardial window drainage via video-assisted thoracic surgery and was started on Celebrex. Drained fluid analysis was performed and was negative for malignancy. The patient was discharged home with close follow-up however, she again presented to the hospital with worsening shortness of breath and chest discomfort. This time she had an elevated d-dimer and underwent repeat imaging which revealed bilateral pleural effusions and a small pericardial effusion. Her pericardium appeared thickened and she was diagnosed with constrictive pericarditis and was consequently started Colchicine and Celecoxib. The patient was discharged and was arranged for close follow-up however, she subsequently presented with similar symptoms. This time, she was found to have unprovoked bilateral pulmonary emboli and underwent IVF filter placement, due to a history of bleeding GI ulcers. After having a negative hypercoagulable work-up the possibility of malignant recurrence was pondered. Repeat ECHO and cardiac MRI now displayed a mysterious intramural cardiac mass which was later found to be a metastatic melanoma lesion, verified by thoracotomy biopsy and pathology and positive fluid cytology for malignancy on repeat testing.

MM has a very high tendency to metastasize to the heart and it is important for clinicians to be alert to the possibility of possible cardiac metastasis in patients even without clinical symptoms. As seen in this case, drained fluid cytology may be negative for malignancy and early tissue biopsy may be indicated. Furthermore, future utility of interval screening using echocardiograms to prevent advance presentation of patients should be addressed.
An obscure presentation of congenital heart defect in a septuagenarian lady.

First Author: Inga Harbuz-Miller, MD Melissa Mauro, MD Mubashir Ahmed, MD Jacqueline Darcey, MD.

Heart failure (HF) is very frequent in aging population and is sometimes more complex with aberrant anatomy. Atrial septal defect (ASD) is a congenital heart defect which can avoid detection until adulthood when secondary pathophysiologic changes develop. ASD repair in advanced age is often associated with complications.

A 72-year-old woman presented with lethargy, hypoxemia and hypercarbia. Four years prior she had ASD repair, tricuspid annuloplasty and left atrial appendage ligation. During the past year she had multiple hospitalizations for respiratory failure; extensive evaluation ruled out URI, COPD, and obstructive sleep apnea and a diagnosis of HF was made. Transthoracic echocardiogram (TTE) showed a reduced ejection fraction of 30% with combined systolic and diastolic dysfunction. She started treatment with diuretics and required vasopressors and inotropic support. Noninvasive ventilation with bipap was used for ventilator support but she remained hypoxemic even with radiographic and clinical improvement. Repeat TTE with bubble study was granted to reassess ASD. Administration of contrast in left cephalic vein was visualized traversing left atrium and left ventricle without ASD or VSD. Dedicated computer tomography angiogram showed persistent left superior vena cava draining into an unroofed coronary sinus and left atrium: a double right to left shunt from left superior vena cava and coronary sinus. The patient was not a surgical candidate; medical management was optimized and with high-flow oxygen her oxygen saturation was 88-90%.

This illustrates that sometimes with advanced age clinical presentation with HF can conceal underlying anatomical congenital defects that are less likely subject to discovery in septuagenarian population.
Recurrent abdominal pain, a difficult diagnosis of Behcet’s disease

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Background: Behcet’s disease (BD) is a multisystem inflammatory vasculitis, characterized by recurrent oral and genital ulcerations, uveitis and frequently positive pathergy test. There can be a variety of visceral manifestations, including articular, gastrointestinal and nervous system involvement, though not frequently seen in the US population.

Case: A 34 year old Hispanic woman with a history of thrombocytopenia, was hospitalized multiple times in the last 2 years due to recurrent abdominal pain, diagnosed as terminal ileitis and colitis. Further investigation revealed a history of recurrent oral ulcers with a recent labial ulcer which suggested a clinical diagnosis of Behcet’s disease, although she did not have uveitis symptoms and a pathergy test was negative. Colonoscopy revealed a single punched out ulcer of the descending colon, nonspecific acute inflammation with intact crypt architecture on histopathology, anti-*Saccharomyces cerevisiae* IgA antibodies was minimally elevated 26.1(N <20). Labial ulcer biopsy revealed chronic vulvitis with no dysplasia which supports our diagnosis. Interestingly she had chronic mild thrombocytopenia with platelets <130,000 , which can be associated with Behcet’s. Colchicine and azathioprine were attempted but discontinued due to intolerance. Intestinal flares have been reduced and responded well to systemic steroids.

Discussion: The prevalence of BD is higher in Middle and East Asia than in Western countries. Intestinal BD is a specific subtype of BD, characterized by intestinal ulcers and associated gastrointestinal symptoms. Similar to inflammatory bowel disease, intestinal BD exhibits a fluctuating disease course with repeated episodes of relapse and remission that necessitate adequate maintenance therapy after achievement of clinical remission. Medical treatment of intestinal BD is largely empirical since well-controlled studies have been difficult to perform due to the heterogeneity and rarity of the disease. 5-aminosalicylic acid, systemic corticosteroids, and immunosuppressants have been used anecdotally to treat intestinal BD. The clinical course of intestinal BD shows considerable variability, and the exact point at which more potent agents such as immunosuppressants should be used has not been elucidated.

Teaching point

Refractory colitis should raise the suspicion of Behcet’s disease if Crohn’s disease is ruled out.
Multi-vessel Spontaneous Coronary Artery Dissection: A Diagnostic Challenge in an Unlikely Setting

First Author: Waqas Jehangir, MBBS,MD Co-Author: Tarek Aly, Shuvendu Sen, Abdalla Yousif

Introduction: As a healthcare professional, anchoring heuristic is a diagnostic error that one must be aware of when approaching every patient. This diagnostic error is the healthcare professional's tendency to rely on a previous diagnosis, and in situations where a set of symptoms might mask a rare and deadly condition, this error can prove fatal for the patient. One such condition, Spontaneous Coronary Artery Dissection, is an uncommon and malefic presentation of coronary artery disease that can lead to myocardial infarction and sudden death. Spontaneous Coronary Artery Dissection SCAD is seen predominantly in women with a mean age above 40. In a young, athletic male with a SCAD, the danger of diagnostic error is overwhelming due to the broad symptomatology and the betraying demographic.

Case Description: A 27 year old man without any significant past medical history presented with a two week history of intermittent, retrosternal, stabbing chest pain that radiated to his left arm and shoulder. The pain was associated with nausea and diaphoresis. As the pain was pleuritic and positional, and the patient had an upper respiratory tract infection with fever and chills prior to the onset of the pain, his primary care physician had made the clinical diagnosis of costochondritis. The patient was a physically active, young male who denied alcohol use, smoking, or illicit drug use. While engaged in a sporting activity, the pain became exacerbated and the patient was admitted due to concern for a cardiac cause of the distress. On physical examination, patient was tachycardic and tachypneic while his blood pressure and other findings were unremarkable. His initial lab results showed leucocytosis. Follow up ECG showed ST elevation in anterolateral leads which prompted a cardiology consultation. After consultation, the emergency physician called a Code Heart and the patient was sent to the cardiac catheterization lab for rescue angioplasty. He was found to have a 95% mid Right Coronary Artery RCA dissection with a total Left Anterior Descending LAD artery spontaneous dissection while all other remaining vessels were found to be normal. Percutaneous Coronary Intervention to the LAD and mid RCA was performed with intra-aortic balloon pump placement.

Discussion: The initial diagnosis of costochondritis made by the primary care provider was the diagnostic formulation that could have influenced future judgments made in the therapeutic plan. This example presents the danger of anchoring heuristic as this patient did not fit the clinical demographic of SCAD and the diagnosis of costochondritis could have delayed pivotal interventions that could have been life saving. Chest pain must always be taken into serious consideration and Acute Coronary Syndrome should always be ruled out regardless of the presenting demographic.
Spontaneous Hemoperitoneum as an Initial Manifestation of Plasma Cell Leukemia

First Author: Mohleen Kang Other Authors: Nitasha Bhatia and Mirela Feurdean

Introduction: Plasma Cell Leukemia (PCL) is a rare but aggressive variant of multiple myeloma which either presents as a progression of multiple myeloma or as primary PCL. It typically presents with anemia, leukocytosis, acute renal failure, hypercalcemia, lytic bone lesions and in some cases with hepatosplenomegaly. We present a case of plasma cell leukemia presenting with spontaneous splenic bleeding.

Case Report: A 49 year old African American male with past medical history of hypertension, diabetes and anemia presented with one day of acute onset abdominal pain that woke him from sleep. Patient denied any preceding trauma or associated nausea, vomiting or diarrhea. He had visited the emergency department one month before for medication refills, and had been diagnosed incidentally with normocytic anemia (hemoglobin of 8.5 gm/dL). On physical examination, he was borderline hypotensive; his abdomen was soft but diffusely tender with voluntary guarding. Stool was guaiac negative. Initial hemoglobin was 6.9 gm/dL which decreased to 5.1 gm/dL hours later. Laboratory studies were notable for hyperproteinemia with a protein gap, hypercalcemia, elevated LDH and acute renal failure. Abdominal imaging revealed hemoperitoneum with greatest amount of blood near the spleen, which appeared enlarged but without any active bleeding or laceration. The patient received emergent fluid hydration and blood transfusion without adequate response in hemoglobin, and a splenic angiogram was performed which did not reveal any active extravasation. The source of the bleeding was thought to be secondary to a slow but persistent splenic venous bleed and the proximal splenic artery was embolized to prevent further bleeding. Serum electrophoresis was significant for IGG monoclonal gammapathy lambda type. A lymphoma panel of peripheral blood revealed clonal population of plasma cells (17%) that expressed CD38, CD138 and lambda, but were negative for CD45, CD56, CD19 and CD20 expression. Patient had elevated serum free lambda light chains. Further imaging revealed supraclavicular lymphadenopathy and retroperitoneal and intra-abdominal lymphadenopathy with lytic lesions in thoracic vertebral bodies. The patient was transferred to an outside specialty center where a bone marrow biopsy revealed CD138 positive plasma cells which were about 70% of marrow cellularity. Cytogenetic studies were significant for t(14;20) translocation, gain of long arm of chromosome 1, loss of chromosome 13 which indicate poor prognosis.

Discussion: PCL usually presents with signs and symptoms which are often seen in multiple myeloma and other leukemias. It is unclear whether our patient had underlying myeloma prior to presentation which progressed to PCL vs. primary PCL. Spontaneous splenic rupture is a rare occurrence but it has been reported to occur in acute and chronic leukemia. Only four case reports of spontaneous splenic ruptures have been reported with PCL, making it a rare but potentially fatal complication of an already aggressive and deadly disease.
Pulmonary hypertension induced by hyperthyroidism

First Author: Niktha Kasinathan M.D., Chhaya Makhija M.D.

Introduction: Hyperthyroidism is a common endocrine disorder and frequently causes cardiac complications. Common cardiac manifestations related to hyperthyroidism are atrial dysrhythmias, sinus tachycardia, decreased diastolic pressure, increased cardiac output, widened pulse pressure, and cardiac failure. Isolated right heart failure, tricuspid regurgitation, and pulmonary hypertension in patients with thyrotoxicosis have rarely been reported in literature.

Case Description: A 27-year-old male with past medical history of untreated hyperthyroidism for 3 years presented with complaints of dyspnea, unintentional weight loss of 100 pounds, fatigue, and palpitations. Physical examination revealed blood pressure of 163/87 mmHg, heart rate of 114 beats/minute, pulse oximetry of 97 percent on room air. A diffuse, non-tender and soft goiter with prominent thyroid bruit was noted. Other findings were significant for presence of lid lag, mild proptosis, jugular venous distention of 7cm, pansystolic murmur at the left sternal border, hepatomegaly, and bilateral lower extremity edema. Electrocardiogram showed sinus tachycardia. Laboratory evaluation revealed suppressed TSH of 0.01 uIU/ml (0.34-4.82 uIU/ml), Free T4 of 4.45 ng/dl (0.70-1.48 ng/dl), total T3 of 181 ng/dl (58-159 ng/dl), hematocrit of 31%, and normal metabolic panel.

Presence of a large goiter with thyroid bruit, mild ophthalmopathy and substantial elevation of thyroid receptor antibodies confirmed Graves’ disease. Treatment with methimazole and propranolol was instituted. 2D echocardiogram showed severe pulmonary hypertension with pulmonary artery systolic pressure of 100 mmHg, trace tricuspid regurgitation and ejection fraction of 65%. There was no evidence of structural or valvular abnormalities. Initial work up for alternative causes of pulmonary hypertension was negative for parenchymal lung disease, pulmonary thromboembolic disease, hypoxemia, collagen vascular disease, HIV, drugs and toxins. Within three weeks our patient had clinical resolution of dyspnea and lower extremity edema with diuretics and antithyroid therapy. He is scheduled for a repeat 2D Echocardiogram and right heart catheterization once euthyroid status is achieved to confirm the reversibility of hyperthyroidism induced pulmonary hypertension.

Discussion: This case illustrates a rare case of pulmonary hypertension in association with severe hyperthyroidism. Proposed mechanisms of pulmonary hypertension in such cases include high cardiac output-induced endothelial injury, increased metabolism of intrinsic pulmonary vasodilating substances resulting in elevated pulmonary vascular resistance, and autoimmune phenomenon associated with endothelial dysfunction. Given it’s treatable entity, it is important to include hyperthyroidism in the differential diagnosis of pulmonary hypertension or unexplained right heart failure.
Hypercalcemia and rash

First Author: Niktha Kasinathan, MD, Shumaila Kashif M.D., Douglas Zaeh M.D.

Introduction: Human T-Lymphotrophic virus is a retrovirus that infects millions of people worldwide, however it is associated with disease in only 5 percent of these individuals. One well recognized disease association with the virus is adult T cell leukemia-lymphoma. Given the epidemiology of the virus it is rarely encountered by physicians in North America.

Case Description: 70-year-old Haitian female previously in her usual state of health, presents with left lower quadrant abdominal pain radiating to the flank worsening over the past 3 weeks. The pain was associated with dysuria, frequency, and retention. She also had complaints of constipation, decreased appetite, and chills. She denied any night sweats, change in weight, nausea, vomiting, or diarrhea.

Physical exam revealed bilateral cervical lymphadenopathy. Nodes were non-tender, fixed; ranging 1-2 cm. Skin showed an erythematous, papular, non-pruritic rash covering the back and shoulders. Patient also had suprapubic abdominal tenderness and left costovertebral angle tenderness.

Labs on admission were significant for calcium of 16.34, ALP 218, white count of 14.5 with 31% lymphocytes including atypical lymphocytes, 20% smudge cells, and 4% bands. Hemoglobin 11.1, hematocrit 34.1, and platelet count of 241. Electrolytes were significant for a BUN of 24 and creatinine of 1.4.

CT abdomen and pelvis, obtained secondary to abdominal pain, revealed significant inguinal lymphadenopathy suspicious for a lymphoproliferative disease, along with an 18mm non obstructing stone in the left kidney.

Peripheral blood smear showed atypical hypernucleated lymphocytes, and ELISA was positive for HTLV-1. Further work up with flow cytometry confirmed T cell lymphoma.

The diagnosis of HTLV-1 positive adult T cell lymphoma was made and patient underwent chemotherapy treatment. She underwent 5 cycles of combination chemotherapy consisting of etoposide, prednisone, vincristine, and cyclophosphomide. Patient is currently in remission as per her last PET scan.

Discussion: Human T-lymphotrophic virus is prevalent in southwest Japan, Caribbean regions, South Africa, and Sub-Saharan African countries. In the United States however, the prevalence of the virus is 0.01-0.02%, and when present is mainly seen in immigrants from endemic countries. The infection remains dormant for 20-30 years before complications such as T-cell lymphoma present. Rapidly progressive skin lesions, hypercalcemia, and lymphocytosis with cells containing lobulated nuclei, or “flower cells,” dominate the clinical picture. HTLV-1 ATL is treated with combination chemotherapy similar to other forms of lymphoma. Along with this treatment, post-chemotherapy interferon alpha and zidovudine may extend survival.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Javier A Lopez-Moncayo, MD

It’s Supposed to Give You “Wings,” Not a New Heart Valve!

First Author: Javier A Lopez-Moncayo, MD Julie Pantelick, DO

INTRODUCTION: Bicuspid aortic valve (BAV) is the most common congenital cardiac defect. Associated findings including dilation of the proximal ascending aorta secondary to abnormalities of the aortic media are independent of whether the valve is functionally normal, stenotic or incompetent. Although symptomsoften manifest in adulthood, there is a wide spectrum of presentations ranging from severe disease detected in utero to asymptomatic disease in old age. Because it is a disease of valve and aorta, surgical decision making is complicated.

CASE REPORT: A 28 year-old Hispanic male presented to the ER with acute-onset chest pain. While at work as a roofer, the patient drank “a Red Bull energy drink”. Within minutes the patient developed substernal chest pain, headache, nausea and shortness of breath. There was no prior history of personal nor family illness. In the ER he was found to be diaphoretic and pulseless in all 4 extremities. He was hypertensive and bradycardic with a 2/4, harsh, systolic murmur in the second intercostal space on the right. Chest radiograph showed a widened mediastinum. Computerized tomography demonstrated an ascending aortic aneurysm with aortic root dissection, hemopericardium associated with a descending thoracic aortic aneurysm without dissection, and polycystic kidney disease. 2D-echocardiography confirmed severe concentric left ventricular hypertrophy, a bicuspid aortic valve, a severely dilated aortic root dissection, and hemorrhagic pericardial effusion. Emergent cardio thoracic surgery was performed for aortic root and aortic valve replacement with reimplantation of the coronary arteries and placement of a St. Jude mechanical valve. Pathology confirmed myxoid medial degeneration of the aortic root but otherwise unremarkable valve histology. There were no immediate post surgical complications, but days later the patient reported persistent headaches. Axial computerized tomography revealed multiple aneurysms in the left internal carotid artery, left posterior communicating, and right middle cerebral trifurcation. Anticoagulation was started. Complications included a benign hematoma at the surgical access site.

DISCUSSION: Consumption of energy drinks carry potential danger. We offer insight into a patient at high risk of cardiovascular collapse, while promoting valve-preserving surgeries for BAV associated with dilatation of the aorta. Recent studies show this approach has excellent results, including stabilization of the aortic root while improving valve durability.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Adaeze Nwosu Iheme, MD

Lance-Adams Syndrome: Post-hypoxic myoclonus

First Author: Adaeze Nwosu-Iheme, MD Sowmini Medavaram, MD

Chronic post-hypoxic myoclonus, also known as Lance-Adams syndrome (LAS), is a rare complication of successful cardiopulmonary resuscitation often accompanied by action myoclonus and cerebellar ataxia seen days-weeks after the event. Early diagnosis is crucial as adequate treatment and rehabilitation can cause significant improvement in functional status.

37 year-old African-American female with history of hypertension and cardiomyopathy had cardio-respiratory arrest after she was admitted for increasing shortness of breath when she was 29 weeks pregnant. Pt had return of spontaneous circulation after 2 minutes of chest compressions. Emergent C-section was done at the bedside with delivery of a live fetus. On day 1 she had a witnessed generalized tonic-clonic seizure and was treated with phenytoin which controlled the seizures. On day 2 patient had intentional myoclonic jerks after regaining consciousness and EEG was consistent with myoclonus. Pt continued to have myoclonic movements of the limbs and trunk associated with apha, dysphagia and blurry vision. Myoclonus was exacerbated with voluntary movement, tactile stimulation and would disappear at rest or sleep. Pt was unable to sit from sleeping position or carry out simple, co-ordinated manual tasks like holding a cup. As there was no improvement in her condition with phenytoin, it was decided to switch to levetiracetam 500mg twice daily. Her clinical condition significantly improved within 6 days with minimal dysarthria and her myoclonus was reduced in severity and frequency.

With the help of physical therapy on day 16 post-arrest patient was able to get out of the bed into chair with minimal assistance and able to carry out co-ordinated activities. Pt was discharged on home physical therapy and levetiracetam. Pt was seen in the clinic after 5 weeks and the jerks improved, but she still had difficulty with fine motor movements.

LAS is rare condition characterized by action myoclonus which is aggravated by intentional movements and attenuated during sleep. The patho-physiology is related to an abnormal findings of diverse neurochemicals, in particular, loss of serotonin and GABA (gamma-amino butyric acid). Our diagnosis was established by history of cardiac arrest, symptoms of myoclonus and MRI showing areas of acute ischemia. Early diagnosis of LAS is important as combination of physical rehabilitation and medications will provide significant improvement of symptoms. It is important to distinguish LAS from post hypoxic seizures as it has a prognostic significance. The important clinical features is consciousness. In the acute type of posthypoxic seizures, the patient's mental status persists as comatose, but in LAS, the patient later regains consciousness. LAS develops several days after the hypoxic brain insult and persists thereafter, but in posthypoxic seizures myoclonus usually occurs within 48 hours after CPR Combination of clonazepam, sodium valproate and levetiracetam are effective in controlling the symptoms of LAS.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Kunal Manmohan Patel, MD

Dtap-Vaccine Induced Myopericarditis Mimicking ST Elevation Myocardial Infarction

First Author: Kunal Manmohan Patel, MD PALOMA PERALTA MD, JOAQUIM J CORREIA MD, FAYEZ SHAMOON MD

INTRODUCTION: Vaccine related myocarditis is one rare cause of myocarditis. Smallpox vaccination-induced myocarditis has been well-reported in literature however only two cases of myocarditis related to DTaP vaccination have been reported. Both of these cases were documented in the pediatric population.

CASE DESCRIPTION: We present a 37 year old Portuguese male with past medical history only significant for drug abuse that came to the emergency room with complaints of pressure like chest pains, pleuritic in nature associated with fevers and chills for five days. The patient had a DTAP vaccine placed five days prior to the admission after which his symptoms began. Upon arrival to the emergency room an electrocardiogram was performed which showed ST elevations in leads II, III, AVF, v4 and v5. An emergency echocardiogram done at bedside showed an ejection fraction 40% with moderate global hypokinesis but no evidence of pericardial fluid. Immediate cardiac catheterization revealed normal coronary arteries. First Troponin I level was elevated at 30. The patient was transferred to CCU with a presumed differential diagnosis of Myocarditis vs Coronary Vasospasm. Rheumatologic screening and serum viral antibody titers for suspected acute infectious causes were all negative. This included Coxsackie virus group B, Human immunodeficiency virus (HIV), Cytomegalovirus, Ebstein-Barr virus, Hepatitis virus family, and Influenza viruses. In addition, urine and hair samples were sent for drug screen; they were negative for recent cocaine or amphetamine use. Cardiac MRI with and without gadolinium was performed for definitive diagnosis and showed delayed myocardial enhancement involving the myocardium of the mid-inferior and mid-inferolateral wall of the left ventricle. These findings were consistent with edema, inflammation, and myocarditis. Troponin I values were trended to monitor extent of myocardial damage and serial values reached 30, 46.4, 17.8, 0.19, respectively. The patient was treated with Colchicine and NSAIDs and his symptoms improved significantly over the following 3 days.

DISCUSSION: Myocarditis has multiple etiologies however vaccine related causes are rare. In a thorough review of literature, we found only two cases of myocarditis induced by tetanus vaccine. Both were reported in the juvenile population: one in a 3 month old after a DTAP vaccine and the other in a 13 year old male after tetanus vaccination. Our case may be the first one seen in an adult. DTAP induced myocarditis should be suspected in patients with chest pains and fevers with an antecedent of the vaccine and promptly evaluated as it can cause detrimental repercussions.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Biplab K Saha, MD

Cancer related Thrombotic Microangiopathy: A deadly disease

First Author: Biplab K Saha, MD Nirav Mistry, MD Sunil Sapru, MD

Introduction: Thrombotic microangiopathy (TMA) in cancer patients is an uncommon but potentially fatal disease. TMA differs from thrombotic thrombocytopenic purpura (TTP) or hemolytic uremic syndrome (HUS) in clinical presentation and it is not associated with ADAMTS-13 deficiency. Survival is weeks to months after diagnosis.

Case presentation: Fifty two year old lady with past medical history of metastatic breast cancer on paclitaxel, came in the emergency room with the complaints of worsening lightheadedness, exertional shortness of breath, fatigue for the past 2 weeks and bloody urine for 2 days. She denied any chest pain, palpitation, recent weight change, cold intolerance or focal neurological symptom. The patient had received her last dose of chemotherapy about 2 weeks back. Her vital signs revealed BP 126/52, pulse132, respiratory rate 22, temperature 99.7 and oxygen saturation 98% on room air. Physical examination was significant for marked conjunctival pallor and tachycardia. The rest of the examination was normal. Laboratory data showed hemoglobin of 3.1, WBC 9.8, platelet 31000, INR 1.2, PTT 24, BUN 18, creatinine 0.8, reticulocyte 19, low haptoglobin, elevated fibrinogen, LDH 3021 and a negative coomb’s test. Peripheral blood film showed more than 50% schistocytes in a high power field and urinalysis was positive for large amount of blood with very few RBCs on microscopic examination. The patient was started on corticosteroid for treatment of acute hemolytic anemia. She had received 3 units of PRBC transfusion with repeat hemoglobin of 7.3. Subsequently, the hemoglobin dropped again to 5.3 with a platelet count of 8000. Plasmapheresis was started for thrombotic microangiopathy. The patient received 2 cycles of plasmapheresis. Eventually, she became confused, spiked a fever and plasmapheresis had to be stopped due to massive hemolysis. LDH at this point was 7200. Patient was transfused with FFP but despite all efforts the patient died within a week of admission.

Discussion: Among solid tumors, TMA is most common in metastatic gastric, breast, prostate and lung cancer. Lymphoma and Myeloma are also known to cause TMA and it may be the initial presentation of occult malignancy. The extent of hemolysis and resultant LDH elevation are usually much worse than in TTP or HUS. Since there is no deficiency of ADAMTS-13, this condition is usually refractory to plasmapheresis, steroids or immunotherapy. Initiation of chemotherapy might be associated with better outcome and survival.

Conclusion: Although uncommon, TMA is associated with a very high mortality rate. As the clinical course is different from other thrombotic microangiopathies and prognosis is extremely poor, early recognition and initiation of chemotherapy, in addition to conventional management, might be lifesaving.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Aileen P Tlamsa, MD

Blood is Thicker Than Water: Early Plasmapheresis in the Treatment of Severe Hypertriglyceridemia-Induced Pancreatitis

Aileen P Tlamsa, Jessica Riggs, Michael Yudd, RoseMarie Pasmantier, Allen Blaivas

Introduction: Severe hypertriglyceridemia (SHTG), referring to triglyceride levels >1000 mg/dL, is well documented to be a critical condition requiring immediate intervention. SHTG has been reported to account for approximately 10% of episodes of acute pancreatitis, the third most common cause after gallstones and alcohol. Evidence shows that patients with SHTG suffer a higher complication rate and disease severity during acute pancreatitis episodes. The use of plasmapheresis has been shown to be safe and effective in rapidly lowering triglyceride levels in patients with SHTG.

Case Presentation: This is a 33 year old Hispanic man with a medical history of familial hypertriglyceridemia, non-insulin dependent diabetes mellitus, obesity, and sleep apnea who presented to the emergency room with a chief complaint of severe abdominal pain. The patient reported missing his medication for 5 days prior to admission. Additionally, he reported noncompliance with diet over the preceding two months. Upon arrival to the emergency department, the patient reported progressively worsening abdominal pain with subsequent nausea, anorexia, and vomiting. He was found to be tachycardic, diaphoretic and hypertensive with a low grade temperature. His abdomen was diffusely tender with hypoactive bowel sounds. His exam was otherwise unremarkable. Serum chemistry revealed a triglyceride level of 9,312 mg/dL with grossly lipemic blood samples. His amylase and lipase were 342 and 375, respectively. CT of the abdomen showed nonspecific pancreatic inflammation without necrosis. Continuous insulin infusion was initiated for enhancement of lipoprotein lipase activity, with subcutaneous heparin and an oral fibrate for synergism in serum triglyceride reduction. The decision was made for the patient to undergo plasmapheresis for 3 daily sessions with exchange of 4 liters plasma per session and 5% albumin replacement. After the first plasmapheresis session, the triglyceride level dropped by 87%. Following the third session, his triglycerides remained consistently below 500 mg/dL. The patient improved and was discharged to home in stable condition on fibrate, statin and fish oil medications.

Discussion: This case exemplifies the utility of rapid plasmapheresis (within 24 hours) in the management of SHTG, particularly during episodes of acute pancreatitis. In patients with critically high triglyceride levels, as seen in our patient, rapid reduction may not be feasible by standard interventions, including insulin infusion, heparin, and fibrate administration. Plasmapheresis has become a viable option in these patients. In conjunction with strict dietary and medication compliance, removal of triglycerides from plasma has also been shown to prevent relapses of SHTG. Presently, there are no guidelines for the use of plasmapheresis in the treatment of SHTG; however, current practices have shown this to be a safe and effective tool.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Grace Tseng, MD

Adult Patent Ductus Arteriosus in Two Siblings: Case Report and Investigation

First Author: Grace Tseng MD. 1, Asim Hussain M.D.1, Muhammad Awan M.D.1, Oleg Cheboratev M.D.2

Introduction: The ductus arteriosus is a fetal vascular connection between the main pulmonary artery and the aorta which usually obliterates upon birth of the fetus. A patent ductus arteriosus (PDA) occurs when the DA fails to completely close within one week after birth. PDA is common in neonates, but is a rare finding in the adult population. In addition, having a genetic association adds an even more unique angle to this pathology.

Case Description: A 44 year old female with no medical history was referred to the cardiology clinic with palpitations and exertional dyspnea. She stated that she has been dyspneic since childhood with poor exercise tolerance. Her symptoms have worsened in the past 6 months. Her initial electrocardiogram shows normal sinus rhythm with right axis deviation and ischemic pattern in anterior leads. A TTE showed increased right ventricular volume and diastolic pressure. A TEE confirmed pulmonary hypertension with a communication between the right and left pulmonary artery and descending aorta consistent with a patent ductus arteriosus.

Her elderly sister, who has a history of hypertension, presented to the medical clinic complaining of chest pain. Upon physical exam, a loud 4/6 pansystolic machinery like murmur was appreciated. A suspicion of PDA was raised. A few weeks later, the patient presented to the ER for acute chest pain and exertional dyspnea. Her cardiac enzymes and EKG ruled out acute coronary syndrome. Subsequent 2D echo and TEE were inconclusive. The following CT angiogram of the chest revealed a 8mm caliber artery connection between left main pulmonary artery to the proximal descending thoracic aorta, consistent with a PDA.

Discussion: There has been an increase in the incidence of PDA secondary to the survival rate of preterm infants. Nonetheless the un-repaired patent ductus arteriosus in the adult is rare in developed countries. The case also highlights a complication of the disease if it persists until adulthood; namely that the patient may not be a candidate for repair. In addition, this abstract highlighting a PDA in two siblings may suggest a genetic link in the family which has not been identified yet. Previous studies have suggested that genetic abnormalities in chromosome six may predispose individuals to PDA among other clinical features.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Naveen Yellappa, MD

HOOK(ah)ED Up Pneumocytes

First Author: Naveen Yellappa, MD Second Author: Inam Khan, MD

Introduction: Idiopathic Acute Eosinophilic Pneumonia (AEP) is a rare disease which causes acute respiratory failure and is characterized by eosinophilic infiltrates of pulmonary parenchyma. Actual cause of this has remained a mystery with some investigators suggesting an acute hypersensitivity reaction to an unidentified inhaled antigen in an otherwise healthy individual. Various exposures have been associated including smoke, dust and sand. Several case reports have found temporal association between new smokers and AEP. Here we describe an unusual presentation of AEP in a patient with recent exposure to hookah smoking.

Case Report: 21 year old male with no significant past medical history presented to a health care facility with 3 day history of fevers, chills, pleuritic chest pain, fatigue and worsening shortness of breath. On admission patient was found to be hypoxic and started on 100% NRBR and empiric antibiotics. As part of his work-up he underwent a chest CT which revealed he had patchy bilateral ground glass opacities. Due to concern of worsening clinical status and possible transition to ARDS, patient was transferred to our center for higher level of care. On arrival to our hospital, patient was immediately intubated for hypoxic respiratory failure. As part of the work-up, he underwent a bronchoscopy which revealed >25% eosinophils in sputum. Patient was started on high dose steroids, 1gm per day for 3 days. His overall condition improved steadily and he was extubated within a week and transferred out of the unit. He was discharged home within the next few days. On further questioning the patient, once his medical status improved, it was revealed that he had been experimenting with smoking for the last few months and had recently been frequenting hookah bars with friends and most recently about 2-3 days prior to him falling sick.

Discussion: AEP typically occurs in men in the age group of 20-40. They present as an acute febrile illness with malaise, myalgia, night sweats and pleuritic chest pain. Hypoxic respiratory failure is frequently identified at presentation requiring mechanical ventilation. CT chest findings show bilateral patchy ground glass opacities. Analysis of BAL specimen shows high number of eosinophils (>25%). Diagnosis is based on these factors. Biopsy is done if diagnosis is unclear. Our patient met all the above mentioned criteria and he responded appropriately to the treatment with high dose steroids. The teaching point related to this case is the temporal association with hookah smoking. A few cases have been reported, mostly abroad regarding this association. A rare albeit important association with youngsters frequenting hookah bars more often; this is a differential we need to consider when patients present with hypoxic respiratory failure.
NEW JERSEY POSTER FINALIST - CLINICAL VIGNETTE Ping Zhang, MD

STATIN AND ACQUIRED VITAMIN B12 DEFICIENCY

Ping Zhang, MD, Nilma Malik, MD Qiang Nai, MD Abdalla Yousif, MD, Raritan Bay Medical Center (Abdalla M Yousif, MD, FACP)

INTRODUCTION: Vitamin B12 deficiency is estimated to affect 10%-15% of people over the age of 60. Besides malabsorption and pernicious anemia, prolonged usage of certain medications have been linked with Vitamin B12 deficiency.

CASE PRESENTATION: 65 year old female patient with PMHx of HTN and hyperlipidemia presented to ER for one syncope episode. She denied head trauma, no headache, no vision or hearing changes, no palpitation, no weakness or numbness, no abdominal discomfort, no diarrhea or weight loss. She eats balanced diet all her life and she was on HCTZ-candesartan and atenolol for hypertension, and pravastatin was started for hyperlipidemia 10 months ago. Upon admission, her vitals were HR 70, BP 106/53, RR 16, O2 saturation 100% on room air, temperature 99.0. Physical examination including neurological examination was within normal limits. Lab values: Hb 13 g/dl, and MCV 103 fl, compared to Hb 14.2 g/dl and MCV 90.2 fl 10 months ago, Vitamin B12 88 pg/ml, and folic acid was 17.1 ng/ml, homocystine was 27.9 µmol/L, and methylmalonic acid was 1541 nmol/l. Further investigation including MRI, carotid ultrasound, electrolytes and EEG were re-assuring. Vitamin B12 deficiency was diagnosed and pt was prescribed with PO Vitamin B12 and discharged home.

DISCUSSION: Prevalence of vitamin deficiencies increases with age. Prolonged usage of medications such as metformin and H2 blocker have been shown to associated with Vitamin B12 deficiency. One previous study has shown a correlation of simvastatin with vitamin B12 deficiency. In the past, screening for vitamin B-12 deficiency was indicated only for the evaluation of those with relevant symptoms and signs, such as anemia, neuropathy, or cognitive impairment. However, elderly people who have Vitamin B12 deficiency frequently lack the classical signs and symptoms. Statins are widely prescribe as a long term therapy for hyperlipidemia and our case and other studies have shown possible correlations of acquired Vitamin B12 deficiency with chronic statins’ usage. Therefore, it seems reasonable to draw baseline CBC and/or Vitamin B12 level and monitor vitamin B12 levels periodically in patients taking stains.
NEW MEXICO POSTER FINALIST - CLINICAL VIGNETTE Alberto Aguayo-Rico, MD

A close encounter of the mixed kind

Alberto Aguayo-Rico MD Patrick Rendon MD

HIV is known for its extensive manifestations varying from immunodeficiency, inflammatory consequences, opportunistic infections and malignancies. However, other presentations have been described in the literature, such as those related to anemia, which in-and-of-itself can vary in the type of anemia affecting patients with HIV.

A 64-year-old man with PMH of HTN presented to the ED with initial complaints of dizziness and a syncopal episode. At that time he was baking near a hot oven when he had a witnessed syncopal episode lasting 2 minutes with no seizure activity or postictal state. He was evaluated for cardiac etiologies, and at that time diagnosed with vasovagal syncope. Ten days later he presented again with three days of progressive dyspnea. In addition, he noted a history of worsening fatigue and a 30 pound unintentional weight loss over the past year.

On physical exam his vital signs were normal. A mildly enlarged, soft, freely-movable lymph node was noted on the left cervical area. His labs were significant for a hemoglobin of 6.7 from 14.3 ten days earlier. Haptoglobin was low with an elevated LDH. Testing was positive for Coombs, IgG and complement; and the peripheral smear revealed red blood cell agglutination suggesting a mixed cold and warm autoimmune hemolytic anemia. Additional testing revealed a new diagnosis of HIV. An excisional biopsy was obtained on an axillary lymph node to rule out lymphoma. The biopsy results indicated a reactive lymph node with follicular hyperplasia.

The patient was diagnosed with a mixed warm and cold agglutinin autoimmune hemolytic anemia (mixed-type AIHA) secondary to HIV. He was started on 1 mg/kg of prednisone, HARRT for his HIV as well as IM Penicillin for late latent syphilis prior to discharge. He was scheduled for a follow-up in HIV clinic and was without symptoms at the time of discharge. On further follow up visits with hematology his hemoglobin significantly improved and he has remained asymptomatic since that time.

In patients with AIDS, it is known that a positive Coomb’s test can be present in up to 43% of these patients; however overt hemolysis occurs infrequently. Our case demonstrates a very rare manifestation of mixed-AIHA in HIV, its evaluation and management. This case also demonstrates that not all HIV-related manifestations of anemia are straightforward, with this particular case demonstrating an up-front view, the most extreme case of a ‘close encounter of the mixed kind.’
Eyes Wide Shut: An Uncommon Presentation of Recurrent Granulomatosis with Polyangiitis

Christopher Bailey, DO, Shannon Jenkins, MS-IV, Peggy Beeley, MD

**Introduction:** Granulomatosis with polyangiitis (GPA), also known as Wegener’s granulomatosis, is a rare disease characterized by a systemic necrotizing small-vessel vasculitis of unknown origin. It typically affects the upper respiratory tract, lungs, and kidneys, but any organ can be affected. This case presents a particularly unusual presentation of GPA.

**Description:** The patient was a 22-year-old Caucasian female with ANCA-positive GPA. She complained of fever, chills, nausea, vomiting, and severe headache for two weeks. Additionally, she had severe eye pain for one month along with blurry vision and double vision for two months. Her fiancée had noted drooping eyelids and bulging of her eyes, and that she required assistance with most activities of daily living, for one month. Vital signs were normal. Physical exam was notable for bilateral proptosis, dilated and fixed pupils, right-sided trochlear palsy, partial right and complete left paralysis of the abducens nerve, and altered mental status. Her visual acuity was significantly reduced.

Laboratory studies were notable for elevated ESR and CRP. LH, TSH, FT4, FT3 and total T3 were diminished. Lactate and ANCA levels were normal. A head CT scan showed a large suprasellar mass, and an MRI of the head showed leptomeningeal involvement.

On hospital day two, she developed anisocoria and was transferred to the neurosurgery intensive care unit. She also had hypernatremia secondary to diabetes insipidus. She began cyclophosphamide and steroid therapy. During her 31-day hospital course, she showed dramatic improvement in her vision and extraocular movement. With clinical improvement and regression of the mass, the neurosurgery team declined to perform a biopsy. There was no evidence of recurrence at on follow-up four weeks later.

**Discussion:** GPA is a rare disease that can affect all organ systems, leading to significant variation in presentation. This patient showed a classic clinical presentation of granulomatous hypophysitis, displaying hypopituitarism, diabetes insipidus, and visual disturbances. This is very rare, with an incidence of one case per 10 million per year. Based on the patient’s chronic underlying diagnosis, negative infectious workup, and successful response to steroid therapy, granulomatous hypophysitis secondary to GPA remains the most likely diagnosis without the tissue biopsy necessary for a definitive diagnosis. Current medical management is cyclophosphamide and steroid therapy, which is associated with a 50% decreased chance of relapse as opposed to steroid therapy alone. This patient underwent this therapy with good initial outcome and avoided surgical intervention.

This case represents a unique manifestation of GPA known as granulomatous hypophysitis. Prompt medical management is important for favorable clinical outcomes. The dramatic improvement in clinical symptoms and follow-up imaging, along with no evidence of recurrence on follow-up, justify our management.
NEW MEXICO POSTER FINALIST - CLINICAL VIGNETTE Kristen M Gonzales, MD

Biopsy-Confirmed Renal Injury in a Case of Levamisole-Induced ANCA Vasculitis

First Author: Kristen M Gonzales, MD Second Author: Benjamin Deaton MD Third Author: Thomas Vander Jagt, MSIV Fourth Author: Jennifer Jernigan MD

Background: Levamisole is a common adulterant of cocaine and has been isolated in approximately 80% of the U.S cocaine supply. Initially used as a chemotherapeutic agent, levamisole has immunomodulatory effects and a severe side effect profile. It is associated with a clinical syndrome of cutaneous purpuric lesions, arthralgias, leukopenia, and ANCA-positivity. However, the spectrum of systemic disease is widespread and can include renal manifestations, of which there is a paucity of data, and only one kidney biopsy has been reported to date. We present a case of biopsy-proven pauci-immune glomerulonephritis in an active cocaine user with the vasculitic syndrome of levamisole toxicity.

Case Report: A 65-year-old man with hepatitis C virus, type 2 diabetes, and active cocaine abuse presented to the Emergency Department with non-healing skin lesions. His last cocaine ingestion was reportedly 2 weeks prior. His creatinine was 3.42 mg/dL at presentation (baseline 0.9mg/dL 2 years prior). ESR was 111 mm/hr and CRP was 1.6 mg/dL. ANA titer was 1:320, p-ANCA titer was 1:10240, and anti-MPO was elevated. Skin lesions were most notable in bilateral upper and lower extremities, trunk, upper back, and bilateral ear lobes. Biopsies of 2 sites revealed thrombotic vasculopathy consistent with levamisole-induced vasculitis.

Given concern for vasculitis and possible contribution from diabetes mellitus, a renal biopsy was performed revealing focal endocapillary, pauci-immune glomerulonephritis. Features of cryoglobulinemic glomerulonephritis were not identified. Creatinine remained elevated after discharge between 3-3.7 mg/dL and GFR <30, suggesting CKD.

Discussion: Levamisole has been reported to potentiate the stimulant effects of cocaine, acting synergistically and additively on acetylcholine and dopaminergic receptors. Its immunomodulatory effects result in an ANCA-positive syndrome characterized by autoantibody formation leading to diffuse vasculopathy and a variety of systemic manifestations. Of these manifestations levamisole-induced renal dysfunction is an emerging entity which remains poorly described.

One report published in April 2014 recognized a patient with likely, although not biopsy-proven, AKI secondary to levamisole toxicity. Prior to this there was a report of levamisole-induced nephrotic syndrome, but confirmatory renal biopsy was lacking. The only documented biopsy-proven case of pauci-immune focal glomerulonephritis associated with levamisole-adulterated cocaine was published in 2011, and there has been limited data since. Our case is unique in that both skin and renal biopsies were performed, both of which demonstrated histological consistency with an underlying levamisole-mediated process. Thus, this report highlights the need for practitioners to be cognizant of levamisole-adulterated cocaine as a potential cause of both AKI and CKD in select patient groups presenting with other classical findings of levamisole toxicity.
Fatal Non-Hepatic Hyperammonemia in ICU Setting – A Rare but Serious Complication following Bariatric Surgery

First Author: Gyanendra K Acharya MD. Harmanjot Kaur MD. Sunil Mehra MD

INTRODUCTION: Bariatric surgery is well established in reducing weight and improving the obesity associated morbidity and mortality. Neurological complications such as hyperammonemic encephalopathy following bariatric surgery are rare but highly fatal if it is not diagnosed and managed aggressively in time. Both macro and micro-nutrients deficiencies seem to play role in unmasking the functional deficiency of urea cycle enzymes in an adult woman after bariatric surgery.

CASE PRESENTATION: 42 years old Hispanic female with past history of chronic abdominal pain, Protein Energy Malnutrition (PEM) and Roux-en-Y Gastric Bypass Procedure (RYGBP) for morbid obesity was brought to ER because she was found unconscious. On Physical, patient remained unresponsive to verbal commands. Systemic exam revealed ascites and B/L pedal edema. Vitals were stable with pulse oxygen 97%. Initial labs CBC/Serum Glucose/Urine Analysis/Arterial Blood Gas were unremarkable; however urinary toxicology was positive for poly-pharmacy. Patient was empirically treated with Narcan and Flumazenil but patient did not improve and remained obtunded. The patient was intubated. Further investigations revealed serum Ammonia (193 umol/l), INR (2.01), albumin (1.5 gm/l), low pre-albumin, normal liver enzymes, mild hepatomegaly with steatosis on CT abdomen and normal CT head. With IV fluid, oral lactulose and rifaximin over 24 hrs, clinical status and ammonia level (127 umol/l) improved and she was extubated next day. Blood lab revealed immune/viral Hepatitis panel-negative; Vitamin B12/folate level-normal; valproate/lithium level- negative and low Zinc level. Despite optimum treatment for Hyperammonemia, patient’s clinical condition deteriorated and she was re-intubated. Ammonia levels fluctuated with peak level at 491umol/l. At this stage, we considered alternative causes of Hyperammonemia and conducted plasma amino acid profile and urinary orotic acid levels. With elevated Urinary orotic acid and serum ornithine, Normal/low-normal serum arginine and citruline along with other findings, we concluded that non-hepatic Hyperammonemia may result from unmasking of functional deficiency of urea cycle enzymes in a malnourished woman following bariatric surgery. With rapid deterioration to coma, cerebral edema, Status Epilepticus, multisystem organ failure and death, no confirmatory enzymes assay and DNA testing were done.

DISCUSSION: Hyperammonemia Encephalopathy following bariatric surgery in the context of normal liver function tests becomes diagnostically challenging for physicians. The exact mechanism of Hyperammonemia in such patient is still not clear but more data are gradually emerging in the support of causal-effect relationship among the triad of Hyperammonemia, nutritional complications following bariatric surgery and functional deficiency of urea cycle enzymes. We emphasize the importance to consider secondary causes of Hyperammonemia if conventional treatment methods does not responds in an adult woman after bariatric surgery.
Unmasking Autoimmune Pancreatitis from Pancreatic Cancer

First Author: Ashwad Afzal Second Author: Seema Chittalae, Paloma Alejandro, Petros Efthimiou

Introduction: Autoimmune Pancreatitis (AIP) is difficult to distinguish from pancreatic cancer. Pancreatic cancer has an insidious onset with anorexia, nausea, vomiting, loss of appetite, mid-epigastric pain and significant weight loss. AIP also has a similar clinical presentation and is one component of a systemic disease, IgG4 related sclerosing disease. IgG4 related sclerosing disease is characterized by extensive IgG4 positive plasma cells and T-lymphocytes which may involve the pancreas, bile duct, retroperitoneum, salivary glands and other organs.

Case presentation: A 76 year old male, legally blind with past medical history of Hypertension, Hyperlipidemia, Coronary Artery Disease with stents, Diabetes Mellitus Type 2 (established for 25 years) presented with nausea, vomiting, appetite loss associated and 39 lbs weight loss over 3 months. His is an ex-smoker with 30 pack year history. No significant surgical and family history. Vitals signs were stable. BMI was 24.91kg/m2. Pertinent physical exam findings were no sclera icterus, no lymphadenopathy, normal bowel sounds with tenderness to palpation over epigastric area. Routine bloodwork including complete blood count, renal and liver function tests were normal. An Endoscopic Ultrasound showed a 3 by 2 cm mass on the tail of the pancreas with no lymph node involvement. Patient underwent successful distal pancreactectomy and splenectomy with no post-operative complications. Surgical pathology report of the spleen and distal pancreas detected no carcinoma. Microscopic Examination revealed dense lymphoplasmacytic infiltrate with onion-skin pattern fibrosis and lobular atrophy in the medium sized pancreatic duct, consistent with lymphoplasmacytic sclerosing pancreatitis. Immunohistochemical staining shows 30-40 IgG4 positive plasma cells/HPF and further labs revealed igG4 level of 272.5md/dl consistent with the diagnosis of AIP.

Conclusion: Autoimmune pancreatitis is a difficult diagnosis to attain as the presentation is very similar to pancreatic cancer. The diagnosis is based on clinical suspicion with laboratory markers and imaging that may help aid in the diagnosis. However, laboratory markers may be normal and a biopsy is required to make the diagnosis. Failure to differentiate autoimmune pancreatitis from pancreatic cancer can lead to unnecessary resection of the pancreas along with complications of surgery as autoimmune pancreatitis responds well to steroid therapy. We recommend patients with pancreatic mass should be evaluated for autoimmune pancreatitis to avoid invasive treatment.
Hemophagocytic lymphohistiocytosis (HLH): The Mimicker

First Author: Ayobami T Akenroye, MBChB MPH Second: Nidhi Madan, MD Third: Jason Leider, MD PhD Senior Author: Iuliana Shapira, MD

Introduction: Hemophagocytic lymphohistiocytosis (HLH), a rare but potentially fatal disease, is characterized by excessive immune activation and cytokine release which stimulates bone marrow (BM) macrophages to engulf hematopoietic cells. HLH is usually seen in patients with immune dysregulation such as immunodeficiencies, hematological malignancies or autoimmune diseases. We present an AIDS patient with HLH who presented with prolonged fever.

Case: A 45 yr old recently immigrated West African lady with AIDS (diagnosed at 32, currently on HAART-Dolutegravir, Tenofovir, Emtricitabine , CD4 nadir: 170, peak viral load 20,000. Latest CD4- 218, viral load <20copies/ml) presented with extreme fatigue, fever and chills of 2 weeks duration. Vitals: T 102.8F HR 125/min BP 97/65mmHg. Hb: 8.9g/dl, WBC: 1.4K/µL, platelet: 126,000/µL, lactate: 2.67mmol/L, ferritin: 16,926µg/L, LDH: 564U/L, AST/ALT: 148/24U/L, ALP: 238U/L. She was rehydrated with intravenous fluids and given empiric antibiotics. Serial cultures remained negative. She, however, continued to spike fevers. PPD, histoplasma, cryptococcal, Parvovirus B19, EBV, malaria & babesia testing were negative. G-6PD activity was normal. CT-scan showed splenomegaly and retroperitoneal lymphadenopathy. Given the lack of response to treatment, she had a BM biopsy which revealed scattered histiocytes containing erythroid and myeloid elements and high iron storage with no evidence of malignancy, findings consistent with HLH. Treatment with etoposide, cyclosporine and dexamethasone was started. Within the first 2 weeks of treatment, her ferritin level fell to 5057. Her leukopenia and thrombocytopenia initially worsened (nadir: 0.2k/µL, 10,000/µL respectively) but improved to 2.8K and 61,000/µL. She improved and became afebrile. She was discharged to complete chemotherapy as an outpatient. Platelet improved to 126,000/µL & WBC to 8.4K/µL. Her ferritin level continued to decline to 1436 currently.

Discussion: Cytotoxic T-cell activation with hypercytokinemia, which is protective in HIV/AIDS and hinders viral replication, is responsible for macrophage activation and pancytopenia in HLH. Patients with HIV/AIDS and HLH share various non-specific symptoms, such as fever, acute liver failure, and splenomegaly. Consequently, identification of HLH as the cause of fever in a HIV patient could pose a diagnostic challenge. Furthermore, fever in a patient with HIV/AIDS could be secondary to a wide range of conditions and further contributes to this challenge. Since early suspicion and diagnosis of HLH are critical to prompt therapy and prevention of fatality, HLH should be considered as a possible cause of fever in AIDS patients. In this patient, as is usually the case in most patients with HLH, the initial concern was sepsis as she met SIRS criteria. HLH should be suspected when SIRS criteria is met in a patient with immune dysregulation, in the absence of an identified infective cause and in the presence of markedly elevated ferritin.
Neurocysticercosis Presenting With Episodic Headaches

First Author: Hadeel Alkhairw, MD other authors: Anil Kapoor MD, Karen Beekman MD, Ritu Vyas MD

Headaches are often described in patients with neurocysticercosis. Headaches may result from increased intracranial pressure, hydrocephalus or giant subarachnoid cyst. Migraine and tension headaches (primary type) are also more prevalent in patients with neurocysticercosis, although the pathophysiological link is not clearly understood.

A 44 year-old Hispanic male presented with a 5 year history of recurrent headache. The headaches were described as throbbing in the frontal area, 30 minutes to 12 hours in duration, preceded by visualization of black horizontal lines and spots. No nausea, phonophobia, photophobia, or seizures. No precipitating factors identified, attacks were partially alleviated by acetaminophen. Over the past few months, headaches were noted to increase in frequency and severity affecting daily activity and employment. Patient immigrated from Ecuador 3 years prior and denied smoking or alcohol abuse. Vital signs and general physical examination were normal. Neurological examination was non-focal, including cranial nerve, motor, and sensory examination. There was no sinus tenderness or temporomandibular joint tenderness. Ophthalmological examination was normal. CT scan of the head performed to exclude secondary causes of headache revealed multiple parenchymal calcifications in the right occipital lobe, left frontal lobe and midline superior to the corpus callosum. Soft tissue density measuring 6 x 9 x 13 mm was seen in the suprasellar cistern, left of midline. Magnetic Resonance Imaging showed mid- to high intensity ring enhancement of lesions, suggestive of granular-nodular stage of neurocysticercosis. Complete metabolic panel and blood count were normal. Serum was positive for Cysticercosis antibody. Pituitary hormones were normal. The patient was successfully treated with Albendazole and Prednisone. Intraparenchymal neurocysticercosis is known to present with various neurological symptoms depending on the number, size and location of lesions.

Seizure by far is the most common presentation. Migraine has been described in the setting of chronic inflammatory diseases like multiple sclerosis. We propose that parasitic antigen may be the source of intermittent chronic inflammation that can trigger the trigeminal visceral nociceptive afferents innervating the meninges and their relay in the brain stem. The locations of the lesions in the occipital area may explain the aura. It is not clear if this condition is more prevalent in patients who are genetically predisposed to migraine. We are not able to explain the effect of the lesion in the suprasellar area in view of normal hormonal testing, although we cannot predict the patient will not have endocrinologic complications in the long term.

Our case suggests that neurocysticercosis may present with episodic migraine-like headache.
RS3PE AND THE NEED FOR CANCER WORKUP

First Author: Erik Anderson, MD (ACP member) Asha Patnaik, MD Heidi Roppelt, MD Stony Brook University

Introduction: Remitting seronegative symmetrical synovitis with pitting edema (RS3PE) is a rare inflammatory arthritis that was first described in 1985. Since that time, there have been several case reports describing its association with malignancy. Recognition of this syndrome is imperative since it has an associated malignancy rate reported as high as 54%.

Case Description: A 65-year-old African-American man with a remote history of colonic adenocarcinoma (stage II, status-post chemotherapy and resection in 1993) presented to the ER with a 6-week history of bilateral hand swelling and pain. He described an 11-kilogram involuntary weight loss over that period. On physical exam, there was diffuse pitting edema and tenderness to palpation of both hands. Laboratory results were significant for a negative rheumatoid factor (RF) and anti-nuclear antibody, and mildly elevated acute phase reactants. X-rays did not show erosive changes. A diagnosis of RS3PE was considered and treatment with 30 mg of daily oral prednisone yielded some improvement. Computed tomography of the chest/abdomen/pelvis was negative for mass or lymphadenopathy. Upon hospital discharge, the patient had an incomplete response to 3 weeks of prednisone. A colonoscopy performed 5 months later revealed a large polyp (3.3 cm) in the hepatic flexure and a small sigmoid polyp, both negative for carcinoma. The patient subsequently underwent a right hemicolectomy given the high risk of cancer recurrence in the large polyp.

Discussion: By exclusion, this patient was diagnosed with RS3PE, a syndrome characterized by bilateral pitting edema of the hands, sudden onset of polyarthritis, age greater than 50, and seronegativity for RF. Seronegative rheumatoid arthritis is an important diagnostic alternative that should be considered. A proposed mechanism for the pathogenesis of RS3PE involves increased production of vascular endothelial growth factor and/or cytokine (IL-6), influenced by tumor cells. Glucocorticoids are the mainstay of therapy; tocilizumab, a novel IL-6 inhibitor, has been shown in small studies to be an effective treatment for RS3PE in cases refractory to glucocorticoid therapy.

The majority of RS3PE cases have occurred prior to or concurrent with a cancer diagnosis. There are two case reports of RS3PE occurring subsequent to the initial cancer diagnosis; however, these patients had active cancer at the time of diagnosis. Our case is unique in that the diagnosis of RS3PE was made 20 years after the cancer diagnosis, in the absence of active or recurrent cancer. Also, the majority of RS3PE cases described thus far have associated concurrent malignancy with suboptimal steroid response; however, in this case concurrent malignancy was not present, despite a suboptimal clinical response to steroids.

In conclusion, RS3PE is associated with multiple cancers, but may also present years after malignancy or in the absence of active cancer. However, all patients who present with RS3PE should have an appropriate evaluation for malignancy.
OBSTRUCTIVE UROPATHY DUE TO A URETEROINGUINAL HERNIA

First Author: Erik Anderson, MD (ACP Member) Stony Brook University

Introduction: Obstructive uropathy caused by hernia-associated incarceration of the ureter is rare. When present, the majority of cases are associated with inguinal hernias; however, incarceration is relatively uncommon due to the invariably large size of the hernias. Early recognition of the condition is important in order to avoid renal failure.

Case Description: An 87-year-old male with a history of polycystic kidney disease status-post bilateral nephrectomies and a living related donor transplant in 2001 presented with fevers and shortness of breath. He had left lower lobe crackles and a reducible right inguinal hernia. He was diagnosed with a lobar pneumonia and treated with intravenous antibiotics. On hospital day 3, he developed an acute kidney injury (AKI), thought to be secondary to antibiotics versus dehydration, and was started on intravenous fluids. He subsequently developed respiratory distress secondary to pulmonary edema, and his renal function did not improve with fluids. An ultrasound to evaluate progressively worsening AKI revealed moderate to severe hydronephrosis of the right transplant kidney that was new compared to a prior computed tomography (CT) scan of the abdomen/pelvis. The CT also showed moderate hydroureter with non-visualization of the distal aspect of the ureter, suspicious for obstruction. A CT cystogram was performed to evaluate for obstruction and revealed marked hydronephrosis and hydroureter, demonstrating reflux into the collecting system. It also revealed incarceration of a dilated ureter along with the anterior portion of the bladder within a fat-containing right inguinal hernia. Urology was consulted and the patient underwent a right nephrostomy tube placement. After relief of the obstruction, his renal function returned to baseline level. He was scheduled for outpatient ureteral reconstruction and right inguinal hernia repair.

Discussion: Although herniation of the ureter into an inguinal hernia and subsequent incarceration is an extremely uncommon scenario, the present case illustrates the benefit of early recognition and treatment. It typically presents as a mass in the groin without urinary symptoms. A recent case report describes a patient with the left ureter present in an inguinal hernia, with associated mild left ureterohydronephrosis, although no mention of incarceration. It appears that incarceration is especially uncommon; however, failure to diagnose can lead to serious consequences. Incarceration of the ureter within an inguinal hernia should be included in the differential in the setting of hydronephrosis and the detection of a hernia on physical exam or imaging.

The present case also illustrates that nephrostomy tube placement is an important adjuvant treatment that allows relief of the obstruction without delay, while allowing subsequent surgical exploration under optimal conditions. Surgical repair involves careful dissection of the ureter free of the hernia, followed by simple reduction of the hernia into the abdomen. The surgeon must be aware of the possibility of ureteroinguinal hernia in order to avoid ureteral injury during hernia repair, which emphasizes the importance of recognizing the condition.
Rituximab treatment in severe warm autoimmune hemolytic anemia

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Abstract: Autoimmune hemolytic anemia (AIHA) may have a fulminant onset with life-threatening anemia. The data regarding treatment of AIHA are limited, and rely on expert consensus. We report a case of a 69 year old female who was admitted to the ICU with acute respiratory failure secondary to severe hemolytic anemia. She failed to respond to high dose corticosteroids and IVIG. After treatment with rituximab, she recovered with resolution of hemolysis.

Case: A previously healthy 69 year old female was admitted to the hospital with progressive difficulty breathing and generalized weakness. On examination, she was alert but in severe distress and appeared ill. Vital signs notable for a respiratory rate of 32/min. Pallor, and icterus were present but no palpable lymphadenopathy. Chest, cardiac, and abdominal examinations were unremarkable. CBC showed a macrocytic normochromic anemia with hemoglobin of 4.1 g/dl and RDW of 15.1 %. Hemolysis was confirmed with reticulocyte count of 18.3 %, haptoglobin of <8 mg/dl, indirect bilirubin of 10.2 mg/dl and LDH of 625 IU/L. The direct anti-globulin test was positive for IgG, but negative for C3d. ANA level was 1:80, with homogenous pattern, but anti-DNA Ab was negative, with negative complement level. Hepatitis and parvovirus B19 immunity profile were negative. Hemoglobin electrophoresis showed no abnormalities. Bone marrow biopsy showed a hypercellular marrow with marked erythroid hyperplasia, but no evidence of malignancy. CT scan of abdomen and pelvis was significant for peripheral hypodensities in spleen of uncertain significance. Treatment was started with 60 mg solumedrol every 8 hours and 30g IVIG daily for 3 days, but no improvement in her hemoglobin. Rituximab, a monoclonal antibody against CD20, was started at a dose of 375 mg/m2 and given weekly for four weeks. Her hemoglobin persistently increased after the first dose, hemolysis labs improved and she recovered over the following six weeks. She is in complete remission approximately 10 months from her initial presentation.

Discussion: AIHA is a rare but potentially fatal condition. It can be primary (idiopathic) or secondary to lymphoproliferative syndromes, autoimmune diseases, infections, and malignancies. Secondary causes of AIHA were ruled out. The first-line therapy for warm AIHA is corticosteroids, which are effective in 70–85% of patients. For patients unresponsive or intolerant to corticosteroids, splenectomy and rituximab are the most commonly used second-line treatments. Rituximab is highly effective, with an overall response rate (ORR) of 83-87% and complete response (CR) rate of 54-60%. We cannot rule out an indolent splenic lymphoma as an underlying cause, but she had no risk factors or other signs of lymphoma. Splenic lesions, have been observed in other patients with WAHA and in mice, but it is unclear what role they play in primary pathology, or if they represent underlying B-cell disorders or indolent lymphomas.
Black Esophagus: A Case of Acute Esophageal Necrosis

Introduction: Acute Esophageal Necrosis (AEN) is a rare clinical entity. It presents with upper gastrointestinal bleeding (UGIB) and is characterized by endoscopic finding of diffuse circumferential black mucosal discoloration involving the distal esophagus, hence the term “black esophagus.” Its etiology is not well understood. AEN is believed to arise from a combination of ischemic insult to the esophagus, compromised mucosal protective barriers and injury caused by backflow of gastric contents.

Case Report: A 71-year-old male was brought to the emergency department after being found on the floor of his home. He was lethargic and confused without focal neurological signs. Vital signs were: temperature 97.7 F, BP 168/79 mmHg, HR 67/min, RR 18/min and oxygen saturation 97% on room air. Examination findings included icterus, dried blood on his tongue, diffuse abdominal tenderness and maroon-colored, heme-positive stool. Laboratory tests revealed hemoglobin 10.9 g/dL, WBCs 20,300 cells/dL with 95% neutrophils, platelets 104,000/mcL, BUN 65 mg/dL, serum creatinine 3.8 mg/dL, AST 8905 IU/L, ALT 4553 IU/L, total bilirubin 5.4 mg/dL, direct bilirubin 3.1 mg/dL, alkaline phosphatase 536 IU/L, amylase 133 IU/L, lipase 828 U/L, ammonia 1228 mcg/dL (19-60), INR 4.35, lactate 4.8 mmol/L. Blood alcohol, serum acetaminophen, serum salicylate, HIV, hepatitis, malaria smear, autoimmune hepatitis panel and urine toxicology tests were negative. CT scan showed evidence of cholecystitis and colitis. He was admitted with cholecystitis, acute liver failure and UGIB. Antibiotics were empirically started. He was intubated for airway protection. Lactulose and IV Esomeprazole were given. Upper endoscopy revealed black discoloration of the distal third of the esophagus with ulcers seen more proximally. Active bleeding was not noted. Endoscope was not passed beyond the esophagus and biopsy was not obtained, for the risk of perforation. Liver function tests, amylase, lipase, ammonia and leukocytosis gradually improved. On the 7th hospital day, he was extubated. Oral feeding was slowly advanced. He denied taking any corrosive substances prior to hospitalization. On the 16th hospital day, repeat endoscopy showed a normal esophagus and a non-bleeding ulcer on the duodenal bulb. Patient was eventually discharged.

Discussion: AEN, first described in 1990, is associated with male gender, older age, diabetes mellitus, hematologic and solid organ malignancy, malnutrition, renal insufficiency, cardiovascular compromise, trauma and thromboembolic phenomena. Multi-organ failure due to sepsis precipitated AEN in our patient. AEN typically presents as UGIB. Biopsy is recommended, but not required for diagnosis. Treatment is mainly supportive and management of co-morbidities. Complications include perforation, esophageal stenosis and stricture, infection and death. Physicians should be aware of AEN as a cause of upper UGIB in critically ill patients.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Leila G. Bumanglag, MD

Superior Mesenteric Artery Syndrome: A rare cause of small bowel obstruction

First Author: Leila G. Bumanglag, MD

Introduction: Superior mesenteric artery (SMA) syndrome is an unusual and rare cause of small bowel obstruction, characterized by compression of the third portion of the duodenum due to narrowing of the space between the superior mesenteric artery and aorta. It is primarily attributed to loss of the intervening mesenteric fat pad. Incidence of superior mesenteric artery syndrome is reported to be 0.1-0.3% of total cases of small bowel obstruction. We present a case of a middle aged man with SMA syndrome due to extreme weight loss.

Case Report: A 59-year-old male with history of schizophrenia presented with vomiting and abdominal distention for two days. He reported unintentional weight loss of about 50 pounds over several months due to poor appetite. He denied any history of dysphagia or odynophagia. On examination, Vitals were stable. He was cachectic with BMI of 17. Abdominal examination showed distension with hyperactive bowel sounds. There were no masses or lymphadenopathy. Laboratory data, including complete blood count, biochemical profile, HIV testing, liver function, thyroid function and malignancy work-up, was negative. CT scan of the abdomen showed markedly dilated stomal ch, with a transition zone in the duodenal sweep. Esophagogastroduodenoscopy revealed no abnormality. Diagnostic laparoscopy revealed a remarkably distended stomach and proximal duodenum. A caliber change was noted where the superior mesenteric artery was overriding and compressing the duodenum. The distal side of the duodenum and the jejunum were collapsed. No obvious mass lesion was identified. Patient underwent laparotomy and duodeno-jejunal anastomosis. Patient had uneventful post-operative recovery.

Discussion: SMA syndrome often poses a diagnostic dilemma and is considered a diagnosis of exclusion. Most common etiology of this syndrome is significant weight loss, causing loss of mesenteric fat pad, leading to the narrowing of the angle between the aorta and superior mesenteric artery from 38-65º to as low as 6º, causing compression of the third part of duodenum. In the literature, anorexia nervosa, IV drug use, HIV, gastric bypass surgery and scoliosis surgery have been associated with this syndrome. Delay in the diagnosis can result in malnutrition, dehydration, electrolyte abnormalities, gastric pneumatosis, formation of an obstructing duodenal bezoar, hypovolemia, and even death. High index of suspicion is required since clinical signs and symptoms are nonspecific. Physicians should consider the diagnosis of SMA syndrome in patients with proximal small bowel obstruction where there is abrupt cutoff at the third portion of duodenum and imaging demonstrates an abnormality in the angle between aorta and superior mesenteric artery.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Sameer Chadha, MBBS

Anomalous Origin of Left Main Coronary Artery from Right Sinus of Valsalva

First Author: Sameer Chadha, MBBS Syed Iman Husain MD, Shikha Mehta MD, Elliot Borgen MD, Gerald Hollander MD, Robert Frankel MD, Jacob Shani MD

Introduction: Coronary artery anomalies are rare, with an estimated prevalence of around 5% [1]. These anomalies vary with respect to number, location, orientation of the ostia, and origin of the coronary arteries. Some anomalies are merely anatomic variants without any clinical relevance; others can present with chest pain, syncope, or even sudden cardiac death.

Case Presentation: A 46 year old male presented to our emergency department (ED) with complaints of sudden onset chest pain while running for a cab. He denied any associated shortness of breath, palpitations or dizziness. His vital signs were stable, and the results of respiratory and cardiovascular examination were normal. An electrocardiogram performed in the ED showed ST segment elevation in leads I, aVL and V1 through V5 with reciprocal depression in the inferior leads. The patient was rushed for an urgent cardiac catheterization which revealed narrowing at the ostium of Left Main Coronary Artery (LMCA) that did not resolve after intra-coronary nitroglycerin was administered. However, there was no evident atherosclerotic disease.

To better characterize the lesion, a Coronary CT Angiogram was performed, which showed that the LMCA was anomalously originating at an acute angle from the ‘right’ coronary sinus. The CT also highlighted the subsequent malignant course of the LMCA between proximal ascending aorta and the pulmonary trunk. The patient was offered corrective surgical repair for this very high-risk anomaly; however, he refused intervention despite aggressive counseling. The rest of his hospitalization was uneventful, and he was discharged in stable condition.

Discussion: Anomalous origin of Left Main coronary artery from the Right Sinus of Valsalva (approximate prevalence, 0.15%) is a subgroup of coronary artery anomalies that has the highest risk for clinical repercussions. The outward expansion of the aortic root and pulmonary trunk during exertion can lead to external compression of the LMCA which can result in acute Myocardial Infarction or Sudden Cardiac Death [2]. The only definitive treatment is surgical repair.

Conclusion: The origin of Left Main coronary artery from the right Sinus of Valsalva is an extremely rare coronary anomaly which can result in acute Myocardial Infarction or Sudden Cardiac Death in young patients.

References -

Sarcoidosis and Immune Reconstitution Inflammatory Syndrome in the Era of Highly Active Antiretroviral Therapy

First Author: Christian M Chiavetta, DO Second Author: Priyasha Srivastava, MD Third Author: Julius Salamera, MD

Immune Reconstitution Inflammatory Syndrome (IRIS) describes a collection of inflammatory disorders associated with paradoxical worsening of infectious or inflammatory processes upon initiation of Highly Active Antiretroviral Therapy (HAART). In patients with Acquired Immunodeficiency Syndrome, worsening of pre-existing infections is seen more commonly as a manifestation of IRIS, while autoimmune or granulomatous conditions are rare.

A 54 year old African male was recently diagnosed with HIV and Hepatitis C virus co-infection when he presented with progressive weight loss, anorexia, multiple pulmonary nodules, and hepatosplenomegaly. Further testing revealed normocytic anemia, elevated alkaline phosphatase, hypercalcemia, and transaminitis. The HIV viral load PCR was 5100720 copies/ml with a CD4 count of 56 cells/uL. Blood cultures, acid fast bacilli (AFB) blood cultures, serum cryptococcal antigen, and urine histoplasma antigen were negative. Liver biopsy revealed non-caseating granulomata without evidence of malignancy, and AFB and fungal cultures were negative. Bronchoscopic examination revealed no evidence of AFB on multiple smears. He received treatment for presumed disseminated mycobacterial infection with isoniazid, rifabutin, ethambutol, pyrazinamide, and azithromycin along with trimethoprim-sulfa for prophylaxis against Pneumocystis jiroveci pneumonia. HAART was initiated 8 weeks after starting the above regimen. The patient was re-admitted four months later with altered mental status, worsening hypercalcemia, acute kidney injury, mediastinal adenopathy, persistent diffuse pulmonary nodules, and multiple splenic lesions. Intravenous fluids, corticosteroids, and calcitonin were administered. CT-guided biopsy of splenic lesions disclosed non-caseating granulomata. Fungal as well as AFB cultures were negative. Multiple determinations of serum angiotensin converting enzyme (ACE) were consistently abnormal at greater than 100. Repeat CD4 count was 337 cells/uL and markedly reduced viral load to 821 copies/ml. Hyperparathyroidism and multiple myeloma were ruled out. He was discharged on maintenance corticosteroids with titration based on his symptomatology, serum ionized calcium, and radiographic parameters. Outpatient follow-up showed a stable patient with normal renal function, stable electrolytes, although he developed steroid-induced hyperglycemia.

A case of sarcoidosis involving the lungs and gastrointestinal tract presenting as IRIS is seen rarely in AIDS. Whether such associations represent a causal or coincidental finding is unproven. It appears that immune reconstitution after T-Cell depletion resulting from many causes, including HIV infection, is associated with increased susceptibility to immune dysregulation that induces Th1 immune responses against unknown antigens that underlie granulomatous inflammation of sarcoidosis. Prior to introduction of HAART, progressive sarcoidosis and advanced HIV infection were considered to be divergent diseases because CD4 T cells were believed to be essential in granuloma formation. However, the occurrence of sarcoidosis immediately following HAART, typically after >12 months, suggests that immune reconstitution may trigger reactivation of preexisting sarcoidosis.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Usama Ali Daimee, MD

Abdominal Pain with Dyslipidemia: Unrelated or Something Sinister?

Usama Daimee, Scott Cameron, and Robert Block

INTRODUCTION: Cholesterol ester storage disease (CESD) is a rare lysosomal storage disorder that is characterized by deficiency of lysosomal acid lipase and may present at different ages. The pathologic accumulation of cholesterol esters leads to both hepatic and cardiovascular complications. We describe a patient whose CESD diagnosis evaded physicians with treatment evolving over the course of nearly two decades.

CASE PRESENTATION: The patient first presented at age 12 in 1989 with abdominal pain and watery diarrhea. Her physical exam was notable for failure to thrive based on pediatric growth charts. The initial cholesterol profile revealed total cholesterol (TC) 406, low-density lipoprotein (LDL) 356, high-density lipoprotein (HDL) 16, and triglycerides (TG) 206. Liver enzymes at the time revealed aspartate aminotransferase (AST) 74, alanine aminotransferase (ALT) 134, and alkaline phosphatase (ALP) 196. Her abdominal discomfort led to extensive work-up consisting of upper and lower endoscopic biopsies, cholescintigraphy, and stool cultures, all of which were unremarkable. Laboratory screens for several conditions including thyroid disorder, lactase deficiency, cystic fibrosis, and autoimmune disease were unrevealing. The patient was started on cholestyramine with a low-fat diet, which resulted in improvement of her lipid profile.

One year later in 1990, the patient developed hepatomegaly. Right upper quadrant ultrasound showed hyperechoic liver consistent with hepatitis. A liver biopsy led to suspicion of glycogen storage disease, and treatment was changed to cornstarch. When her dyslipidemia worsened, cornstarch was discontinued and cholestyramine resumed. A repeat liver biopsy in the same year, performed via wedge resection, showed diffuse fatty change concerning for storage disease of a lipid nature. A reduced lysosomal acid lipase (LAL) level later in 1990 established the diagnosis of CESD. She remained on cholestyramine but was transitioned to atorvastatin by 2008. After dose adjustments and trials of different statins, her symptoms and laboratory tests stabilized in adulthood with the combination of atorvastatin and ezetimibe. A recent lipid panel showed TC 126, LDL 71, HDL 34, and TG 10, while hepatic enzymes were AST 47, ALT 46, and ALP 52. Evaluation with echocardiogram, exercise tolerance test, and carotid ultrasound over the years showed no significant abnormalities. The patient’s lipid profile and liver enzymes are indicated graphically throughout the evolution of her treatment regimen until symptom resolution.

DISCUSSION: As our case illustrates, both recognition and treatment of CESD are challenging. Given its myriad manifestations, misdiagnosis is common and a high index of suspicion is required. CESD is identifiable through characteristic biochemical, genetic, and/or tissue findings. If detected early, stabilization may be achieved with statins, though enzyme replacement therapy is an emerging strategy. Close monitoring is necessary to prevent complications.
INTRODUCTION: Non-small cell lung cancer (NSCLC) is one of the most commonly occurring malignancies and is a leading cause of cancer-related deaths worldwide. About 20 - 50% of NSCLC patients develop metastatic disease. Oligometastases is used to describe cases of minimal distant metastasis (< 5 lesions) that can be treated by local therapy to achieve long term survival or cure. We report a case of oligometastatic NSCLC with skeletal metastases managed with local treatment.

CASE PRESENTATION: A 74-year-old white male, while being treated for a ruptured appendix, was observed to have a mass in his left lung on a chest x-ray (CXR) and was treated for a presumed pneumonia. CXR one month later showed partial improvement. However, six months later, the patient complained of shortness of breath on strenuous activity. The physical exam and laboratory values were unremarkable but a PET/CT scan showed a left lung density, 3.4 x 2 cm, with an intermediate SUV uptake of 1.8. Subsequently, a CT-guided biopsy revealed adenocarcinoma. Two months later, in October 2008, the patient underwent mediastinoscopy with biopsy and thoracoscopic left lower lobectomy with lymph node sampling. There was no evidence of pleural or lymph node metastases, and the bronchial margins were negative for tumor. Final diagnosis was well-differentiated adenocarcinoma T1N0M0.

In July 2010 the patient complained of significant weight loss (about 70 lbs) and new back pain. A follow-up CT scan showed a new sclerotic lesion in the T11 spine. CT-guided biopsy of the lesion showed that the sample was TTF1-positive and histologically similar to his lung primary. The patient received palliative radiotherapy of 30Gy to the T10, T11 and T12 thoracic vertebrae. Zoledronic acid was added as an adjunctive therapy for bone metastasis. As he did not have other evaluable sites of disease, systemic chemotherapy was not administered. He continued to receive Zoledronic acid periodically, with CT scan in May 2013 showing abnormal heterogeneous sclerosis diffusely involving the T11 vertebra but no other evidence of metastatic disease.

DISCUSSION: While studies have shown that local therapies, including radiotherapy and/or surgery, are the preferred primary approaches in the management of oligometastatic disease, systemic therapy is commonly employed in the general practice. Our case illustrates that long-term disease-free survival maybe achieved following local treatment only, in patients with metachronous presentation of isolated skeletal metastasis. This may be a feasible approach in patients with a long duration of disease free interval prior to demonstration of oligometastatic involvement as this may portend a biologically more indolent process.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Christine A Garcia, MD

Carry Me Home: A Curious Case of Tumor-Induced Osteomalacia with Fanconi’s Syndrome

First Author: Christine A Garcia, MD, MPH; Rishi Mehta, MD; Chananya Goldman, MD; Vanya Grover, MD; Kyung Ho Kim, MD; Nand Wadhwa, MD

Introduction: Tumor-induced osteomalacia (TIO) is a rare paraneoplastic syndrome characterized by severe renal phosphate wasting due to phosphatonin-secreting mesenchymal tumors. Patients with TIO usually present with vague, long-standing symptoms of bone and muscle pain, weakness and osteomalacia due to severe hypophosphatemia. Occasionally, patients may present with concurrent Fanconi’s syndrome including glucosuria, aminoaciduria and phosphaturia.

Case Description: A 34 year-old man without significant past medical history presented with 2 years of progressively worsening lower back pain and bilateral lower extremity pain and weakness which subsequently led to inability to walk. The patient had back pain 1 year ago without trauma and was found to have compression fractures in the thoracic and lumbar spines on imaging. He was treated with pain medications and did not follow up. The pain progressively worsened to bilateral upper extremity weakness requiring complete assistance with normal activities of daily living (ADLs) including standing up without support. He denied dysphagia, headaches, urinary and bowel incontinence. The patient lost 40 pounds and a significant amount of muscle mass. Physical exam was significant for severe temporal wasting with profound muscle weakness in all extremities.

The patient had severe hypophosphatemia (phosphorus level 0.9 mg/dl) with inappropriate phosphaturia, hyperparathyroidism (PTH intact 132.6 pg/ml) with normal serum calcium, vitamin D deficiency (25OH Vitamin D level 16) with normal 1,25-OH Vitamin D, glucosuria (with normal serum glucose), and aminoaciduria. SPEP and UPEP were negative. CT abdomen and pelvis with intravenous contrast showed diffuse metabolic bone disease with multiple insufficiency fractures and liver cysts with no obvious masses. FGF-23 was elevated to 738 RU/ml [normal =180]. The patient was treated with aggressive phosphorus, ergocalciferol and calcitriol repletions with limited improvement in muscle strength. He was eventually discharged to subacute rehabilitation. Patient was suspected to have an underlying occult tumor-induced osteomalacia.

Discussion: Tumor-induced osteomalacia (TIO) is a rare paraneoplastic form of renal phosphate wasting that results in severe hypophosphatemia, inappropriately low or normal 1,25OH vitamin D, and osteomalacia. Occasionally, Fanconi syndrome accompanies the profound phosphaturia seen in TIO. Definitive treatment is removal of the phosphatonin (usually FGF 23) secreting tumor that may completely resolve the metabolic abnormalities. The rarity and occult nature of TIO often delays its recognition, with average time from onset of symptoms to correct diagnosis exceeding 2.5 years and the difficulty locating the underlying tumor adding another 5 years. This uncommon, debilitating disease presents a formidable diagnostic challenge with protracted delay in the correct diagnosis and treatment. Internists should consider TIO in any patient with persistent, enigmatic bone pain with renal hypophosphatemia with or without Fanconi’s syndrome.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE NANCY GUPTA, MD,MBBS

AUTOIMMUNE HEPATITIS IN ASSOCIATION WITH SOFOSBUVIR AND RIBAVIRIN

First Author: NANCY GUPTA, MD,MBBS

Introduction. Sofosbuvir in combination with Ribavirin was approved by the Food and Drug Administration as a treatment option for Hepatitis C (HepC) in 2013. We describe a case of autoimmune hepatitis triggered in a patient on therapy with Sofosbuvir and Ribavirin.

Case presentation. A 65 year old woman with past medical history of diabetes mellitus, hypertension, HepC (genotype 2) underwent pretreatment liver biopsy in May 2012 that demonstrated mild chronic active hepatitis with focal piece meal necrosis, mild stage 1 periportal fibrosis with no increased iron deposition. No features of autoimmune hepatitis were seen on biopsy. The patient was started on 400 mg Sofosbuvir and weight based 1000 mg Ribavirin for a planned duration of 12 weeks. Liver Function Tests (LFTs) initially improved on therapy, however 3 weeks after the treatment initiation, patient started complaining of weakness and fatigue. Repeat tests revealed elevated LFT’s. Autoimmune titres were positive for anti-nuclear antibody, anti smooth muscle antibody with elevated IGG and serum gamma globulin levels. Repeat liver biopsy in June 2014 showed markedly distorted architecture secondary to formation of nodules completely enclosed by fibrous septa and areas of confluent necrosis with mild to moderate chronic inflammation consisting mainly of lymphocytes and plasma cells along with moderate to severe interface hepatitis. Balloon degeneration of hepatocytes, with rosette formation possibly associated with regenerative activity was seen, consistent with superimposed autoimmune hepatitis. Based on laboratory and biopsy findings, diagnosis of drug induced autoimmune hepatitis was made and the treatment for HepC with Sofosbuvir and Ribavirin was discontinued. The patient was subsequently started on Prednisolone with improvement in LFT’s.

Discussion. The above case describes autoimmune hepatitis after initiation of Sofosbuvir and Ribavirin. To our knowledge, this complication has never been reported before. The most frequent adverse events noticed with this combination regimen have been headache, anemia, fatigue, and nausea.

The etiology for autoimmune hepatitis is unknown in most cases. It has been believed to occur in patients with genetic susceptibility in which a trigger is required to initiate the liver injury, with drugs/medications being a potential trigger for autoimmune hepatitis. Hepatitis C virus is usually associated with the autoimmune diseases and it is not unreasonable to think that hepatitis C might have triggered the autoimmune phenomenon. But in this case, the trigger was most likely the drug since the patient had no evidence of autoimmune hepatitis until the therapy was started.
Unraveling The Mystery Of Neurocutaneous Manifestations In A Young Male

Hayas Haseer Koya, MD, Dona Varghese, MD, Arpan A Patel, MD, Roshni Radhakrishna, MD, Mathew Hess, MD

**Introduction:** The etiology of neurological symptoms with skin manifestations include a multitude of differentials ranging from vasculitis to nutritional deficiencies. We present an unusual case of reversible neurocutaneous manifestations in a young male.

**Case Presentation:** A 35 year old male with a history of pulmonary embolism (diagnosed one month prior and on warfarin) presented with 5month history of progressive gait instability, numbness and discoloration of hands, episodic confusion, erectile dysfunction and decreased libido. Vitals signs were stable. Physical examination revealed hyper pigmentation of dorsum of hands and face, short term memory deficit, psychomotor slowing, hypertonia, spasticity and hyperreflexia with ankle and patellar clonus. A thorough infectious (including CSF analysis), vasculitis and paraneoplastic work up was negative. Venous Doppler showed a right lower extremity DVT and INR was sub therapeutic at 1.08. Pertinent lab results included: macrocytic anemia with hemoglobin of 11.7, MCV of108.8, hypersegmented neutrophils on peripheral smear, normal folate, very low B12 level at 57 and hyperhomocystenemia at 133.8. MRI revealed diffuse hyper intensity of the posterior thoracic spinal cord from T8-T12 level consistent with sub-acute combined degeneration (SCD) of spinal cord. Electromyography showed moderate chronic sensory motor axonal polyneuropathy. Further workup for B12 deficiency with esophagogastrroduodenoscopy(EGD) and biopsy revealed findings consistent with autoimmune gastritis. Serologic studies revealed presence of anti-intrinsic factor antibody. A diagnosis of encephalomyeloneuritis, SCD, and hypercoagulable state due to hyperhomocystenemia secondary to vitamin B12 deficiency resulting from pernicious anemia was made. Patient was initially treated with parenteral B12 and heparin followed by lifelong oral B12 supplementation and warfarin. He had complete resolution of neurocutaneous findings in 4 weeks.

**Discussion:** Vitamin B12 deficiency can result in serious neurologic sequelae including dementia, encephalopathy, ataxia, progressive weakness, and paresthesia. Rare findings include cutaneous hyperpigmentation predominantly involving dorsum of hands and feet-the exact pathogenesis of which is unclear but thought to be due to decreased levels of intracellular reduced glutathione(which has a tyrosine kinase inhibitor activity) resulting from B12 deficiency, which leads to stimulation of epidermal melanocytes and increased melanin synthesis. Clinical suspicion in the setting of pancytopenia, hypersegmented neutrophils and neurologic symptoms should prompt measurement of cobalamin and folate levels and if low, methylmalonate and homocystine level should be obtained. Radiological studies show T2 hyper intensity of signals in the posterior columns of spinal cord. Work up should include evaluation for autoantibody to intrinsic factor and an EGD. If neurological symptoms dominate treatment includes parenteral B12 supplementation followed by lifelong oral therapy. In most of the cases neuro-radiologic recovery occurs with supplementation of cobalamin.

**Conclusion:** We reiterate the need for a careful history, physical examination and systematic work up for diagnosis of B12 deficiency, as in most cases neurologic symptoms are reversible and resolves with B12 supplementation.
Unusual Presentation of Pulmonary Actinomycosis with 'stem-and-bud' Appearance on CT Scan

First Author: Sandeep S Jubbal, MD Ravi R. Vinnakota, MD, Sheetal Malhotra, MD, Paul Endres, MD, Azra Shahidi, PhD Sheldon T. Brown, MD James J Peters Veterans Affairs Medical Center

Introduction: Actinomyces is an anaerobic oral cavity commensal bacterium that can rarely cause Actinomycosis, a disease characterized by the formation of abscesses in the oral cavity, lungs, or gastrointestinal tract.

Case: We present a case of 64 year old male chronic smoker, who presented with rash, cough and shortness of breath. Initial CT scan chest showed no mass, but a follow up CT four months later revealed a large, fungating, mediastinal mass leading to a diagnosis of esophageal cancer, invasive to lungs on bronchoscopy. Subsequently, the patient underwent tumor debulking radiation and chemotherapy. Treatment course was complicated by neutropenic fever and productive cough. Repeat CT chest revealed extensive peripheral ‘stem-and-bud’ type infiltrates in bilateral lung fields. Fever spikes continued despite treatment with cefepime, ampicillin, vancomycin, azithromycin, micafungin and fluconazole. Sputum for AFB, urine legionella and serum fungal antigen assays were negative. A bronchial lavage revealed widespread filamentous branching, beaded gram positive rods along with polymorphs consistent with Actinomyces and “sulfa granules” were evident on cytopathology. Cultures grew Actinomyces israelii. Review of original esophageal biopsy specimens showed squamous cell carcinoma with concurrent Actinomycosis. A 4-week course of intravenous penicillin resulted in suppression of fever and improvement of respiratory status.

Discussion: Patient had squamous cell carcinoma of the esophagus invading to the lungs with concurrent Actinomyces infection. The infection added bulk to the tumor and later led to bronchiolar extension due to immunosuppression from chemotherapy and radiotherapy.

Conclusion: Actinomycosis is known to mimic solid tumors and bronchiolar extension and presents rarely as ‘tree-and-bud’ appearance on CT as in our patient.
LACTATEMIA OF UNKNOWN SIGNIFICANCE IN A PATIENT WITH GLIOBLASTOMA

First Author: Arunpreet S Kahlon, MBBS Amrita K. Dhillon M.B.B.S, Ganesh Aswath M.B.B.S, Najam Ud Din MD, Jonathan Wright MD.

Introduction: Elevated lactate levels are usually seen in patients who have cellular hypoxia which can be either due to decreased blood flow to the cells, decreased oxygen in the blood reaching the cells or inability of the cells to utilize that oxygen. Since lactate is produced as lactic acid, it usually causes a positive anion gap acidosis when produced in significant quantity in the body. We are presenting a rare case of chronically elevated lactate levels in a patient with glioblastoma.

Case: A 37 year old patient with a past medical history of known glioblastoma multiforme status post ventriculopreitoneal shunt, glucocorticoid induced diabetes, admitted for treatment of newly found deep vein thrombosis. Except for bilateral leg swelling, patient was asymptomatic with vital signs within normal range. On lab workup it was found that patient had an anion gap of 20, but her serum bicarbonate levels were within normal range. Further workup revealed a plasma lactate level of 5.5 mmol/L and negative ketones. An arterial blood gas (ABG) revealed a pH 7.40, pCO2 42mmHg, O2 sat 99%, Total CO2 27mmol/L, Base excess -1 and PO2 110mmHg on 2 liters oxygen by nasal cannula. On retrospective review of patient’s records it was found that her anion gap had been elevated for at least 1 year. During the entire time her serum bicarbonate levels were within normal range. Serial lactate levels and ABG revealed similar results. An MRI of brain revealed a stable tumor unchanged when compared to prior imaging. The patient was not on any medication that could cause elevated lactate levels. She was worked up for bacterial infections and malaria, but no infection was found.

Discussion: Lactic acidosis has been reported in patients with highly malignant tumors. This has been described as type B lactic acidosis. It is mainly seen in hematologic malignancies where the cell proliferation is robust, but is rare in solid malignancies. The postulated hypothesis is ischemia of malignant cells causing anaerobic glycolysis. Another phenomenon known as aerobic glycolysis or Warburg effect describes lactate production in the tumor microenvironment as a selective mechanism used by tumor cells to suppress antioncogenes and promote tumor growth factors. However this is unlikely to cause such high lactate levels in the blood. In our patient, a thorough workup did not reveal any obvious cause of high lactate levels for such a long duration with normal bicarbonate levels. In the light of this we suspect that the patient’s glioblastoma may be the cause, although there is little literature to support it. Further work needs to be done to study lactate metabolism in glioblastoma and its significance.
Chikungunya Virus: An emerging threat? A chronical of the first American death secondary to CHIKV

First Author: Morgan Samuel Kellogg, MD

Introduction: Chikungunya fever is caused by the Chikungunya Virus (CHIKV), transmitted primarily by *Aedes aegypti* and *Aedes albopictus*. This year, CHIKV has become epidemic within the western hemisphere with an epicenter in the Dominican Republic. Patients with chikungunya fever typically experience arthralgia, fever, headache, and petechial rash. The virus is usually self-limited after several days to weeks, and severe complications of CHIKV are infrequent. In past outbreaks, the most common atypical manifestations of CHIKV include cardiovascular and neurological disorders. Peripheral cyanosis has not been previously described, and notably, death secondary to CHIKV is exceedingly rare. In this report, I present a case of the first documented death secondary to CHIKV in the U.S.

Case Presentation: A 47-year-old man with past history of alcohol abuse and pancreatitis presented to our hospital in July, four days after traveling to the Dominican Republic where he was attending the funeral of his sister who reportedly died of CHIKV with acute onset of progressive arthralgia and mild headache. CHIKV and Dengue fever serology were ordered given the patient's travel history but he was deemed to be non-septic and supportive care at home was recommended. Over the subsequent days, the patient had ongoing fever with diarrhea, one episode of syncope, progressive pain in his legs, and developed an erythematous rash on the chest, abdomen, and back. Nine days after his return to the U.S., he developed severe bilateral lower extremity edema prompting the patient to present back to our ED where he was noted to be hypotensive and tachycardic. Labs revealed lactic acidosis and acute kidney injury. Most strikingly, he had severe non-pitting edema of the upper and lower extremities with dusky-blue fingertips and toes. The patient was admitted to the ICU where he experienced a progressive course including severe shock refractory to multiple pressors, respiratory failure requiring intubation and mechanical ventilation, gross cutaneous desquamation, renal failure requiring renal replacement, DIC with gastrointestinal bleed, and compartment syndrome requiring fasciotomy. Two-and-a-half weeks after admission, the patient died. The presence of CHIKV was confirmed by PCR while workup for other etiologies including Dengue fever proved negative.

Discussion: Given the evolving nature of the CHIKV epidemic in the Americas, American physicians can expect to care for increasing numbers of patients with Chikungunya fever. There is ongoing work to develop vaccines against CHIKV, but once infected, the care of patients with CHIKV remains supportive. The optimal approach to patients with atypical or severe manifestations of CHIKV has yet to be fully elucidated. The possibility of progressive or severe Chikungunya fever must be considered when evaluating patients with known CHIKV or who are returning from the Caribbean or Central America.
Cryptococcocal Meningoencephalitis in a Non-HIV Patient - The Search for an Underlying Disease

First Author: Sarah Khan MD, Marilou Corpuz MD

Introduction: Cryptococcal meningitis, in the absence of HIV or organ transplantation, is seen infrequently. Other predisposing conditions for cryptococcosis include sarcoidosis, connective tissue disease, malignancy, glucocorticoids, and idiopathic CD4 lymphocytopenia. When patients do not have a known underlying immune deficiency, the diagnosis of cryptococcal meningitis is a surprise that poses a diagnostic and therapeutic dilemma, as seen in our case.

Case: An 87 yo male with a history of pulmonary embolism, deep venous thrombosis and a recent herpes zoster infection presented with fever and worsening confusion. His wife reported that he has been mentally declining since his zoster a few months ago. In the last few days the patient was more confused and has been complaining of generalized pains, attributed to post herpetic neuralgia by his private physician. On exam, the patient was intermittently confused, agitated, tachycardic and tachypneic with a Tmax of 103. Initial lab work showed leukopenia and elevated creatinine. Lumbar puncture showed normal pressure, CSF wbc 45 (95% lymphs), protein 114, glucose 51, positive CSF angiotensin-converting enzyme (5.9, normal 0-2.5) and CSF cryptococcal antigen of 256. Serum ACE level was normal and serum cryptococcal antigen was 128. Patient was initially started on acyclovir for presumed zoster encephalitis, pending CSF VZV PCR. CT thorax and abdomen pelvis was done. There were no overt findings of pulmonary/extra pulmonary sarcoidosis or specific evidence of neoplasm. CT showed multiple hypodensities in liver, splenomegaly with perigastric varices. CSF bacterial, viral and fungal cultures remained negative. He was given amphotericin B lipid complex for 2 weeks, which was changed to fluconazole. Vasculitis work up was negative. His CD4 count was 302, total T-cells of 438. His hospital course was complicated by pneumonia, thrombophlebitis, acute kidney injury, and CHF. The patient failed to show significant neurological improvement.

Discussion: The finding of cryptococcal meningoencephalitis in a patient without any known predisposition to the infection is a rarity. The pursuit for the underlying problem can be monumental, and the treatment and duration are unclear. In our patient, there are many confounding factors including a positive CSF ACE level, but negative serum ACE and no clinical signs of sarcoidosis. A diagnosis of idiopathic CD4 lymphocytopenia is favored in our patient. His CD4 is relatively low and he had zoster, which has been associated with ICL patients who have cryptococcal meningitis.

Conclusion: Cryptococcal meningoencephalitis can occur in a non-HIV patient without a known underlying immune deficiency. The diagnostic investigation can be a major undertaking.

Idiopathic CD4 lymphopenia should be recognized in the differential diagnosis as a risk factor for cryptococcosis.
Fulminant hepatic failure from hemophagocytic lymphohistiocytosis secondary to hepatosplenic T-cell lymphoma

Case Description: A 44-year-old female with no past medical history presented for unexplained acute jaundice and fatigue. She developed a new skin rash in the bilateral lower extremities two weeks prior, which spread to the entire body. She received traditional Chinese herbal treatment by a Chinese herbalist. Her rashes seemed to resolve, but she developed progressive fevers and severe jaundice over the next two weeks. At hospital admission, she was pancytopenic with a white blood cell count (WBC) 3,800 /µL, hemoglobin 8.4 g/dL, and platelet 35,000 /mm³. Total bilirubin and direct bilirubin were 20.7 mg/dL and 18.7 mg/dL with an INR 1.4. She was admitted to the medical intensive care unit (ICU) for acute liver failure secondary to Chinese herbal ingestion, in which she received albumin, fresh frozen plasma, and cryoprecipitate, at one point requiring pressors for hypotension. She was treated with vancomycin and piperacillin/tazobactam and maintained on N-acetylcysteine and prednisone. Her peak MELD score reached 31. She remained febrile, and pancytopenia worsened. Computerized tomography (CT) of the abdomen revealed a 4.7 cm irregular mass at the posterior right hepatic lobe. Transjugular liver biopsy did not reach the mass, but it showed hepatocyte steatosis with portal tract fibrosis as well as a minimal degree of hemophagocytosis interpreted as toxic liver injury with evidence of chronicity. Due to persistent fever, progressive pancytopenia with WBC 100 /µL and unexplained RBC/platelet transfusional requirement, bone marrow biopsy was performed, showing hypercellularity (70%) with 27% CD3+ CD52+ lymphocytes localized in sinusoids; and 73%, CD68+ histiocytes with hemophagocytosis. A diagnosis of hemophagocytic lymphohistiocytosis (HLH) with hepatosplenic T-cell lymphoma (HSTL) was made. With worsening bilirubin (71.2 mg/dL) and ferritin (56,856 ng/mL), dexamethasone, pentostatin, and alemtuzumab were started. However, the patient deteriorated and died 5 days later from cardiopulmonary arrest secondary to pneumonia.

Discussion: This report is the first case of HTCL presenting as fulminant liver failure with secondary HLH mimicking acute hepatotoxicity attributed to herbal ingestion. She was admitted to ICU, but the initial treatment focus was on the management of fulminant liver failure secondary to toxic ingestion. Her personal history, laboratory studies, and liver biopsy all supported the diagnosis. However, this delayed the decision on bone marrow biopsy although she remained pancytopenic with unexplained fever and very high ferritin. Later, bone marrow biopsy confirmed the diagnosis of HLH. Although abnormal liver function is frequently seen in HLH, it is not a diagnostic criterion, and no study has been reported on hepatic features of HLH. However, a high index of suspicion for secondary HLH is required for patients with unexplained pancytopenia and high MELD scores.
A RARE CASE OF HYPERAMMONEMIC ENCEPHALOPATHY SECONDARY TO VALPROATE TOXICITY

First Author: Saurav Luthra, MD,MBBS Vasvi Singh, MD Carlos Palacio, MD

Introduction: Valproic acid (VPA) indirectly increases the amount of gamma-aminobutyric acid (GABA) available to the central nervous system (CNS). It also alters fatty-acid metabolism, impairs mitochondrial beta-oxidation, and disrupts urea cycle that leads to hyperammonemia. We present here our experience of managing a rare case of hyperammonemic encephalopathy from VPA overdose.

Case Description: A 38 year old male with bipolar disorder and presently going through marital problems was found on the floor of his father’s basement unresponsive, with an empty bottle of VPA next to him. It was filled 1 week ago with 60 tablets. On admission, vitals were notable for an oral temperature of 36.1 degree Celsius. He was unconscious, minimally responsive to noxious stimuli and pupils were pinpoint. Cardiopulmonary, abdominal and skin exam were normal. Labs were notable for mixed high anion gap metabolic acidosis and respiratory acidosis. Urine toxicology screen was positive for cocaine, ETOH level was 0.03, and acetaminophen and salicylate levels were negative. VPA level on admission was 1463 mg/L (normal: 50-100 mg/L) and serum ammonia was 263 mcg/dL (normal: 28-80 mcg/dL).

Chest X-ray and Non-contrast CT head were normal. He was intubated in the intensive care unit (ICU) for airway protection, and received levocarnitine therapy and emergency hemodialysis the same day as recommended by the poison control. Post-dialysis, VPA level came down to 250 mg/L and then 125 mg/L on day 2. Ammonia levels also normalized. Patient was extubated on day 3 and discharged to inpatient psychiatry after 5 days of ICU stay.

Discussion: Severe VPA poisoning may present with hypothermia, refractory hypotension, confusion, lethargy, hallucinations and coma, along with dose dependent respiratory depression that may require mechanical ventilation. Hyperammonemic encephalopathy is an unusual complication and results from inhibition of carbamoyl phosphate synthetase-I that begins the urea cycle. Hyperammonemia leads to increased brain glutamine level that causes astrocyte swelling and cerebral edema. Management is mainly supportive. Decontamination and elimination may be required. Hemodialysis decreases VPA levels and should be initiated promptly when levels exceed 850-1000 mg/L. Long-term use of VPA is associated with serum carnitine depletion, which leads to hyperammonemia. Carnitine also plays a direct role in metabolism and elimination of VPA. Levocarnitine supplementation is believed to provide benefit in VPA toxicity, particularly with concomitant hyperammonemia, encephalopathy, or hepatotoxicity. It is best administered in consultation with a poison control center for dosing recommendations. More experience is needed before levocarnitine use for valproate toxicity becomes a standard of care. This case is unique; with remarkably high levels of acute VPA toxicity that responded very well to our therapy of intensive supportive care, emergent hemodialysis and levocarnitine therapy, and will add to the knowledge to other physicians facing similar presentation.
Irreversible Paraplegia in a Systemic Lupus Erythematosus (SLE) Patient

Suman Majumdar, Julius Birnbaum, Rithika Menezes, Sakshi Jasra

A 46-year old Caucasian female with SLE presented for evaluation of paraplegia. Two months prior to the onset of neurological symptoms, she developed active SLE symptoms (low-grade fevers, a photosensitive rash, polyarthritis, and aphthous ulcerations). Her labs included ANA-antibodies, elevated anti-double stand DNA antibodies, anti-Ribonucleic Protein and anti-Smith antibodies, with hypocomplementemia. A complete blood count revealed only leukopenia.

Three weeks prior to neurological symptoms, she noted difficulty initiating her urinary stream, and described a sensation of incomplete emptying. Four days prior to onset, she experienced an acute onset of back pain, nausea and vomiting, and was admitted for dehydration. During day four of her admission, she fell while ambulating and was unable to move her lower extremities. A neurological examination at that time revealed flaccid paraplegia, areflexia of her lower extremities, and a sensory cord level at T10. MRI showed a longitudinally extensive lesion spanning the entire spinal cord. However, T2 hyperintensity was restricted to the gray matter in the central part of the spinal cord. Furthermore, the lack of enhancement on T1 post-Gadolinium sequences was suggestive of venous infarction. Lumbar puncture excluded infection.

Patient was diagnosed with “lupus myelitis”, and treated with pulse 1000 milligrams intravenous methylprednisolone for five days. Sequential neurological examinations revealed persistent flaccid paraplegia, and she underwent seven cycles of plasma exchange, followed by Rituximab 1000 milligrams administered two weeks apart. Unfortunately, she had persistent flaccid paraplegia, was relegated to a wheelchair, and discharged to a rehabilitation facility.

Myelitis is increased 1000-fold in patients with systemic lupus erythematosus (SLE) versus the general population, and can result in severe neuropathic pain, weakness, and sphincteric deficits. Although lupus myelitis is traditionally considered a demyelinating mechanism, a subtype of “gray-matter” myelitis has been shown to represent venous infarction. As illustrated in our patient, SLE patients with gray-matter myelitis suffer explosive onset of irreversible paraplegia, and have MRI neuroimaging studies supporting venous infarction. Furthermore, SLE patients with gray matter myelitis invariably present with difficulty voiding hours to days prior to onset of paraplegia. This is a potentially treatable prodrome (also seen in our patient), with important mechanistic implications, given that sphincteric tracts constitute the watershed zone of the spinal cord. Therefore, recognition that SLE myelopathies may represent venous infarction, not demyelinating disease, suggests that urinary retention is a potentially treatable prodrome to prevent irreversible paraplegia.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Kaushik Mandal, MD

STEMI of a rarest etiology: an unusual case report

First Author: Kaushik Mandal, MD; Apurwa Karki, MD; Riteshkumar Patel, MD; Aditya Mangla, MD. Department of Medicine, Jamaica Hospital Medical Center, NY.

Introduction: Approximately 90% cases of MI are due to acute thrombus. Other causes involve coronary occlusion secondary to vasculitis, valvular disease, emboli etc. Congenital pericardial defect is a rare clinical entity which may present as angina, palpitation and rarely as catastrophic condition posing diagnostic dilemma.

Case Description: A 43-year-old male presented in the ER with sudden onset of chest pain at rest. The pain was graded 10/10, typical chest pain with mild discomfort in breathing and was not relieved with nitroglycerin. Patient had no known significant past medical illness. Patient is non smoker, non alcoholic, denied drug abuse. Vitals were remarkable for elevated BP: 179/114. Physical examination revealed well developed obese male in severe distress. The initial ECG revealed sinus rhythm, normal rate (84) with ST elevation in lead I, aVL, II, V4-V6. Labs were significant for elevated Troponin-I: 11.1 (normal :<0.033 ng/ml) with normal creatinine clearance. Diagnosis of acute STEMI was made.

Immediate cardiac catheterization revealed multiple filling defects in left circulation system. There was two vessel diseases involving LAD and Left circumflex. In the distal LAD there was 99% stenosis. In 1st, 2nd and 3rd Diagonal there were 95% stenosis each. In 1st obtuse margin and 2nd Obtuse margin there was a 95% and 90% stenosis respectively. LV grams revealed overall normal EF. An immediate impression was multiple embolic thrombi which occluded these vessels and PCI was attempted on the culprit lesions. Thrombectomy was performed on distal LAD and 2nd Diagonal lesions with balloon angioplasty which were unsuccessful with 95% residue. Final conclusion post procedure was compression of coronary vessels OM1, OM2, LAD and diagonal distal part from external source. To confirm diagnosis immediate structural evaluation of heart was performed with imaging studies. CT images showed a cardiac lesion with increased attenuation arising from the apex. MRI further confirmed constricted apex due to herniation through the existing partial pericardial defect. Urgent left thoracoscopy was performed, an obvious defect in the pericardium identified and herniation of the heart was confirmed. A left mini thoracotomy was performed to release the constriction imposed over the heart with improvement in circulation.

Discussion: In conclusion, an angiographic intervention finding such as in this case with linear circumferential obstruction should raise a suspicion of cardiac herniation. The differentials of such would be left ventricular aneurysm, cardiac tumor, pericardial tumor, thoracic tumor etc. Imaging should be performed in such cases and intervention should be done early before incarcerated hernia develops to prevent irreversible myocardial damage, cardiogenic shock and death.
Parotid MALToma as the Initial Presentation of Sjogren’s Syndrome

First Author: Jessica J Patel, MD; Shreya Sinha, MD; Arunpreet Kahlon, MBBS; Ivan Marchena, MD; Hom Neupane, MD

Introduction: Sjogren’s syndrome has a strong association with the transformation of benign epithelial tissues into malignant lymphomas, such as mucosa-associated lymphoid tissue lymphoma. We present a case in which malignancy preceded the discovery of an underlying autoimmune pathology.

Case Description: Eight years ago, a 32-year-old man presented to the clinic with a soft, rubbery mass behind his right pinna, in which pathology showed benign lymphoepithelial lesions. At that time, the mass and entire right parotid gland were resected. He remained asymptomatic until age 40, when he developed another palpable mass, now in the left parotid gland. Left partial parotidectomy was carried out, with removal of 1.6 cm oval-shaped mass and partial deep facial nerve. Histology revealed a low grade B cell Non Hodgkin’s Lymphoma, MALT lymphoma. Contrast-enhanced CT scan of the chest, abdomen, pelvis, and PET scan illustrated regional nodes bilaterally in the neck, 1 cm right submandibular lymph node and 1.2 cm irregularity in the left parotid bed, staging the MALToma as IIE. Patient was referred for definitive radiation; he declined due to developing xerostomia, which would worsen with radiotherapy.

Six months later, patient complained of severe, persistent dry eyes and mouth, and weight loss due to poor appetite. He started developing fatigue and bilateral synovitis of his hands. Repeat imaging for surveillance was unchanged. Rheumatic serology was negative for rheumatoid factor, however strongly positive for SSA/Ro, SSB/La autoantibodies. Lacrimal gland dysfunction was evidenced by a positive Schirmer’s test, confirming Sjogren’s syndrome. Hydroxychloroquine sulfate was started in light of arthritic symptoms, followed by methotrexate and prednisone when the former proved to be ineffective. The patient’s symptoms have since improved, and there has been no recurrence or systemic disease detected secondary to MALToma.

Discussion: One of the most serious complications of Sjogren’s syndrome is malignant lymphoma, however the pathogenesis of autoimmune disorders leading to malignancy remains unclear. It is thought that B-cell activation and lymphocytic infiltration seen in Sjogren’s causes autoimmunity and reaction with benign epithelial tissue, leading to immunoglobulin disturbances, which disrupt tumor suppressor genes and apoptosis causing malignancy. In this case, patient initially had lymphoepithelial lesions of the right parotid and eight years later MALToma on the left. During the interim, he did not have symptoms of dry eyes, dry mouth or arthralgia until six months after resection of left parotid gland. This case has provided an atypical presentation of Sjogren’s in which malignancy appeared before the full blown disease, thus autoimmune causes should be in the differential diagnosis for lymphoproliferative malignancy.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Bradley William Petkovich, MD

A RARE CAUSE OF REFRACTORY ASCITES - A REMINDER THAT SEEING IS BELIEVING

First Author: Bradley William Petkovich, MD Second Author: Kerry Schaffer, MD Third Author: John Grable, MD

Introduction: Ascites, the pathological accumulation of fluid in the peritoneal cavity, is commonly encountered in medical practice. It is frequently associated with liver disease, congestive heart failure, inflammatory conditions, or neoplasms. We present a case of non-portal hypertensive, exudative ascites to review the systematic approach to ascites and to highlight the need for aggressive diagnostic techniques when preliminary tests and imaging are negative.

Case: Mr. S is a 55 year old gentleman with a past medical history remarkable for atrial fibrillation on warfarin, hypertension, type 2 diabetes, and multiple stable pulmonary nodules. Mr. S developed severe refractory ascites in the setting of an IR guided biopsy of a 2 cm posterior left kidney nodule as part of a work up for microscopic hematuria. The biopsy showed atypical cells mixed with lymphoplasmacytic inflammation consistent with a reactive process. Days after this procedure, the patient developed new onset abdominal pain, distention and ascites not seen on the previous two CT scans. Initial work-up for the ascites revealed a Serum – Ascites Albumin Gradient (SAAG) of <1.1, ascites total protein of 3.1, an ascitic: serum creatinine ratio of 1.03, no malignant cells on cytology, with normal amylase, lipase, and triglyceride levels. A liver ultrasound was normal for hepatic flow and liver architecture. After a renal nephrostogram revealed a small amount of contrast extravasation, a left proximal ureter stent was placed. However the patient continued to require multiple taps for rapidly accumulating ascites with a net 30 L of ascites removed over a two week period. These further ascites evaluations continued to demonstrate negative acid fast bacilli stain and culture, negative bacterial or fungal growth, negative cytology and tumor markers (CEA, CA-19-9 and AFP), with low triglycerides, and normalization of the ascitic: serum creatinine ratio to < 1. As our patient continued to decompensate and accumulate ascites without a diagnosis, Surgical Oncology was consulted to perform a diagnostic laparoscopy. Biopsies from surgery revealed a high-grade angiosarcoma lining the omentum. The angiosarcoma had not been visualized on the four previous abdominal/pelvic CT scans. Repeat biopsy of the initial posterior kidney nodule showed entirely necrotic tissue. With a poor performance status, the patient was not a candidate for systemic chemotherapy and eventually died of complications from his massive fluid shifts while under palliation.

Discussion: Angiosarcomas are typically considered rare skin/soft tissue cancers of endothelial origin accounting for 1-2 % of all cancers with even fewer cases involving the gastrointestinal tract. Refractory ascites is a common condition seen by hospital physicians. This case of refractory non-portal hypertensive ascites of a rare diagnosis serves as a reminder that when ascites labs continue to lean towards malignancy, directly visualizing the peritoneum with diagnostic laparoscopy can be invaluable.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Darya Rudym, MD

“All Smoke, no Mirrors”: Pulmonary Langerhans Cell Histiocytosis in Smokers

Darya Rudym MD, Jack C. Naggar MD, Mitchell Charap MD

Introduction: Pulmonary Langerhans Cell Histiocytosis (PLCH) is a rare histiocytic disorder that presents with nonspecific pulmonary and constitutional symptoms. Given the dearth of specific symptoms and the rarity of the disease, making the diagnosis remains challenging.

Case Description: A 62 year-old male, 80 pack-year smoker with Gold Stage 4 COPD, presented to his primary medical doctor for follow up. He has been compliant with his medications. He reported no change in his usual daily cough productive of white sputum but noted a decrease in his exercise tolerance from a baseline of half to a quarter of a block, limited by dyspnea. He also described feeling more fatigued and reported significant night sweats. Chart review revealed four admissions for COPD exacerbations in the last six months. A 30-pound weight loss was noted over the same time period. His exam revealed a chronically ill appearing man with diffuse rhonchi bilaterally but no lymphadenopathy. He was referred for Computed Topography (CT) of his chest out of suspicion for lung cancer. CT chest was notable for peripheral airway wall thickening with retained secretions as expected, but showed no evidence to suggest a lung neoplasm. Few low-density foci of unusual configuration with definable walls and few small scattered ill-defined nodular opacities, most pronounced in upper lobes, were appreciated. The constellation of these radiographic findings suggested PLCH. The patient was counseled on smoking cessation, prescribed corticosteroids and referred to a pulmonologist.

Discussion: Pulmonary Langerhans Cell Histiocytosis is a disease entity classified under a group of smoking related interstitial lung diseases. Initial presenting symptoms are often worsening cough and dyspnea that can be easily mistaken for COPD exacerbation, especially in chronic smokers. Presence of additional constitutional symptoms, however, should suggest PLCH. It should be recognized that vast majority of patients with PLCH are long-term smokers. While chest x-ray can be normal or have micronodular infiltrates, CT is essential for diagnosis. Diagnostic findings include peribronchiolar nodules, cavitated nodules, and cysts with relative sparing of lung bases. Definitive diagnosis is made with greater than five percent CD-1a positive cells on bronchoalveolar lavage. Despite its rarity, PLCH should be considered in the differential diagnosis in an active smoker who presents with chronic pulmonary symptoms and weight loss. Provider continuity and careful chart review were instrumental in assuring further investigation and arriving at the correct diagnosis in this case.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Gokul Samudrala, MD

A RARE CASE OF ACUTE MYOCARDIAL INFARCTION SECONDARY TO CORONARY EMBOLISM IN A PATIENT WITH NON-ISCHEMIC CARDIOMYOPATHY

First Author: Gokul Samudrala, MD, Abigail Quintos MD, Tejan Patel MD, Michael DiSalle MD. Department of Medicine, Department of interventional cardiology, Rochester Regional Health System, Rochester, NY.

Introduction: Coronary embolism is a rare cause of acute myocardial infarction (MI). We are reporting a case of MI due to coronary embolism in a patient with Non-Ischemic Cardiomyopathy (NICM).

Case Description: Patient is a 75 year old female with a medical history of NICM with an ejection fraction (EF) of 10-15% first diagnosed in 2008. At that time an angiogram revealed normal coronaries and echocardiogram showed normal heart valves. Patient was admitted in 2014 for decompensation of her systolic congestive heart failure (CHF). While being treated for CHF, she suddenly developed new onset throat pain, followed by chest pain radiating to her left arm. Vitals at that time were notable for HR 92, BP 110/72, RR 18, Temp 98.4F and Spo2 100% on room air. EKG revealed left bundle branch block (LBBB) and was similar to her baseline EKG except for nonspecific T wave inversions in Lead I and V6 and mild ST segment elevations of the inferior leads. Troponin-I were 0.11,2,78 and peaked at 152. Emergent coronary angiogram revealed 100% occlusion of left obtuse marginal branch (OM1). Per cutaneous transluminal coronary angioplasty followed by embolectomy resulted in complete recanalization of the OM1. No atherosclerotic plaques were seen in any coronary arteries. Transthoracic Echocardiogram did not demonstrate any intra cardiac thrombus. Considering the fact that the patient had normal sinus rhythm, no valvular heart disease nor intracardiac thrombi, it was concluded that this embolus arose from the left ventricle given the severely depressed EF. Patient was anticoagulated with warfarin before discharge to home.

Discussion: It is a well-established fact that myocardial infarction can occur due to coronary embolism especially in patients with known history of NICM with an ejection fraction (EF) of 10-15% first diagnosed in 2008. At that time an angiogram revealed normal coronaries and echocardiogram showed normal heart valves. Patient was admitted in 2014 for decompensation of her systolic congestive heart failure (CHF). While being treated for CHF, she suddenly developed new onset throat pain, followed by chest pain radiating to her left arm. Vitals at that time were notable for HR 92, BP 110/72, RR 18, Temp 98.4F and Spo2 100% on room air. EKG revealed left bundle branch block (LBBB) and was similar to her baseline EKG except for nonspecific T wave inversions in Lead I and V6 and mild ST segment elevations of the inferior leads. Troponin-I were 0.11,2,78 and peaked at 152. Emergent coronary angiogram revealed 100% occlusion of left obtuse marginal branch (OM1). Per cutaneous transluminal coronary angioplasty followed by embolectomy resulted in complete recanalization of the OM1. No atherosclerotic plaques were seen in any coronary arteries. Transthoracic Echocardiogram did not demonstrate any intra cardiac thrombus. Considering the fact that the patient had normal sinus rhythm, no valvular heart disease nor intracardiac thrombi, it was concluded that this embolus arose from the left ventricle given the severely depressed EF. Patient was anticoagulated with warfarin before discharge to home.

Current guidelines recommend anticoagulation for at least 3 months in patients with LV dysfunction and intracardiac thrombi. However, there are no current guidelines on patients with embolic events and no intracardiac thrombi.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Najamus Sehar, MD

Collapsing Focal Segmental Glomerulosclerosis in an HIV negative, Acute Malaria infected patient

First Author: Najamus Sehar, MD, MPH Emad Gobran, MD Suzanne El-Sayegh, MD

Introduction: Collapsing Focal segmental glomerulosclerosis (FSGS) is most commonly seen in association with HIV infection. In a few case reports, collapsing FSGS has been described in relation to other infections like CMV, Parvovirus B1, Pulmonary TB and Leishmaniasis. Rare data is available about the association between Collapsing FSGS and Malaria.

Case description: A 72 year old African male patient presented to the hospital for generalized body aches, fatigue, fever and night sweats for three days. He had history of recent travel to Ghana and returned to the USA ten days prior to symptom onset. Past medical history included gout and hypertension. Initial physical exam was significant for BP of 186/99 and Temperature of 102o F. Patient looked in acute distress and was shivering. Laboratory tests showed elevated serum Creatinine (Cr) of 2.09 (baseline was 1.5 in 2012). Hospital course was significant for rapid elevation of Cr to 9.5 and proteinuria (7.9 gm). Autoimmune workup was negative. Blood smear resulted positive for Plasmodium Falciparum and patient was treated with Artemether/Lumefantrine. Patients fever and pain improved but kidney function continued to deteriorate and he became oliguric. On day seven, he was started on Hemodialysis. He underwent left kidney biopsy which revealed 8 glomeruli, 3 of which were globally sclerosed and 4 of the remaining glomeruli displayed lesions of collapsing glomerulopathy which ranged from segmental to global. Biopsy also showed collapse of the glomerular tufts and prominent hyperplasia of overlying epithelial cells as well as interstitial fibrosis. Findings were consistent with severe collapsing glomerulopathy.

Discussion: Collapsing FSGS carries the worst prognosis among all five types of FSGS. This case illustrates a biopsy proven Collapsing FSGS likely secondary to Malarial infection with rapid deterioration of kidney function to the point of requiring renal replacement therapy. Literature review revealed only few case reports done in Africa that suggested the possible association of Malaria to secondary form of FSGS.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Sumaira Shafi, MD

DIFFUSE LARGE B CELL LYMPHOMA PRESENTING AS ISOLATED SPLENOMEGALY.

Sumaira Shafi MD, Cristian Papazoglou MD, Zhenyang Jiang MD, Munima Shaikh MD, Prasanta Basak MD, Stephen Jesmajian MD

Hematological disease accounts for approximately 16–66% of all cases presenting with splenomegaly in USA. Most common diagnoses include lymphoma, CML, CLL, Hemoglobinopathy and Myelofibrosis. Primary splenic lymphoma is a rare disorder with an incidence of <1%. Diffuse large B cell lymphoma (DLBCL), most common subtype of Non Hogkins Lymphoma, usually manifest as lymphadenopathy. We report a case of DLBCL presenting predominantly with splenomegaly.

A 58 year old male presented with 10 months history of fever, weight loss and upper abdominal discomfort. In the past, he was treated with INH for presumed latent tuberculosis, doxycycline for possible tularemia, atovoquone and azithromycin for possible babesiosis with persistent symptoms. Physical examination was unremarkable except of pallor and palpable spleen. There was no fever or palpable lymphadenopathy. Laboratory data showed Hb: 8.2g/dL, WBC 8600/µL with normal differentials, platelets 273,000/µL, microcytosis and anisocytosis. Serum electrolytes were normal. LFTs showed albumin of 2.9g/dL, AST 72U/L, LDH 1,047 U/L, B2 microglobulin 4.2µg/mL, ESR 50mm/hr, CRP 95.4mg/L. CT chest abdomen and pelvis showed homogenous hepatosplenomegaly with no focal lesions in the liver or spleen. Blood and urine cultures were negative. Peripheral blood smears and serology were negative for parasites and Lyme disease. HIV and Miliary tuberculosis were ruled out. Echocardiogram was normal. Bone marrow biopsy showed normocellular marrow with trilineage hematopoiesis. After 12 months of illness, a 2 cm firm lymph node was palpable in the right axilla. Histopathology of the lymph node showed B cell type germinal center and positive immunohistochemistry markers consistent with DLBCL.

Lymphoid malignancies that can present with isolated splenomegaly include marginal zone lymphomas, splenic diffuse red pulp B-cell lymphoma or primary splenic nodal lymphomas like DLBCL. Symptoms of primary splenic lymphoma include fever, weight loss, generalized weakness and left upper quadrant pain. Significant laboratory findings include cytopenia, elevated ESR, LDH or B2 microglobulin levels.

In absence of lymphadenopathy, isolated spleenomegaly can be a diagnostic challenge. In the setting of positive B symptoms and splenomegaly, primary splenic lymphoma should be considered as a differential and splenic biopsy may be indicated in such cases.
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Yash Shravah, MD

Smoking - What is it good for?

Yash Shravah, MD., Roxana Elena Lazarescu, M.D.

Introduction: Tobacco is an extremely well studied substance with many detrimental side effects, however its beneficial effects are less well understood. There are many harmful products within tobacco plant itself, most notably the addictive alkaloid nicotine. However, there are other compounds that are less well studied such as anatabine. Anatabine is a minor alkaloid found in the same tobacco plant that has recently started to be studied. There appears to be a lower prevalence of Hashimoto’s thyroiditis in tobacco smokers.

Case Presentation: This is a 58-year-old male with a past medical history of hypertension, hyperlipidemia, and sudden cardiac arrest 4 months ago, who presented with an inability to chew. Jaw weakness was associated with generalized weakness, fatigue, muscle tightness, severe tiredness, and increased sleepiness for the past 4 months. Patient also complained of dyspnea on exertion and occasional chest pain. He stopped smoking 4 months ago following sudden cardiac death in Russia (as per patient with extensive work-up and unclear etiology). He also says he has a 10-12 pound weight gain since smoking cessation. He denies hematuria, dysuria, constipation, unusual hair loss, or fever. He also denied illicit drug use (no cocaine, heroin, marijuana, amphetamines), and had no alcohol use. Vital signs were unremarkable as well as was physical exam including thyroid examination. Labwork was significant for elevated creatinine kinase, low thyroid stimulating hormone, and strongly positive anti-thyroid peroxidase antibodies.

Discussion: Smoking seems to induce changes in thyroid function tests, like a decrease in TSH and increase in thyroid hormones. In Hashimoto’s disease, a lower prevalence of thyroglobulin antibodies, thyroperoxidase antibodies and hypothyroidism were found in smokers. Carlé A et all assessed in a recent study the association between smoking habits (smoking cessation in particular) and development of autoimmune hypothyroidism. Incidence of hypothyroidism was very common in people who had recently stopped smoking. Results were consistent in both sexes and irrespective of age. Within two years after smoking cessation, the percentage of hypothyroid cases attributable to cessation of smoking was 85%. In conclusion, the risk of having overt autoimmune hypothyroidism diagnosed was more than 6-fold increased the first 2 years after cessation of smoking. However the component that is responsible for such effects has only recently been suggested to be the minor alkaloid anatabine. There are several studies that have shown a benefit to the use of anatabine in mice. Currently there are ongoing studies called the ASAP human thyroid study which is looking at the effect of taking supplemental anatabine in thyroid disease. While this was a randomized control trial showing beneficial effect of anatabine, it was performed with a low power
NEW YORK POSTER FINALIST - CLINICAL VIGNETTE Pramod Theetha Kariyanna, MD

Myocardial Ischemia following Intracavernosal Phenylephrine Injection for Priapism secondary to Tamsulosin

First Author: Pramod Theetha Kariyanna Tamera Akarah, B.S., Hardik Patel M.D

Introduction: Priapism is a rare side effect of Tamsulosin. Phenylephrine, an alpha-agonist is commonly used to treat tamsulosin induced Priapism. We here report a case of NSTEMI following intracavernosal phenylephrine that was injected to treat tamsulosin induced priapism.

Clinical Vignette: A 71-year-old black male presented with painful priapism of 6 hours duration, which was not relieved by ice-packs application. He had a past medical history of BPH, HTN, and DM for which he was on Tamsulosin (for 4 years), Enalapril, and Metformin. He stopped taking all his medications 6 weeks before the symptom onset, as he felt “asymptomatic”. However, upon relapse of BPH symptoms he took double (0.8 mg) the regular dose of Tamsulosin the night before the onset of priapism. Physical examination revealed tender, rigid penile erection without any signs of trauma. He was given terbutalin without any relief followed by right corpus cavernosum aspiration with 18 G needle, which revealed ischemic priapism and helped to provide brief relief. Then he was given intracavernosal phenylephrine injection, which helped to achieve detumescence. However, within an hour of phenylephrine administration, he developed palpitations. EKG revealed sinus tachycardia with mild ST segment depression in leads II and V6. Laboratory findings demonstrated significant elevation of Troponin-I. He was diagnosed to have NSTEMI. Medical management followed by successful PCI and stent placement in the obtuse marginal branch of LCX was done.

Discussion: Tamsulosin is a selective a1A receptor antagonist that is prostate specific, but is known to have effect on corporal smooth muscle. Alpha blocker’s (AB’s) directly inhibit sympathetic stimulus for detumescence. Tamsulosin is the only AB know to improve sexual function, priapism is viewed as one end of this effect. Priapism in patients on Tamsulosin usually follows a high dose or with concurrent use of medication that inhibits its metabolism. Phenylephrine, a pure alpha agonist is the drug of choice, as it has minimal cardiovascular effects. Myocardial infarction following Phenylephrine administration is likely due to systemic vasoconstriction causing reflex bradycardia and low cardiac output, which in turn reduces coronary blood flow, especially in elderly patients with pre-existing CAD. Furthermore, peripheral vasoconstriction increases afterload and hence increases myocardial oxygen demand. This phenomenon could have led to the precipitation of myocardial infarction in this patient. This case is remarkable as ischemic priapism is very uncommon side effect of Tamsulosin. In addition, a literature review revealed no previous reports of myocardial ischemia following intracavernosal Phenylephrine injection. The case exemplifies unique challenges that are encountered even with the use of common medications. It is also an eye-opener that necessitates vigilance during the use of drugs that can precipitate myocardial ischemia, especially in high-risk elderly patients.
Tell me where you have been so I can tell you what you have

First Author: Sharmila Tilak, MD Second Author: Roxana Lazarescu, MD

**Introduction:** In today’s society with migration and tourism on the rise, a clinician must carefully consider demographics and exposures in clinical decision making to facilitate timely diagnosis and institute appropriate therapeutic measures.

**Case Presentation:** 44-year-old male, smoker with no past medical history who emigrated from Greece three months prior, presented to the ED for severe anemia. The patient reported several weeks of subjective fevers, chills, night sweats, generalized malaise, unintentional weight loss and worsening epigastric pain. He first noted severe left upper quadrant abdominal pain four months prior while in Greece, which resolved. Routine blood tests were within normal limits then. He subsequently developed postprandial epigastric pain controlled with antacids. Patient was febrile and tachycardic on presentation. Initial blood tests showed significant pancytopenia with bandemia and reticulocytosis, however no evidence of hemolysis or disseminated intravascular coagulation. Fecal occult blood test was negative. Patient was started on broad-spectrum antibiotics however failed to defervesce. Extensive infectious disease workup was unrevealing for any bacterial, fungal or acute viral infections; including tuberculosis and HIV. Bone marrow biopsy showed no morphological or immunophenotypic evidence of EBV infection, carcinoma or lymphoma. An atypical lymphoid population was detected on peripheral blood smear; however T-cell receptor gene rearrangement studies were negative. Serum protein electrophoresis showed hypergammaglobinemia. Rheumatologic workup was inconclusive and the patient failed to respond to steroid therapy. Throughout hospitalization, the patient continued to be febrile and subsequently developed transaminitis with significant splenomegaly. CT of the abdomen and pelvis showed markedly enlarged spleen. CT-guided liver biopsy showed benign liver parenchyma. Patient was planned for diagnostic and potentially therapeutic splenectomy since he became blood transfusion-dependent. Further discussion with an infectious disease specialist in Greece revealed recent outbreak of Leishmaniasis in local communities. A bone marrow biopsy was repeated, confirming the diagnosis of Leishmaniasis by protein electrophoresis. Patient completed a course of liposomal amphotericin B with resolution of fever, splenomegaly and pancytopenia.

**Discussion:** Our patient presented with fever of unknown origin and was subjected to extensive multi-organ system investigations with proposed splenectomy for a condition commonly encountered and easily treated in his native country. Leishmaniasis has been classified as a Neglected Tropical Disease – a group of parasitic and bacterial diseases which have been essentially eliminated in developed countries however cause significant illness in more marginalized, developing communities affecting more than one billion people worldwide¹. The literature however demonstrates a rise in imported leishmaniasis in developed, non-endemic countries over the past decade, resulting from increased international tourism, military operations, and immigration from endemic countries.² Careful consideration of demographics and exposures in clinical decision making facilitates timely diagnosis and institution of appropriate therapeutic measures.
Macrophage activation syndrome (MAS) is a hyper-inflammatory condition characterized by a cytokine storm. Cytokines act on macrophages causing hemophagocytic conversion and expansion with multi-organ infiltration. Patients typically present with acute febrile illness, diffuse lymphadenopathy, hepatosplenomegaly, liver dysfunction, neurologic symptoms, low ESR, and extremely high ferritin levels. MAS is generally considered a form of Hemophagocytic Lymphohistiocytosis (HLH) that occurs in patients with rheumatologic disorders such as systemic juvenile inflammatory arthritis, rheumatoid arthritis, and SLE. It is a rare, yet rapidly progressive and life-threatening condition that requires a low threshold of suspicion, with early diagnosis and prompt initiation of therapy being essential for a greater likelihood of survival.

We describe a 62yo white female with a prior medical history of long-standing rheumatoid arthritis who presented with three days of shortness of breath. Additional medical history was significant for hypertension. On admission, patient was tachycardic and tachypneic with wheezing in her bilateral lung fields. Non-invasive mechanical ventilation was initiated, upon which her shortness of breath improved. Chest X-ray demonstrated bilateral pulmonary nodules of unclear etiology. CT chest/abdomen/pelvis confirmed the presence of pulmonary nodules as well as hilar and inguinal lymphadenopathy. The patient's condition deteriorated over the next twenty-four hours requiring mechanical ventilation and the use of vasopressors. Work-up for sepsis including bronchoscopy was negative for infection. Her subsequent hospital course was significant for further multi-organ failure, including oliguric acute kidney injury requiring CVVH, transaminitis of unclear origin, and refractory pancytopenia requiring multiple transfusions. Given the multi-system involvement, especially the unexplained pancytopenia in a patient with underlying rheumatoid arthritis, the diagnosis of MAS was strongly considered. This suspicion was confirmed by the presence of marked hyperferritinemia (36,260 ng/ml) in the setting of low ESR (10 mm/hr). Therefore, treatment with etoposide and dexamethasone was initiated. To further support our diagnosis, a bone marrow biopsy was performed which demonstrated the presence of histiocytes with features suggestive of hemophagocytosis. Also in favor of MAS, additional lab work came back showing elevated serum levels of IL-2 receptor. Unfortunately, despite the early initiation of therapy the patient expired five days later.

As described in our case, MAS presents an extreme diagnostic challenge. Given its similar presentation to sepsis with a rapid progression to multi organ failure, a high index of suspicion is warranted. The combination of unexplained cytopenias and extremely high ferritin levels in patients with underlying rheumatologic disease should make the diagnosis of MAS a strong consideration and treatment should be initiated immediately, irrespective of confirmatory diagnostic testing.
INTRODUCTION: With the growing obesity health epidemic, weight loss surgery is becoming more common. Both obesity and peri-operative immobilization are independent risk factors for venous thromboembolism. Despite rising use of novel anticoagulant agents, there remains a paucity of data on the efficacy and safety of therapeutic anticoagulation in patients of extreme weight with history of gastric obesity procedures.

CASE DESCRIPTION: A 36 year old Caucasian female with significant past medical history of hypertension, super obesity and recent gastric obesity procedure with intra-operative infrarenal inferior vena cava (IVC) filter placement presented to an emergency room with shortness of breath, right groin pain, and right lower extremity swelling one month after her Roux-en-y gastric bypass. As venous thromboembolism prophylaxis, she had received 40 milligrams of Enoxaparin subcutaneously twice daily for 10 days immediately following her gastric bypass. She had no known history of venous or arterial thromboembolism or known clotting disorder. Exam at first presentation was significant for tachycardia and hypoxia. Lower extremity doppler ultrasound revealed a large deep venous thrombosis extending from the right common femoral vein to the right popliteal vein. Computed Tomography Angiography (CTA) of her chest showed bilateral pulmonary emboli. The IVC filter was visualized radiographically in the infrarenal IVC. Echocardiogram showed no evidence of right heart strain. She was started on Rivaroxaban and discharged home on supplemental oxygen. Four days after discharge, she re-presented to our hospital for worsening shortness of breath and persistent right groin pain. At that time, her body mass index was 62 and she was hemodynamically stable, without increased oxygen requirement. Electrocardiogram showed sinus rhythm. Chemical profile and complete blood count profile were unremarkable. Repeat CTA was not done, out of concern for unnecessary radiation exposure. A Heparin infusion was initiated and extensive literature review was undertaken to evaluate the appropriateness of novel anticoagulants for treating obese patients and for treating obese patients with gastric obesity procedures. The decision was made to stop Rivaroxaban and initiate warfarin therapy with extensive patient education and close monitoring. Our patient was discharged 4 days after warfarin initiation with therapeutic international normalized ratio (INR). At 8 week follow up, she was tolerating warfarin and her INR was stable.

DISCUSSION: Our case highlights a rising challenge in medicine; the need for physicians to extrapolate previously published data to extremes of weight, all in the setting of known alterations in absorption after gastric bypass. Ultimately, more studies are needed to fully determine the safety, effectiveness and pharmacokinetics of novel anticoagulants for therapeutic anticoagulation in this special patient population.
A Triad of Phenazopyridine Toxicity

First Author: Samaya Qureshi, MD  Second Author: Rakesh Alva, MD

Introduction: Phenazopyridine (Pyridium) is a urinary analgesic with side effects including urine and skin discoloration to more serious reactions including anemia and renal failure. We describe a case of methemoglobinemia induced hypoxic respiratory failure, hemolytic anemia, and acute renal failure secondary to Phenazopyridine toxicity. This case is significant due to the occurrence of multiple coinciding adverse reactions of an over the counter medication. It stresses the importance medication list review and clinician awareness of common side effects and toxicity of such medications.

Case: A 56-year-old female with anemia, hypothyroidism, bilateral pulmonary emboli on Rivaroxaban, and interstitial cystitis on chronic Phenazopyridine was admitted for acute respiratory failure. Initial labs were significant for acute renal failure and acute on chronic anemia. Further investigation revealed significantly elevated percentage of methemoglobin and evidence of hemolysis with schistocytes on peripheral blood smear, elevated lactate dehydrogenase, and low haptoglobin. Hospital course involved packed red blood cell transfusions for worsening anemia and conservative management of renal failure. With cessation of Phenazopyridine, methemoglobinemia and hypoxia resolved. Anemia and renal failure also improved and methylene blue was not given.

Conclusion: Phenazopyridine is an over the counter medication indicated for the relief of symptoms such as pain, frequency, and burning associated with irritation of the lower urinary tract mucosa. Phenazopyridine toxicity is well described in the literature. This case illustrates multiple simultaneous adverse reactions including hypoxia due to methemoglobinemia, hemolytic anemia, and renal failure in the setting of chronic Phenazopyridine use. Providers need to remain vigilant in regards to these serious reactions and educate their patients as well. Prompt recognition of toxicity and initiation of treatment can lead to improved outcomes and avoid needless testing. Regular review of medication lists and timely cessation of such agents can prevent similar toxicity events in the future.
Empiric Treatment of Cytokine Release Syndrome during Septic Shock

First Author: Julia L Agne, MD Robert A Baiocchi, MD, PhD Maria R Lucarelli, MD

Cytokine release syndrome (CRS) is a potentially life threatening complication following adoptive T cell therapies for the treatment of cancer. Symptoms of CRS often mimic those of severe sepsis, which may delay anti-inflammatory treatment if not clinically suspected.

A 71 year old woman with history of treatment-refractory diffuse large B cell lymphoma presented to a local emergency department upon returning from a medical facility in Mexico where she received autologous immune enhancement cell therapy as adjunctive cancer treatment. The therapy consisted of a combined infusion of activated T cells stimulated by systemic perfusion hyperthermia and autologous dendritic cells. Upon completion of the infusion, the patient reported fever, arthralgias, myalgias, abdominal pain, and back pain, which continued to persist after the patient returned to the United States 24 hours after the infusion. In the emergency department, the patient was febrile, hypotensive, and tachycardic. Further laboratory testing revealed leukocytosis (WB C 24,000), hyperkalemia (potassium 6.0 mmol/L), hyperuricemia (uric acid 10.4 mg/dL), and acute kidney injury (serum creatinine 5.0 mg/dL). Two peripheral blood cultures revealed gram positive cocci in clusters, and transthoracic echocardiogram revealed a 1 cm aortic valve vegetation consistent with infectious endocarditis. The patient was fluid resuscitated, required norepinephrine for blood pressure support, and was empirically treated with IV vancomycin and doripenem for septic shock. Upon transfer to our tertiary care center, the patient became apneic, requiring intubation and mechanical ventilation.

In light of the patient’s recent adoptive cellular therapy, there was high clinical suspicion for CRS. Serum C-reactive protein (CRP) level was disproportionately elevated compared to the erythrocyte sedimentation rate (143 mg/L and 29 mm/h, respectively), an indirect indicator of high serum concentrations of the interleukin 6 (IL-6) cytokine. Subsequently, serum IL-6 was elevated at 222 pg/mL. Due to high concern for Grade 4 CRS, associated with a near 100% mortality if untreated, the patient was empirically treated with high dose dexamethasone (two doses of 40 mg). She was successfully weaned from norepinephrine within 24 hours and extubated 72 hours after admission.

Cytokine release syndrome is a clinical diagnosis associated with elevated levels of multiple cytokines, including IL-5, IL-13, IL-10, IL-6, and interferon gamma. This case illustrates the difficulty of distinguishing CRS from septic shock and the importance of initiating anti-inflammatory treatment. Empiric treatment of CRS was warranted due to the patient’s recent history of autologous T cell infusion. Dexamethasone is considered second-line therapy after tocilizumab, an IL-6 receptor antibody that was contraindicated due to the patient’s gram positive infectious endocarditis. Treatment of Grade 4 CRS should not be delayed due to high incidence of mortality with concomitant septic shock.
Pyogenic Liver abscess: An Unusual Post-ERCP Complication

First Author: Amit Arbune, MBBS Patrick Brine, MD Thomas Marnejon, DO

Pyogenic liver abscess (PLA) is one of the most common visceral abscesses found in patients with underlying hepatobiliary or pancreatic disease. Recently, the incidence of PLA has decreased. Common etiologies include malignant biliary tract, portal seeding from appendicitis and diverticulitis. We present an unusual case multiple liver abscesses with streptococcus intermedius as a complication of ERCP.

A 76 year old Caucasian male was brought to the ER due to a fall and altered mental status. The patient's mentation improved with volume resuscitation, subsequently reported having abdominal pain for ~5 months duration. The pain was described as dull, non-radiating, epigastric and progressively worsening over the past few months without any aggravating or relieving factors. Patient reported lethargy, fever, chills, and decreased appetite over the preceding 3 weeks. Denied any nausea, vomiting, diarrhea, melena, hematochizia, chest pain, or dyspnea. The patient's past medical history included hypertension, gout, cholelithiasis and colonic polyps. His past surgical history included laparoscopic cholecystectomy and right knee arthroplasty. He underwent ERCP 5 months prior to admission and colonoscopy 3 years ago. The patient denied any drug allergies, was a former smoker, denied alcohol and illicit drug use.

The patient’s initial vitals included a temperature of 101.7 degree F, HR 190bmp, RR 20 per minute and BP 93/56 mm Hg. Initial laboratory studies showed normal basic metabolic profile, leukocytosis, slightly elevated transaminases, normal bilirubin, albumin, and total protein. A non-contrast CT abdomen-pelvis showed fluid in the gall bladder fossa, inflammatory changes around the pancreas, pneumobilia, multiple hepatic hypodensities, and some fat stranding surrounding the distal aspect of descending colon.

The patient was treated with volume resuscitation, broad spectrum antibiotics, and subsequently underwent a repeat CT abdomen with oral contrast which was suspicious for gastric perforation leading to an exploratory laparotomy. During the procedure, the patient was found to have ascites and multiple hepatic abscesses which were drained. No gastric perforation was noted. An upper endoscopy was normal. Blood cultures and culture from the abscesses grew streptococcus intermedius.

The complication rate of ERCP is 5-15%. The most common being pancreatitis, hemorrhage, perforation and cholangitis. In a prospective study by of 1,177 ERCP patient’s Christensen et al. from 2004 post-ERCP infections accounted for only 5% of all complications. Post-ERCP complications were predominantly cholangitis, however only 1 patient out of 59 was reported to have multiple liver abscesses. We could only find 2 similar cases in literature. These 2 reported cases described post-ERCP PLA in patients with intact GB versus our patient.

In conclusion, this case highlights the importance of having a high index of suspicion for PLA in patient's post-ERCP, who presents with fever, and abdominal pain, for early initiation of appropriate treatment to reduce mortality and morbidity.
A 79-year-old male was admitted to the hospital for altered mental status and right shoulder pain. He complained of shoulder pain since a fall while climbing stairs 3 days prior to arrival. On physical examination, the shoulder was swollen, erythematous, warm and had severely limited range of motion. He was afebrile. Labs revealed a normal WBC. Plain films of the shoulder displayed chronic degenerative changes. MRI of the shoulder was performed and identified full thickness tearing of several rotator cuff muscles and the posterior superior labrum. On Day 2 of hospitalization, the patient spiked a fever of 103° F. Blood cultures were drawn and grew E. coli. Orthopedic surgery was consulted and performed a shoulder aspiration. The fluid was cloudy with the following cell count; WBC 3400 with 93% granulocytes. Joint fluid culture was positive for E. coli. On Day 4, a CT abdomen was obtained due to his prior history of rectal cancer status post partial colectomy with subsequent reversal of ileostomy, which revealed circumferential wall thickening of the rectosigmoid junction. GI was consulted and performed a colonoscopy revealing an ulcerating rectal mass, which was biopsied and consistent with adenocarcinoma of the rectum.

Septic arthritis is most commonly due to gram-positive species as a result of hematogenous spread. Most of the time, the affected joint is confined to the lower extremities. The incidence of gram-negative septic arthritis is 10-15% of documented cases. Shoulder joint involvement constitutes <3% of total septic arthritis cases and colonic sources (2 case reports of knee involvement, one with S. bovis and one with C. septicum) are incredibly rare. This case demonstrates a hematogenous seeding of E. coli of the shoulder from an ulcerated colon mass. The location of infection, source and speciation of this case highlights a very unusual presentation of a relatively common condition. Further investigation should always be pursued when unlikely presentations occur in the context of appropriate risk factors and medical history.
Catastrophic Coagulopathy with Thrombocytopenia after Enoxaparin - It’s Not Always Heparin Induced Thrombocytopenia

First Author: Garren J DeCaro, MD Second Author: Rex Wilford DO, FACP

Coagulopathy in cancer is relatively common. The standard treatment of venous thromboembolism in patients with cancer is low molecular weight heparin. However, heparin induced thrombocytopenia (HIT) is a known side effect of low molecular weight heparins and it should always be considered in any patient on a heparin product who develops new onset thrombocytopenia and thrombosis. The diagnosis should be confirmed using HIT antibody testing.

We present a patient with clinically suspected HIT who suffered catastrophic hypercoagulable state due to underlying malignancy. A fifty one year old female recently diagnosed with metastatic lung adenocarcinoma and deep venous thrombosis (DVT) of the lower extremity presented with nausea, vomiting, bilateral flank pain and worsening cognition. Therapy for the malignancy had not been started yet, she had been started on enoxaparin 6 days prior to presentation in order to treat the DVT. The patient’s platelet count had dropped from 313 thou/cmm at the time enoxaparin was started to 87 thou/cmm on the day of admission for the DVT. Her physical exam was without focal neurological deficits, but positive for bilateral flank pain to percussion and general confusion. The abdominal CT showed multiple bilateral renal infarctions, splenic infarction and right hepatic artery embolus. MRI of the brain revealed innumerable areas of acute infarction throughout both cerebral and cerebellar hemispheres. HIT was tentatively diagnosed. Enoxaparin was discontinued and argatroban drip was started immediately with a rapid therapeutic PTT level reached. Review of peripheral smear by a hematologist revealed thrombocytopenia and no evidence of microangiopathic hemolysis. On day 3 of hospitalization the patient developed right sided hemiplegia and aphasia. CTA of the head and neck revealed no hemorrhage, multiple ischemic changes, and a filling defect in the superior vena cava thought to represent thrombus. Echocardiography suggested a right atrial mass concerning for thrombus. The patient developed seizures and respiratory failure and the family opted for comfort care. The patient died on day 7 of hospitalization. Pending workup revealed both anti-platelet factor 4 antibody and serotonin release assay to be negative, but a positive lupus anticoagulant test (LA-HexPhospholipid Neut).

This case illustrates ongoing, catastrophic, diffuse coagulopathy in a patient being treated presumptively for HIT. It is critical to determine the underlying pathological process in patients with thrombosis to best guide treatment. Lupus anticoagulant has been found more frequently in malignancy and is associated with increased thrombotic risk. Catastrophic hypercoagulable state of malignancy or antiphospholipid syndrome should be considered in patients with suspected HIT who continue to have thrombosis despite recommended therapy.
OHIO POSTER FINALIST - CLINICAL VIGNETTE Mohamed Elrifai, MD

A peculiar culprit for acute pancreatitis.

First Author: Mohamed Elrifai, Anna Maria Affan, Suresh Balasubramanian, Keyvan Ravakhah.

Introduction: Lipomas are uncommon pancreatic tumors. They are often found incidentally, and their association with pancreatitis has not been widely reported. We report a case of acute pancreatitis caused by a large lipoma of the pancreatic body, diagnosed by computed tomography (CT) and confirmed histologically.

Case description: A 55-year-old-man with no significant past medical history presented with a 2-week history of 7/10 constant, dull and deep epigastric pain radiating to the back. It was only alleviated when he lay flat and still. He denied fever, nausea, vomiting or other constitutional symptoms. He denied any similar previous episodes. He never smoked or consumed alcohol. He had no past surgeries and denied abdominal trauma. There was no exposure to toxins or new drugs nor did he have recent infection. Physical examination revealed a well-nourished male in obvious painful distress. He was tachycardic and demonstrated epigastric tenderness with voluntary guarding. The bowel sounds were sluggish. The only significant laboratory finding was an elevated lipase of 7645U/L. Triglycerides were normal. CT abdomen showed edema of the distal pancreatic body and tail, with surrounding inflammatory stranding compatible with acute pancreatitis. There was a 1.9cm lesion in the pancreatic body which was noted to be compressing the main pancreatic duct. Radiological features were consistent with internal fat and soft tissue attenuation. MRI of the abdomen concluded that the mass was 2.3cm in size with significant lipid content and well demarcated suggesting a tumor of mesenchymal origin possibly a lipoma or liposarcoma but given the well demarcated borders lipoma was more likely. The patient underwent endoscopic ultrasound with biopsy which confirmed the histology as lipoma. He had resection of the mass to avoid any further episodes of pancreatitis.

Discussion: Pancreatic lipomas are rare tumors of mesenchymal origin and until now, the etiopathogenesis is unclear. Generally, they have an asymptomatic clinical course and are diagnosed incidentally. However symptoms can arise as the tumor grows causing mass effect which can result in abdominal pain, jaundice, portal hypertension or, as in our case, acute pancreatitis. Although rare, pancreatic lipomas are well demonstrated on CT scan. The characteristic imaging features include a solid, non-enhancing homogenous mass with a clear margin and without any continuity or invasion of the peripancreatic tissue or organs. The tissue density ranges from -30 to -120 HU (Hounsfield units) keeping in with the consistency of fatty tissue. Taking into account the benign nature and lack of clinical manifestation, most cases can escape surgical management. However, in light of compression of the pancreatic duct, our patient underwent surgical resection to prevent further episodes of acute pancreatitis.
A rare cause of infective endocarditis; Pasteurella multocida infection of the tricuspid valve.

First Author: Mohamed Elrifai, MD Other Authors: Magadia, A, Affan A, Subramanian S, Ravakhah K.

Introduction: Pasteurella multocida is a gram-negative coccobacillus found primarily in the natural oral flora of animals. It is known to cause localized infections in humans however life threatening infections are uncommon. We present a rare case of tricuspid valve endocarditis caused by Pasteurella multocida.

Case report: An 86 year old woman with history of mitral valve replacement was admitted for one day duration of left upper thigh swelling, fever and chills. The patient owned a cat but denied a recent bite or scratch.

On admission, temperature was 38.2 °C, pulse rate 113 beats/min, respiratory rate 22/min and blood pressure 164/101. Physical examination revealed a 4x2 cm red patch overlying the left upper thigh with localized swelling and tenderness. Inguinal lymph nodes were not palpable. Cardiovascular examination was significant for a grade II/VI non-radiating, systolic murmur located at the left parasternal border. Her white cell count was 17,200 with 90% neutrophils. Chest roentgenogram and electrocardiogram were normal. Blood cultures were drawn, preliminary results returned as gram negative coccobacilli which later confirmed colonies of P. multocida. The bacteria was reported to be susceptible to ampicillin (MIC 0.25 µg/ml) and ceftriaxone (MIC < 0.25 µg/ml). Due to the patient’s septic presentation combined with a history of prosthetic valve in situ, transesophageal echocardiogram was done and revealed a tricuspid valve vegetation.

The patient was initially treated with Ampicillin/Sulbactam 3g IV every 6 hours and discharged on Ceftriaxone 2g daily to complete a six week course of treatment. Repeat blood cultures prior to discharge were negative. She remained in good health over the subsequent three months and did not require surgical intervention.

Discussion: Human infection due to P. multocida has not been only described following animal bites or scratches but with licking too, mainly from dogs and cats. Bacteremia associated with P. multocida most commonly accompanies localized soft tissue infection. Complications such as endocarditis are rare and typically present in immunocompromised patients. To date, only fifteen cases of infective endocarditis have been reported in literature and generally involve the aortic valves. To our knowledge, this is the second case of tricuspid valve endocarditis described. Our patient had native tricuspid valve infective endocarditis based on the modified Duke criteria. However, none of the risk factors traditionally associated with right-sided endocarditis were present. Infective endocarditis due to P. multocida can be treated medically based on the susceptibility studies and may not require surgical intervention, however left-sided infective endocarditis is associated with 30% mortality rate.

Clinicians should have a high index of suspicion particularly in high risk patients, as failure to recognize this condition may lead to devastating outcomes.
Rapidly progressive dyspnea with unexpected autopsy finding

First Author: Madiha Fida, MD Ragheb Assaly, MD Ali Abdulmonam, MD

INTRODUCTION: It can be challenging to find the exact etiology of pulmonary arterial hypertension on the basis of clinical grounds alone. Here we present a unique case of severe PAH with unexpected findings on autopsy.

CASE PRESENTATION: A 73 year old man with history of ILD, pulmonary hypertension, asbestosis with plaques and known heavy exposure to asbestos was admitted with progressive worsening of shortness of breath (NYHA class IV). Past medical history was significant for coronary artery disease, hypertension, sleep apnea and atrial fibrillation. Physical exam revealed a systolic murmur accentuated by inspiration, bibasilar end inspiratory crackles and lower extremity edema. His chest x-ray showed bilateral interstitial infiltrates with pleural plaques in the left upper lobe. Pulmonary function tests were consistent with restrictive pattern. Right heart catheterization showed severe pulmonary arterial hypertension with right ventricular systolic pressure of 113mmHg. V/Q scan was negative for pulmonary embolism. His DLCO declined from 56% in 2010 to 36% in 2013. On a recent 6 minute walk test, the patient was only able to walk 22% of his predicted distance. On the second day of admission, he became hypotensive and subsequently had a cardiopulmonary arrest. Limited autopsy of the heart and lungs ruled out pulmonary embolism, acute myocardial infarction or significant asbestosis, however, it showed profound pulmonary capillary hemangiomatosis.

DISCUSSION: Pulmonary capillary hemangiomatosis is frequently misdiagnosed as primary pulmonary hypertension and pulmonary veno-occlusive disease and the correct diagnosis is not made until autopsy. Less than 100 cases of pulmonary capillary hemangiomatosis have been reported. In our case, the interstitial lung disease was secondary to the proliferating microvessels that are prone to recurrent bleeding leading to hemosiderosis and fibrosis.

CONCLUSION: Our case highlights the fact that etiologies other than ILD or OSA should be considered when pulmonary arterial hypertension is out of proportion to the mild restrictive pathophysiology. The precise diagnosis of PCH is very important because the treatment with pulmonary vasodilators such as prostacyclin can cause fatal pulmonary edema.
Papulonodular skin lesions with monocytosis: What is your diagnosis?

Raktim Kumar Ghosh, MD, MBBS Mey Somasundaram MD, Poornanand Palaparty MD, Keyvan Ravakhah MD

Introduction: Monocytes normally comprise less than 10 percent of total circulating white cells, with the absolute monocyte count being <800/microL. Persistent monocytosis is associated with certain hematological malignancies including Chronic myelomonocytic leukaemia (CMML), chronic myeloid leukemia (CML), acute myeloid leukemia (AML) and hodgkins lymphoma. CMML is a uncommon clonal haematopoietic stem cell disorder with overlap features of myelodysplastic and myeloproliferative features. Erythematous papules and nodules on skin are often the only clinical manifestation of this uncommon malignancy. Skin involvement is regarded as late stage of the disease.

Case: A 84 years old lady, with PMHx of chronic atrial fibrillation and diastolic heart failure presented in the office for routine 3 months follow up. CBCD showed leukocytosis of 11.8 with 40% monocytes and normal hemoglobin and platelet. Careful physical examination revealed new onset non ulcerated, purplish papulonodular lesion on the right leg. Rest of the physical exmination was essentially benign, including absence of hepatosplenomegaly and lymphadenopathies. Review of 3 months back blood work showed WBC count of 10.6 and 30% monocytes. Patient was sent for skin biopsy which showed intradermal infiltrate consisting of large immature appearing myeloid cells with small prominent nucleoli, sparse basophilic cytoplasm and frequent mitosis, suggestive of leukemia cutis. The infiltrate was positive for lysozyme, CD 45 and CD 68 but negative for myeloperoxidase. The immunohistochemical phenotype was most consistent with monocytic origin. Flow cytometry showed increased monocytosis of 31% but no increase in myeloid blasts. FISH analysis was negative for BCR/ABL1 translocation. Patient refused bone marrow biopsy. She was diagnosed with CMML after ruling out CML, AML and MDS. Considering her age and comorbid conditions, allogeneic stem transplant was not an option. The patient was started on hydroxyurea. At the time of writing this report, significant reduction in monocyte percentage (19%) and improvement in skin lesions were noted following 2 months of treatment.

Discussion: CMML should be suspected when persistent (>3 months), unexplained peripheral monocytosis is present in an older adult. Some of the benign causes of monocytosis including pregnancy, asplenic state, sarcoidosis, major depression, and treatment with corticosteroids need to be ruled out first. Diagnostic criteria for CMML include peripheral blood monocytosis > 3 months; absolute monocyte count >1000/microL, greater than 10 percent of the entire white blood cell differential, absent BCR-ABL1 fusion gene, <20 percent myeloblasts, monoblasts, promonocytes in peripheral blood and bone marrow. Leukemia cutis is defined as cutaneous infiltration by neoplastic leukocytes resulting in papulo nodular skin lesions. Skin involvement in CMML patients suggest disease progression. Allogeneic hematopoietic cell transplantation (allo-HCT) is the only potentially curative therapy for patients with CMML. Cytoreductive therapy with hydroxyurea is an accepted alternative for patients who are not candidate for bone marrow transplant.
Anti-synthetase syndrome associated with cryptogenic organizing pneumonia: Case report and review of literature.

First Author: Nilamba A Jhala, MD Second Author: Kusuma Kurmayagari MD, Keyvan Ravakhah MD

Introduction: Anti-synthetase syndrome (ASS) is a heterogeneous autoimmune connective tissue disorder presenting as inflammatory myopathy associated with particular myositis-specific autoantibodies which are specifically directed against the aminoacyl-tRNA synthetase enzymes. The organs involved are numerous and diverse, and can vary from patient to patient. We present a case of ASS associated interstitial lung disease (ILD) and discuss the clinical implications.

Case Description: A relatively healthy 45-year-old African-American man presented with six week-history of dyspnea, non-productive cough, low grade fever and fatigue associated with pain & swelling of extremities for past three weeks. In the meantime, he was evaluated once in clinic and twice in ED and was treated as a case of community acquired pneumonia (CAP) without any clinical improvement. Eventually he was admitted for further management. He was afebrile, hypoxic (PO2 91% RA) with sinus tachycardia of 117/min and BP 156/88mmHg. Physical examination revealed dry crackles throughout bilateral lungs, proximal muscular weakness, mechanic hands and synovitis of MCP, PIP and DIP joints with trace pitting edema. There was no skin rash, mouth ulcers or palpable mass. The remainder of physical examination and review of system was unremarkable. Laboratory evaluation was remarkable for WBC of 12.5, CK > 26,000 K, ESR 72, myoglobinuria, positive RF and anti-Jo antibodies.

Chest radiograph revealed diffuse interstitial thickening in both lungs, predominantly involving the lower lobes with associated small to moderate bilateral pleural effusions. HRCT revealed multifocal nodular ground glass opacities and confluent areas of consolidation with mild septal thickening and small to moderate bilateral effusions suggestive of acute ILD in a pattern observed as cryptogenic organizing pneumonia (COP). A diagnosis of ASS with COP was made and the patient was started on high dose corticosteroids. Muscle biopsy was suggestive of polymyositis. Patient did not improve with steroids, cyclophosphamide was added with significant clinical improvement and was discharged to SNF for rehabilitation.

Discussion: Anti-synthetase syndrome (ASS) is a systemic autoimmune syndrome characterized by the presence of anti-aminocyt tRNA antibodies accompanied by a constellation of clinical findings including polymyositis-dermatomyositis (PM-DM), ILD, “mechanic hands” and Raynaud’s phenomenon etc. This is relatively uncommon clinical entity and is considered as a subset of idiopathic inflammatory myopathies. Among the anti-synthetase antibodies more frequently associated with lung involvement is the anti-Jo-1. It is noteworthy that, when present, the lung disease is the main determinant of survival in patients with ASS. Our patient predominantly complained of respiratory illness, HRCT demonstrated consolidations consistent with acute ASS associated COP/ILD. This case uniquely demonstrates how the diagnosis of ASS may not be clinically obvious on initial presentation, but may appear upon further investigation. We need to consider broad differential diagnosis for suspected infectious pneumonia cases that are not responding to standard antibiotic regimens. Early diagnosis and treatment can prevent disease progression and improve patient outcome.
Guillain Barre Syndrome and Autoimmune Hepatitis...is there a relationship?

First Author: Sehrish Kamal, MD Muhammad Ali Khan, MD Thomas Sodeman, MD

Introduction: Guillain Barre syndrome (GBS) is a rare clinical syndrome with an estimated incidence of 0.6-4/100,000 persons/year worldwide. GBS commonly occurs in association with infectious agents like Campylobacter jejuni, Cytomegalovirus, viral hepatitis, Ebstein-Barr virus, mycoplasma, etc. GBS can also be associated with mild elevation of alanine transaminase without any known cause. We hereby report an extremely unusual occurrence of autoimmune hepatitis in a patient with Guillain Barre syndrome.

Case Presentation: A 24-year-old white male came to the emergency room with complaints of worsening weakness, numbness, and tingling of distal upper and lower extremities progressing more proximally. He denied any other symptoms. There was no significant past medical, surgical, social (no alcohol or smoking), or family history. On examination, he had 1/5 power in bilateral upper extremities and 2/5 strength in bilateral lower extremities. Upper and lower extremity deep tendon reflexes were diminished bilaterally. CT and MRI brain did not reveal any acute abnormality. Baseline laboratory studies including CBC, BMP, INR, and UA were within normal limits. LFTS showed total bilirubin 1.1 mg/dL, direct dillirubin 0.2 mg/dL, ALT 928 U/L, AST 549 U/L, and alkaline phosphatase 205 U/L. Lumbar puncture revealed elevated protein levels with normal white cell count. EMG nerve conduction study was consistent with acute inflammatory demyelinating polyneuropathy (AIDP). Ultrasound of liver and gallbladder were both normal. Viral hepatitis panel including hepatitis A, hepatitis B, hepatitis C, and hepatitis E were all negative. ANA titers were found to be 1:40, anti-smooth muscle antibody titer 1:80, liver kidney microsomal antibody titer <1:20; antimitochondrial antibody was not detected. Ceruloplasmin levels and iron studies were within normal limits. Liver biopsy revealed lymphoplasmacytic infiltrates in portal tracts with interface hepatitis, hence, the diagnosis of autoimmune hepatitis was made. During the hospitalization, the patient received IVIG courses for Guillain Barre syndrome, and for autoimmune hepatitis, he was started on prednisone 60 mg per day, which resulted in improvement of his liver enzymes. Prednisone was tapered over a course of months, and azathioprine was added. His liver enzymes normalized over a period of 4 months and he was maintained on azathioprine.

Conclusion: Association of GBS with infectious hepatitis has been widely described in literature. To the best of our knowledge, this is the first reported case highlighting the unique occurrence of GBS with autoimmune hepatitis. Hence, autoimmune hepatitis can be considered as 1 of the possibilities in GBS patients with elevated liver enzymes.
**OHIO POSTER FINALIST - CLINICAL VIGNETTE Aahd Kubbara, MD**

**Bilateral Pulmonary Emboli as an Indirect Complication of Gastric Bypass Surgery**

First Author: Aahd Kubbara, MD. Danae Hamouda, MD. Shipeng Yu, MD. Youngsook Yoon, MD.

**Introduction:** Micronutrient deficiencies are a well-known complication of gastric bypass surgery, with two such micronutrients being vitamin B12 and folic acid. As deficiencies in those vitamins are associated with increased serum levels of homocysteine, we are reporting a case of a patient who suffered multiple venous thromboses, with pulmonary emboli, in the setting of vitamin B12 and folate deficiencies secondary to gastric bypass surgery.

**Case Presentation:** A 54 year old lady with a past medical history significant for morbid obesity managed with gastric bypass surgery presented to the ED with nausea and anorexia of 10 days duration. Associated symptoms included ten-pound weight loss in the prior ten days, exertional dyspnea, projectile vomiting, and diarrhea. Initial workup in the ED was undertaken. An EKG obtained upon presentation did not show any acute changes and three sets of cardiac enzymes were within normal limits, thereby ruling out myocardial ischemia. Further workup included radiographic studies such as a CT with contrast of the abdomen, which revealed superior mesenteric vein thrombosis in addition to portal vein thrombosis. CT angiography of the chest was also obtained, which revealed multiple bilateral pulmonary emboli. Doppler ultrasound of upper and lower extremities did not demonstrate any evidence of thrombus.

In light of the radiologically proven emboli found, heparin infusion was initiated with an Unfractionated Heparin “UFH” target of 0.7 U/ml. On the third day of admission, warfarin treatment was begun with heparin bridge therapy, to complete a course of 3-6 months of anticoagulation therapy.

Further workup during the patient’s hospitalization included a complete hypercoaguable workup, which showed the following results: Factor II level was slightly elevated at 137 % “normal range being 65-120%”. The prothrombin 20210A mutation was negative; homocysteine level was 96 (normal range 4 to 10 umol/L); compound heterozygote for the Methyl Tetrahydrofolate Reductase “MTHFR” mutation; Vitamin B12 was 102 with the lower limit of normal being 200 ng/dl; and folic acid was 2.7 “lower limit of normal being 5.9”.

Oral replacement for her nutritional deficiencies was initiated and she was maintained on these treatments as an outpatient.

**Conclusions:** Weight-reduction surgeries are an effective and widely accepted measure of rapid weight loss. As the population undergoing such surgeries is increasing, the side effects are becoming more easily identifiable. Vitamin deficiencies, being a known side effect of gastric bypass surgery, may be preventable with oral supplements and subsequently may have a previously underestimated impact. The patient’s compliance and education are mandatory in such circumstances in an attempt to prevent fatal complications such as multiple venous thromboses and embolization occurring as a result of vitamin B12 deficiency.

Physicians need to recognize this potentially reversible risk factor in every gastric bypass surgery patient who develops thrombosis or thromboembolism.
OHIO POSTER FINALIST - CLINICAL VIGNETTE Jason V Kunz, DO

Levamisole – an Emerging Public Health Threat

Jason Kunz D.O., Ben Stewart-Bates B.A. Candidate, Courtney Thomas D.O., Nick Detore M.D., Michael Rich M.D., Lynn Clough Ph.D.

Introduction: Levamisole is an immunomodulatory agent previously used as both an antirheumatic drug and adjuvant antineoplastic agent. Levamisole's physical similarity to cocaine allows its use as a bulking agent; its properties also enhance cocaine’s euphoric effect. Sixty-nine percent of cocaine in the United States is estimated to be adulterated with levamisole. Levamisole-induced vasculitis in cocaine users is being seen with increasing frequency.

Case Description: A 51-year-old female with a history of polysubstance abuse and Hepatitis C presented with a well-demarcated violaceous and necrotic appearing rash on her bilateral ears and right cheek that progressed over three days. She had a similar rash on her left cheek two months prior. The patient had associated polyarthralgias and leukopenia. Cocaine was detected in the urine toxicology. Perinuclear Anti-Neutrophil Cytoplasmic Antibodies (ANCAs) were detected. Cryoglobulins were negative with normal C3 and C4 levels. Beta-2 glycoprotein and human immunodeficiency virus antibodies were also negative. Anti-cardiolipin antibodies were equivocal.

Cutaneous punch biopsy performed on the earlobes was reported as vascular occlusive disease.

Discussion: Levamisole-induced vasculitis classically presents with purpura of the ears, nose, and cheeks. Bullae and necrotic lesions can also be seen. Constitutional symptoms including weight loss, fever, and malaise are common with arthralgias and seizures also reported. Vasculitis is often seen with prolonged use of the drug. ANCAs are often positive in levamisole-induced vasculitis associated with cocaine use. Associated laboratory features include the presence of leukopenia, neutropenia, and agranulocytosis. Internal organ involvement is absent. Nonspecific histopathology reveals thrombotic vasculopathy and leukocytoclastic vasculitis. An evaluation for other causes of vasculitis should be included. Treatment of levamisole-induced vasculitis is largely supportive. Cessation of cocaine leads to granulocyte recovery. Symptoms can recur with rechallenge of the drug. Debridement of necrotic tissue may be necessary and infection resulting from neutropenia should be treated with antibiotics. It is unclear whether steroids offer any clinical benefit. This case illustrates a typical presentation of an emerging public health threat which is not commonly seen by the general internist. When a patient presents with characteristic purpura or necrosis on the ears, nose, or cheeks, with cocaine abuse, leukopenia and neutropenia, and ANCA positive, then levamisole-induced vasculitis should be considered. Increased physician awareness of this condition will promote early recognition and prompt management.
A Case of Pituitary Macroadenoma Presenting as Transient Global Amnesia

First Author: Suryanarayan Mohapatra, Resident, Department of Internal Medicine, Fairview Hospital, Cleveland, OH

INTRODUCTION: Transient global amnesia (TGA) is a clinical syndrome of reversible anterograde and retrograde amnesia accompanied by repetitive questioning, lasting for 2-8 hours, that occurs in middle-aged and elderly individuals. It is usually considered a benign condition often without an underlying identifiable cause. However, there have been 2 case reports published previously where a pituitary tumor presented as TGA.

CASE DESCRIPTION: A 67 year old right-handed male presented to emergency department 1 day after an episode of amnesia as witnessed by his wife. At around 8 AM on a Sunday morning, his wife noticed that he looked strange. He did not remember their grandson's birthday party celebrated one day prior, the ongoing bathroom tiling work and their upcoming vacation. He forgot his wife goes to church every Sunday. He recalled his workplace he ceased to work 6 years ago. He became perfectly alright after 2 hours. There was no history of facial deviation, diplopia, weakness or numbness. He gave history of occasional self-limiting tunnel vision. Past history was significant for hypertension and hyperlipidemia. He was admitted for further evaluation of amnesia. On examination we found, BP 143/87 mmHg, Pulse 62/min, Temp 36.4°C, BMI 28.62 kg/m². Neurological examination revealed normal visual acuity and field of vision. Cranial nerves III through XII were normal. No sensory or motor deficit was noticed. Rest of the physical examination was unremarkable. Non-contrast CT of head was essentially normal. The patient was diagnosed with TGA.

MRI of the brain revealed a 19 x 14 x 12 mm sellar mass with minimal suprasellar extension and abutment of the optic chiasm. The mass was encroaching on right i.e. non-dominant medial temporal lobe. EEG ruled out any epileptic phenomenon. Hormone assays revealed prolactin levels: 32 ng/ml and 39 ng/ml on same day. The levels of TSH, FSH, LH, IGF-1, cortisol and ACTH were normal. Hence, a clinical diagnosis of prolactinoma was made and the patient was started on cabergoline. He reported no more episodes of TGA afterwards.

DISCUSSION: TGA caused by pituitary tumors is attributed to dysfunction of mesial temporal lobe and hippocampus. TGA alone has an excellent prognosis which does not need any treatment; recurrence is uncommon. Here we report that pituitary macroadenoma, a treatable condition, can occasionally manifest as TGA with possible recurrence. Hence, in the face of a secondary cause such as a tumor, prompt treatment will prevent such episodes. In order to rule out any latent organic pathology like stroke and tumor, MRI of the brain is recommended. Therefore, the role of MRI in evaluation of such cases cannot be overemphasized.
Krokodil-A flesh eating Zombie drug !!

First Author: Ritika Ohri, MD Second Author: Andrey Strunets Third Author : Babu Mohan Fourth Author: Keyvan Ravakhah

Introduction: Krokodil, a homemade injectable opioid, has gained its moniker from the excessive harms associated with its use. This novel flesh-eating street-drug originated in Russia in early 2000s. Soon it spread to Ukraine and other former Soviet countries. This horrendous poisonous concoction is now sporadically surfacing in USA. Reports of it being sold on the street as heroin have appeared in lay press, but only minuscule real scientific information is available in the medical literature.

Case presentation: A 26-year-old African-American woman with history of Schizophrenia was admitted for severe bilateral leg pain and multiple ulcers. Patient reported injecting Krokodil in both legs and under her breasts. Two weeks ago she was admitted at another hospital for same complaints but she continued to inject Krokodil, while under treatment. Her ulcers worsened over this time and were extremely painful.

Relevant on examination was a huge right lower leg necrotic ulcer of 19X6cm size. There was also a 4X4cm left lower leg necrotic ulcer and 3X4 cm ulcer with clean margins & granulation tissue under left breast. Wounds were non-fluctuant, non-purulent, non-malodorous, with no undermining or tracking, but were tender.

She met 3 out of 4 criteria for SIRS. X-ray revealed extensive soft tissue ulceration in both legs and gas formation in right lower leg. She was treated with Vancomycin, Aztreonam and surgical excisional-debridement. Wound cultures grew MRSA, P.aeruginosa, K.pneumoniae & E.avium.

Patient improved with IV antibiotics, IV analgesics and daily wound care. She was transferred to Extended Care Facility on Ciprofloxacin and Trimethoprim-Sulfamethoxzole for 2 weeks.

Discussion: Krokodil is cooked in 'kitchen laboratory'! Crushed Codeine tablets are boiled with a diluting agent (paint thinner that may contain lead, zinc, ferric or ferrous agents, antimony) and gasoline, hydrochloric-acid, iodine & red-phosphorous, which are scraped from striking surfaces on match-boxes. In this process, desmorphine is generated which is the psychoactive core agent of Krokodil. This suspension is injected subcutaneously or intravenously without using any type of filter. This accounts for tremendous immediate damage to blood vessels, muscles & bones resulting in abscesses, thrombophlebitis, gangrene & large-scaled necrosis.

Desmophine was synthesized in 1932 in USA and has high dependence potential. It is a controlled substance and has no accepted medical use in USA. Krokodil abuse in USA was first reported in 2012 in Missouri. Recently more cases have been reported in many states across the country. Tests for desmophine detection are not widely available & all reports are currently anecdotal. Routine urine toxicology would likely not be positive for opioids, but even that is not yet certain.
OHIO POSTER FINALIST - CLINICAL VIGNETTE Brian Petullo, MD

Hypoxia after ABVD therapy for Hodgkin’s lymphoma

First Author: Brian Petullo, MD Second Author: Laura Maher, MD

Introduction: Pulmonary diseases in patients with hematologic malignancies frequently present diagnostic challenges. Infections from both typical and atypical pathogens, toxicity from drugs or radiation, and complications from graft-versus-host disease comprise the majority of etiologies [1].

Case Description: A 41 year-old female with Hodgkin’s lymphoma who had undergone 4 cycles of adriamycin, bleomycin, vinblastine, and dacarbazine (ABVD) had presented to her outpatient hematologist with complaints of fevers, pleuritic chest pain, and non-productive cough of 1 month’s duration. She was admitted and noted to be hypoxic, requiring 4 liters of oxygen via nasal cannula to maintain her oxygen saturation above 92%. Initial laboratory workup was notable for neutropenia. Chest radiography revealed no abnormalities. She was febrile on Day 1, and after blood and urine cultures were obtained, patient was empirically started on vancomycin, cefepime, and azithromycin. Voriconazole was added after patient continued to fever. She was given filgrastim and her absolute neutrophil count recovered. CT chest was obtained on Day 3 of her hospital stay which revealed bilateral, upper lobe predominant, ground-glass opacities. Patient underwent bronchoscopy with bronchoalveolar lavage (BAL) and transbronchial biopsy. Analysis of her BAL fluid revealed a lymphocyte-predominant white blood cell population. Blood, urine, and bronchial fluid cultures remained without growth, but fungal forms consistent with Pneumocystis jirovecii were discovered on bronchial biopsy fragments stained with Gomori methenamine silver. Patient was started on clindamycin and primaquine, due to a trimethoprim-sulfamethoxazole allergy. She defervesced and her hypoxia resolved. HIV was checked and was negative. CD4 count was 1022 cells per mm3.

Discussion: A plethora of disease processes can result in hypoxia and lung changes in patients with hematologic malignancies. Multiple factors led to the delay in diagnosis of Pneumocystis jirovecii pneumonia (PJP) in the above case: the patient did not belong to the typical patient population of HIV-infected individuals that is usually affected by PJP, her clinical presentation was not classic for PJP, and her diagnostic workup did not reveal the organism in a timely manner through the usual diagnostic methods of sputum and bronchoalveolar lavage stain/culture. Furthermore, because of this delay, bleomycin-induced lung injury, a well-known and feared complication of ABVD therapy that can present in a variety of non-specific ways, became high on our differential.

As this case typifies, infectious etiologies can be difficult to diagnose in immunosuppressed patients, as they frequently do not present with the typical clinical, laboratory, and radiographic manifestations found with immunocompetent individuals. Pneumocystis pneumonia is a well-known complication of HIV infection, but is becoming more frequently associated with patients in other immunosuppressed states [3]. As it does, careful vigilance in these populations is necessary to lead to its rapid recognition and treatment.
**OHIO POSTER FINALIST - CLINICAL VIGNETTE Teresa Ratajczak, MD**

**Hemoglobin South Florida a rare Hemoglobin Variant causing falsely elevated HbA1c values.**

First Author: Teresa Ratajczak, MD Sadia Afaz, MD Ankur Gupta, MD

**Introduction:** We report a case of a rare hemoglobin (Hb) variant, Hb South Florida with only three cases reported worldwide to our knowledge since initial description in 1985. It causes falsely elevated HbA1c results during standard laboratory testing in the range of poorly controlled diabetes mellitus.

**Description:** 42yo woman with history of melorheostosis was noted to have an elevated HbA1c (13.8%) during routine blood work using the ion-exchange high performance liquid chromatography (HPLC) method. The patient did not have a prior diagnosis of diabetes mellitus and denied any symptoms consistent with the diabetes. Physical exam was unremarkable. Her blood sugars were normal to minimally elevated. Over several months, she was noted to have persistent elevation in HbA1c in the range of 12-14%. She remained asymptomatic. Patient was referred to Endocrinology clinic. Hemoglobin electrophoresis was performed due to suspicion for a hemoglobinopathy. The patient was noted to be heterozygous for a rare hemoglobin variant called Hb South Florida that causes falsely elevated HbA1c levels. Her corrected HbA1c, when evaluated by affinity column high performance liquid chromatography (HPLC) was in normoglycemic range.

**Discussion:** Hemoglobin South Florida was first described in 1985 in Tampa Florida and has since been reported in two other cases worldwide. The hemoglobin is not associated with any clinical disorder reported in literature. There are many commercially available tests for measuring HbA1c levels. Additionally, structural variants in hemoglobin interfere with many of the methods. HPLC separates hemoglobin based on their charge differences. In this method, the Hb South Florida variant substitutes a neutral amino acid for a charged one, with valine substituted by methionine. This alteration decreases the transit time in the exchange column and causes it to co-elute together with HbA1c, giving a falsely elevated value as they get measured as same species. Affinity chromatography is based on affinity of a species for a particular ligand. It recognizes the structure of the N-terminal glycated amino acids of the beta chain of hemoglobin. In the case of Hemoglobin South Florida it was able to separate the variant hemoglobin from glycated species.

**Conclusion:** This is the fourth case of Hb variant South Florida to our knowledge. It is important for clinicians to keep a wide perspective when making an assessment of diabetes solely based on HbA1c values. Patients who do not present with symptoms consistent with diabetes, and have normal blood glucose should prompt a further workup for abnormal hemoglobin variants. This should be done in order to prevent incorrect diagnosis and treatment.
OHIO POSTER FINALIST - CLINICAL VIGNETTE Samantha L Schockman, MD

Retinal artery occlusion as a first thrombotic event associated with high Factor VIII and low free protein S in the first trimester of pregnancy

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Background: Central retinal artery occlusion (CRAO) during pregnancy is a marker for maternal familial thrombophilia and for placental insufficiency, secondary to thrombotic obstruction of the spiral arteries of the uterus-placenta mediated by the physiologic hyperestrogenemia of pregnancy interacting with underlying thrombophilia.

Case Description: A healthy 31 year-old Caucasian female was evaluated after an ophthalmologist diagnosed CRAO at 13 weeks gestation in her first pregnancy. Cardio-embolic etiologies were ruled out by cardiac echocardiogram and carotid ultrasound. The patient had no previous thrombotic events, however her maternal grandmother had multiple episodes of venous thromboembolism (VTE), including a lethal pulmonary embolus (PE). Thrombophilia and hypofibrinolysis studies were carried out and she was found to have elevated factor VIII (165%, UNL 150%) and low free Protein S (44%, LNL 50%). She maintained vision loss in the affected eye. Thromboprophylaxis with Lovenox (60 mg/day) and 81 mg aspirin was initiated.

Discussion: CRAO during pregnancy as a first thrombotic event heralds the presence of familial or acquired thrombophilia, here represented by elevated factor VIII and low free Protein S. During normal pregnancy, particularly comparing the last to the first trimester, factor VIII increases, and total and free protein S fall, making the diagnosis of familial high factor VIII and familial protein S deficiency difficult during pregnancy. However, the rare development of CRAO during the first trimester in the presence of a strong family history of VTE, points to the presence of familial thrombophilia. The physiologic hyperestrogenemia of pregnancy promotes thrombosis, including ocular events, in patients with major gene familial thrombophilias.

Conclusion: When CRAO occurs during pregnancy, a complete thrombophilia and hypofibrinolysis evaluation should be done. The goal is to protect against a second thrombotic event during pregnancy in the mother and to protect the fetus from thrombotic placental insufficiency, both achieved by low molecular weight heparin therapy throughout pregnancy. CRAO during pregnancy should also lead to screening of first-degree relatives, to minimize risk of VTE for the patient and kindred.
OHIO POSTER FINALIST - CLINICAL VIGNETTE Rupal P Sonani, MBBS

SPONTANEOUS RETROPERITONEAL BLEEDING DURING HEMODIALYSIS AND A REVIEW OF THE LITERATURE

First Author: Rupal P Sonani, MBBS Second Author: Saad Hussain MD,

CASE REPORT: A 51-year-old white male with a past medical history of end stage renal disease secondary to Alport syndrome presented to the hospital from a dialysis center after sudden onset of left flank pain and hypotension during hemodialysis. At presentation he was found to be hypotensive and tachycardic with systolic blood pressure in the 70’s. His labs showed a hemoglobin level of 10.3 mg/dl and hematocrit of 30.2. His PTT was 27, PT was 11 and INR was 1.0. Considering the patient’s new onset abdominal pain, hypotension and tachycardia, it was thought that the source of this could be an intra-abdominal bleed. CT scan of the abdomen was done. This demonstrated a large left retroperitoneal bleed. The left kidney was displaced anteriorly by this collection. There were a few punctate areas of contrast enhancement within the left kidney consistent with active hemorrhage. General surgery was consulted but as the patient was stable enough for conservative management, a wait and watch strategy was adopted. The next morning his hemoglobin dropped to 8.5 mg/dl, and we transfused one unit of packed red blood cells. Following transfusion, the patient’s hemoglobin increased to 9.4. His flank pain started to decrease in intensity and there was no further bleeding during his hospital stay. The patient was subsequently discharged home in stable condition.

DISCUSSION: Bleeding with anticoagulation during dialysis has been rarely reported. Different modalities of anticoagulation have been used during hemodialysis. In patients who are not at increased risk of bleeding we use the standard heparin modality. In patients who are at increased risk of bleeding we utilize modalities such as minimal dose heparin, no heparin hemodialysis etc. Our patient had no risk factors for bleeding so we used the standard heparin modality for anticoagulation. Retroperitoneal hematoma should be high on the list of differential diagnoses for any patient on dialysis who complains of abdominal or back pain, especially with tachycardia or hypotension. Fatal bleeding with heparin use during hemodialysis has been reported. Most patients with spontaneous retroperitoneal hematoma can be monitored closely and treated conservatively. Emergency angiography to embolize or stent-graft the bleeding vessel(s) is indicated if there is active bleeding. Patients who develop abdominal compartment syndrome may require emergent decompression laparotomy.

CONCLUSION: Anti-coagulation during hemodialysis can result in massive spontaneous retroperitoneal bleeding. It is important for physicians and dialysis personnel to be aware of this complication as it can be potentially life threatening.

REFERENCES
Pneumatosis Intestinalis Including the Left Colon Caused by Ischemic Bowel.

First Author: Mohamad Khaled Soufi, MD Fazel Dinary, MD Buthayna Dinary, MD Muhammad Raihan Malik, MD Keyvan Ravakhah, MD

Background: Pneumatosis intestinalis [PI] is a rare condition in which gas is found in the bowel wall. It exists in a primary form or can be secondary to an underlying pathology. We present a case of patient in whom PI was caused by ischemic bowel. The diagnosis was made by using computed tomography (CT) scan. A total colon resection with ileostomy was performed. Patient fully recovered after surgery.

Case: 51 year old male with past medical history of hypertension, hyperlipidemia, type 2 diabetes mellitus, end stage renal disease (ESRD) on hemodialysis, peripheral vascular disease, seizures, hepatitis B, hepatitis C and with altered mental status. On clinical examination, blood pressure was 56/22 mmHg, heart rate of 39 bpm, respiratory rate of 19 bpm, oxygen saturation of 78%, temperature of 35.5°C and confused. There was moderate abdominal distention, generalized tenderness, and sluggish bowel sounds.

Initial labs showed PH of 7.13, white blood cell count of 16.6 x 10^3/µL with a neutrophil percentage of 93%, Hemoglobin of 12.9 g/dL, platelet count of 178 x 10^3 cells/µL, international normalized ratio of 1.45, Sodium of 132 mEq/L, Potassium of 5.2 mEq/L, Chloride of 113 mEq/L, HCO3 9, creatinine of 4.3 mg/dL, BUN of 28 mg/dL and lactic acid of 10 mmol/L.

CT abdomen showed markedly abnormal appearance of the large and small bowel at the level of the cecum demonstrating progressive pneumatosis along with multiple fluid-filled small bowel loops, some of which demonstrate diffuse wall thickening. The patient was immediately transferred to the operating room for urgent surgery. During operation massive necrosis of the left and right colon were with imminent perforation. A total colectomy was performed with ileostomy. Antibiotic therapy consisted of Meropenem was given for seven days. Postoperatively, parenteral nutrition was administered for five days followed by uneventful transition to normal diet and the patient was discharged from the surgical ward nine days postoperatively.

Discussion: Pneumatosis intestinalis (PI) is a condition characterized by gas formation in either a cystic or linear form, inside the submucosa or subserosa of the bowel wall. It is a rather unspecific sign, which can be found in a wide range of clinical settings. Primary PI is extremely rare (15% of the cases) [1]. In 85% of case PI is secondary to an underlying condition and it affects mainly the right colon and small bowel, rarely it affects the left colon. Overall, PI is a rare radiological finding and can occur in a wide spectrum of clinical disorders. In the setting of the acute abdomen with coexisting systemic sepsis, necrotic bowel must be suspected and emergent operative management pursued. However, in stable patients, benign causes of PI need to be considered in the differential diagnosis.
Breast cancer is the most common malignancy in women in the United States with White females having a higher incidence but lower mortality rate than African-American (AA) females. Young AA females often present with more aggressive forms with hormone negative or triple negative disease. On the contrary, hormone receptor positive (ER+) disease is typically less aggressive with a much better prognosis. However, we report a case of a young African American female who presented with an extremely aggressive form of ER+ breast cancer who died within one year of diagnosis.

A 35 year old AA female was diagnosed with stage IIIA (pT1b N2a M0) invasive ductal carcinoma of the left breast. She completed neoadjuvant chemotherapy with Adriamycin, Cytoxan, and Taxol and subsequently underwent a left partial mastectomy with axillary dissection. Pathology showed invasive ductal carcinoma with negative margins but with 5 of 17 positive lymph nodes. Genetic testing was negative for BRCA1 and BRCA2. Immunohistochemistry staining was positive for ER but negative for progesterone receptor (PR) and human epithelial growth factor receptor 2 (HER-2). Patient completed 6 weeks of radiation therapy and was then started on hormonal therapy with tamoxifen.

Her course was complicated by acute onset of hypoxia to 84% with heart rate in 130s and significant back pain. CT scan was negative for pulmonary embolism but showed ground-glass opacities in the upper lobes suggestive of inflammation possibly from radiation versus interstitial pneumonitis from prior chemotherapy. Thus patient was started on IV steroids. MRI of the spine also showed diffuse replacement of normal marrow signal concerning for metastatic disease. CT abdomen showed multiple hepatic lesions with biopsy revealing adenocarcinoma. Patient was given salvage chemotherapy with gemcitabine and carboplatin. She continued to have progressive hypoxia eventually requiring intubation but subsequently went into pulseless electrical activity arrest. ACLS was performed with no improvement and thus patient was pronounced. Autopsy revealed diffuse miliary metastatic disease in the lungs with multiple occlusive and non-occlusive tumor emboli. Diffuse metastatic disease was found in the gastrointestinal tract, kidneys, thyroid, and adrenal glands. Diffuse bone marrow infiltration by metastatic disease and lymphovascular invasion by tumor emboli was present throughout.

Aggressive forms of breast cancer due to triple negative or hormone negative disease in AA females has been described; however, aggressive forms of ER+ breast cancers is less common. Nabawanuka et al. conducted a study in Uganda demonstrating that aggressive forms of metastatic breast cancer with bone lesions was commonly found in premenopausal women with ER+ disease. This study suggests that young AA women with African ancestry may have a genetic predisposition for aggressive ER+ disease. Identifying this genetic abnormality may allow for earlier detection and target therapies for this high risk populations.
A rare presentation of prostate metastasis to the lung as an isolated lung mass

First Author: Anandhi Sudhagaran, MD, Nasfat Shehadeh, MD, Kinner Patel

Background Prostate cancer metastasis usually occurs to the bone as the primary metastatic site. Lung metastasis is usually an uncommon finding as the primary metastatic organ but more common in cases with metastasis to three or more organs. Here we present a case of an isolated lung mass as the primary site of metastasis for prostate cancer.

Case Presentation Patient is an 86 year old Caucasian male who had history of prostate cancer in 1996 which was treated with surgery followed by radiation. He received androgen depression therapy until 2 years ago. He presented to us for workup of incidental mass in lower lobe of left lung.

He had a CT scan of the abdomen done for nonspecific symptoms 1 week before presentation and it showed incidental lower lobe mass measuring 3.6 cm x 1.8 cm in the left lung. Subsequent positron emission tomography scan showed the same finding in the left lower lobe without any mediastinal adenopathy or evidence of metastatic disease.

At the time of presentation to the office the patient’s Karnofsky performance status scale was 100% and he denied any smoking, cough, hemoptysis or unintentional weight loss. Patient was then referred for fine needle aspiration and core biopsy which was consistent with moderately differentiated primary lung adenocarcinoma which we staged as T2aN0M0, stage 1B clinically. He then underwent robotic left lower lobectomy with mediastinal lymph node dissection. Surprisingly the biopsy revealed metastatic prostatic adenocarcinoma with Gleason score of 9 and clear margins. Immunostaining was positive for Prostate-specific antigen(PSA) and negative for Thyroid-transcription factor 1 (TTF-1) and Napsin. This pattern was consistent with metastatic disease from the prostate. Lymph node biopsy was negative for malignancy. Reevaluation of core needle biopsy of the mass was also found to be positive for PSA and negative for TTF-1 suggesting prostate metastasis rather than primary lung adenocarcinoma. Patient's PSA declined significantly after removing the lung nodule from 0.3 ug/L to <0.01 ug/L. We decided to observe the patient clinically and monitor his PSA levels.

Discussion The incidence of prostate cancer in the United States is 28% with a mortality of 10% in men. The primary site of metastasis of prostate cancer has been reported to involve the bone in up to 90% of cases with hematogenous spread. Lung involvement in metastatic prostate cancer is relatively rare with Fabozzi et al reporting a 3.6% incidence in 47 patients of the 1290 patients with metastatic prostate cancer. Furthermore, isolated lung metastasis is a rare finding with incidence reported by Saidtoh et. al. of 4 of 1367 (0.3%) autopsy cases.
Seizure with a Surprise.

First Author: Erika H Wilson Second Author: Kyle Feldmann Third Author: Julie Coffman

Introduction: Seizures account for 1 to 2% of emergency department visits each year. Brain tumors comprise 1.7% of total seizure presentations. An uncommon cause of a CNS mass is neurosarcoidosis, especially in patients who do not have systemic signs of sarcoidosis. We describe a case of primary neurosarcoidosis in a 35 year-old male presenting with seizure.

Case Description: 35 year-old male sustained a grand-mal seizure after a car accident. He presented from an outside hospital after a non-contrast head CT showed a mass of the left temporal lobe. No neurological deficits were identified on admission. Labs and urine drug/alcohol screens were also normal. Levetriacetam and dexamethasone were initiated. MRI with contrast revealed an 11 x 25 x 24mm left temporal mass concerning for astrocytoma. The lesion was resected and pathology demonstrated numerous, noncaseating granulomas. Acid-fast staining was negative, and pathology was consistent with sarcoidosis. Post-operative course was complicated by a left MCA ischemic stroke with receptive aphasia. CT thorax was negative for hilar lymphadenopathy and serum angiotensin-converting enzyme (ACE) level was unremarkable. Prednisone was initiated, and the patient was later discharged on levetriacetam, prednisone taper. He has had no further neurologic complications or seizures.

Discussion: Sarcoidosis is a rare, inflammatory disorder characterized by noncaseating granulomas. Incidence in the general population is 40 per 100,000. Pulmonary involvement is seen in 90% of patients, while neurologic complications occur in 5-10% of patients with active, systemic disease. The most common neurologic presentation are cranial neuropathies (50%), while seizures occur in 10%. Neurosarcoidosis, without evidence of any systemic involvement, however, is scarce: only 1% of sarcoidosis cases present in this fashion. Definitive diagnosis requires tissue biopsy and may be difficult if no peripheral lesions are available. In absence of biopsy, gadolinium enhanced MRI of the brain and CSF analysis, demonstrating inflammatory cells and increased ACE levels are used, but both are non-specific. There is no known cure for sarcoidosis. Treatment is aimed at reducing symptoms by immunosuppression with steroids, and anti-epileptic drugs are seldom needed in those with seizures. Depending on the extent of the disease or severity of symptoms, pulse dose steroids can be initiated followed by prednisone. If steroids cannot be weaned or are not tolerated, immunomodulators, such as methotrexate, may be used. In severe disease, infliximab has increasing evidence as an appropriate alternative. Two-thirds of patients will respond to medications. Those with refractory disease often require radiotherapy. The mortality rate of neurosarcoidosis is 10%, twice the mortality of other sarcoid lesions, with increased incidence in those experiencing seizures or meningitis. Although rare, neurosarcoidosis should be considered in patients presenting with seizure.
OKLAHOMA POSTER FINALIST - CLINICAL VIGNETTE Omer Iftikhar, MBBS

CLOVES SYNDROME : A case series of three patients with rare overgrowth anomaly.

First Author: Omer Iftikhar, MBBS, MD Second Author: Alfonso J Tafur, MD Third author: Ana Casanegra, MD

INTRODUCTION: CLOVES syndrome is a newly recognized clinical entity that is an acronym for Congenital Lipomatous Overgrowth, Vascular anomalies, Epidermal nevi along with Skeletal abnormalities. We describe here three cases of CLOVES / Proteus syndrome with their specific phenotypic features:

Case 1: 49-year-old male comes in for increasing circumference of the left lower extremity stump. Based on history of lower extremity asymmetry resulting in left leg amputation, ischemic stroke, bilateral lymphedema, large hemangiomas on the chest and abdomen a diagnosis of proteus/CLOVES syndrome was made and he was scheduled for regular follow-up to see the progression of his scoliosis and lower extremity disparity.

Case 2: 52-year-old female with history of portal vein aneurysm was seen in the clinic with recurrent lymphedema. The patient had a history of Left upper extremity debulking at the age of 6 months. Port wine stain of 5 cm diameter was found on right upper back area along with significant macrodactyly without any significant scoliosis.

Case 3: 29-year-old male with history of lower extremity hemihypertrophy was evaluated for left lower extremity skin lesion. On physical examination, he was found to have small areas of left flank discoloration, left leg circumference greater than the right along with lymphedema on the left side. MRI of the left leg showed significant subcutaneous fat deposits and an angiogram of the lower extremities showed dilated left common iliac and external iliac arteries along with venous engorgement.

DISCUSSION: The co-existence of multiple tissue overgrowth along with vascular anomalies has been a known phenomena and can has been described most often under Proteus syndrome, hemihyperplasia, multiple lipomata syndrome and Klippel-Trenaunay syndrome. CLOVES syndrome presents as overgrowth pattern is distinct from the dysplastic and disorganized nature of that seen in other similar syndromes. The lipomatous masses are generally associated with capillary malformations in the truncal areas. All patients have slow flow malformations (lymphatic, venous, and capillary) and a small percentage of patients have additional fast-flow arteriovenous malformations. Asymmetric limb growth, broad spade like hands, laxity of collateral ligaments of the thumb and large sandal gap between great and second toes are some of the phenotypes distinct to CLOVES syndrome. Systemic manifestations like renal agenesis/hypoplasia, splenic lesions and pulmonary embolism have been described. The majority have some degree of neurological impairment. The diagnosis is based on clinical examination. Surveillance studies should be performed to identify complications like scoliosis. Soft tissue debulking, osteotomies, staged reconstruction and amputations are possible surgical options for treatment of complications.
Langerhans Cell Histiocytosis Presenting in an Adult with Mandibular Osteomyelitis

First Author: Kathryn White, DO Heather Bell, DO

A 35 year-old Caucasian male presented with fevers, chills, malaise, some shortness of breath and left jaw pain ongoing for approximately three months. Two years prior, he had a pathologic fracture secondary to chronic infection of the left mandible treated with reconstruction with an allogenic bone graft. Blood cultures and labs were drawn at admission and infectious disease and oral surgery were consulted for suspected mandibular osteomyelitis. His labs showed a white blood cell count of 13.0 ×10⁹/L, erythrocyte sedimentation rate of 28 mm/hr, and C-reactive protein of 0.9 mg/L (8.56 nmol/L). He underwent debridement and biopsy of the mandible and was started on ampicillin-sulbactam for oral flora coverage. Mandibular cultures showed moderate leukocytes, Bacteroides melaninogenicus, moderate Capnocytophaga and few beta-hemolytic streptococci group F.

The left mandibular biopsy showed extensive destruction of the bone by cellular infiltrate of eosinophils with large sheets of histiocyte cells. The histiocytic cells were positive for immunohistochemical markers S100 and CD1a consistent with Langerhans cell histiocytosis. Further imaging revealed pulmonary involvement. A computed tomography scan of the chest showed metastatic disease with diffuse reticulonodular interstitial pattern with minimal early cyst formation at mid and upper lungs and mild hilar adenopathy. Skeletal radiographic survey was negative for any bony involvement. His positron emission test showed diffuse activity at mandibular lesion but no other abnormal activity. The magnetic resonance imaging for his brain and spine revealed no metastatic disease.

Radiation oncology recommended smoking cessation for pulmonary involvement and treatment with 1000 cGy in five fractions for the mandibular involvement.

Primarily considered a disease of childhood, Langerhans cell histiocytosis rarely occurs in adults. While low dose radiation is considered curative, especially for single bony involvement, it is still unknown if this disease is an oncologic process or a reactive process.
ONTARIO POSTER FINALIST - CLINICAL VIGNETTE Siraj Mithoowani, MD

The blue man: A case of methemoglobinemia secondary to chronic dapsone therapy

Siraj Mithoowani, Lindsay Melvin, Tim Karachi. Department of Medicine, McMaster University, Ontario, Canada.

Background: Methemoglobin is an oxidized form of hemoglobin where one or more heme irons change from ferrous (Fe2+) to ferric (Fe3+) state. This leads to a “left-shift” of the hemoglobin-oxygen dissociation curve and impairs oxygen delivery at the peripheral tissues. Methemoglobin levels above 15% cause headache, exercise intolerance and altered mental status. We present a case of dapsone-induced methemoglobinemia in a critically ill patient.

Case: A 39 year old male with a past medical history of HLH requiring chronic immunosuppressive therapy was admitted in septic shock. Medications on admission included chronic dapsone for primary PCP prophylaxis. Several days after the patient was stabilized, he appeared cyanotic with SpO2 89% on 50% FiO2 by facemask but without respiratory distress. An ABG appeared muddy red in colour and revealed pH 7.43, pCO2 36, bicarbonate 24, pO2 177 and an elevated methemoglobin level of 14%. A diagnosis of dapsone-induced methemoglobinemia was made and the medication was discontinued. A single dose of 1mg/kg IV methylene blue was administered resulting in complete resolution of his cyanosis within one hour. The SpO2 rose to 95% on 2L nasal prongs and a repeat ABG showed a normal PaO2 and methemoglobin level.

Discussion: Dapsone, an oxidizing agent, is a common cause of acquired methemoglobinemia in the hospital setting, accounting for 42% of all cases, though often in acute initiation of therapy. Recognizing methemoglobinemia can be challenging, particularly when it is associated with chronic dapsone use as in this case. Our case demonstrates that one should consider this unusual diagnosis when faced with a hypoxic, cyanotic patient with a paradoxically normal or supra-normal PaO2.
Sympathetic pericarditis? Acute myopericarditis in a patient with concomitant MRSA pneumonia and empyema

David M. German

Introduction: Acute pericarditis is a common cause of acute chest pain. Most cases are idiopathic or of presumed viral etiology and typically have a relatively benign clinical course. Respiratory infections caused by Staphylococcus aureus can be aggressive, and in the pre-antibiotic era were more often associated with severe suppurative complications such as purulent pericarditis. This case of a patient with acute myopericarditis and MRSA pneumonia complicated by empyema serves as a reminder of the possibility of bacterial pericarditis in patients with pneumonia, and also suggests the possibility of “sympathetic pericarditis.”

Case: A 56 year-old man presented with severe “stabbing” pleuritic chest pain and dyspnea in the setting of 6 days of productive cough and myalgias. His temperature was 101.1 F, heart rate 99, respiratory rate 17, blood pressure 101/69 mm Hg, and oxygen saturation 97% on room air. Physical examination was notable for a faint pericardial friction rub and diminished lung sounds at the left base. A pulsus paradoxus was < 10 mm Hg. Laboratory studies were remarkable for a WBC count of 24,300/µL with 83% neutrophils and 6% bands, as well as a troponin T of 0.36 (reference range 0 – 0.04). An ECG revealed diffuse ST elevations, and an echocardiogram showed mildly reduced LV systolic function with hypokinesis of the inferior wall, not concordant with the observed ECG changes, and no pericardial effusion. A chest radiograph revealed collapse of the left upper lobe, consolidation of the left lower lung, and a left pleural effusion. Thoracentesis was done, and revealed an exudative pleural effusion with multiple gram-positive cocci on gram stain. The patient improved after placement of a chest tube and treatment with colchicine, ibuprofen, IV vancomycin. Blood cultures remained negative, but both sputum and pleural fluid cultures grew MRSA. A respiratory viral panel was negative. There was no pericardial effusion on a follow-up echocardiogram. Symptoms completely resolved after prolonged course of outpatient antibiotics.

Discussion: Though an unrecognized viral infection may have preceded the pneumonia and precipitated the patient’s myopericarditis, this case is also a reminder of the ominous possibility that myopericarditis may itself be a complication of bacterial respiratory infections. Further evaluation for this with pericardiocentesis may have been warranted had an effusion been present with failure to improve on empiric treatment. The incidence of myopericarditis in patients with pneumonia is unknown, but an association between pericardial effusion and parapneumonic effusion has been observed. Pericardial effusions in this setting are described as “sympathetic” pericardial effusions. This case suggests the possibility of “sympathetic” myopericarditis given the highly inflammatory process adjacent to the pericardium.
OREGON POSTER FINALIST - CLINICAL VIGNETTE Jia Luo, MD

An unusual upper gastrointestinal bleed; Hemobilia as a presentation of chronic portal vein thrombosis

First Author: Jia Luo, MD Jonathan Pak, MD, Amaiak Jensen-de la Cruz, MD, Scott E Naugler, MD

INTRODUCTION: One of the most common causes of an upper gastrointestinal bleed (UGIB) is bleeding from esophageal varices secondary to either cirrhosis or thrombus leading to portal hypertension. Hemobilia, or bleeding into the biliary tree, is a less frequent cause of UGIB and is usually thought to be secondary to instrumentation or trauma. One cause of hemobilia rarely reported in the literature is portal hypertensive biliopathy or engorgement of collateral veins around the gall bladder forming a portal cavernoma in the setting of portal venous obstruction.

CASE PRESENTATION: A 58-year-old male with a history of portal hypertension secondary to chronic portal vein thrombosis (PVT) presented to the hospital with two weeks of black tarry stools. He underwent esophagogastroduodenoscopy (EGD) and banding one-month prior for known esophageal varices and was taking nadolol for portal hypertension. Labs revealed a hematocrit of 19.5, which did not respond appropriately to blood transfusion, and the patient was admitted to the hospital for further workup. Endoscopic studies and imaging revealed extensive varices, including biliary varices, and hemobilia. Initial angiography revealed varices abutting the biliary tree, which likely caused some of the hemobilia. In addition, multiple tiny arteriovenous malformations (AVMs) were noted in the liver, and on subsequent angiography one of these “microaneurysms” was found to be bleeding into the biliary tree. Multiple procedures including endoscopic retrograde cholangiopancreatography, transjugular intrahepatic portosystemic shunt and embolization of the AVM-to-bile duct fistula did not lead to resolution of his transfusion-dependent bleeding. Intermittent cessation of bleeding from clot formation in the biliary tree was associated with biliary obstruction and an episode of septic cholangitis. He received a liver transplant for definitive treatment.

DISCUSSION: For patients with chronic PVT, clinicians should be alert for symptoms of portal hypertensive biliopathy, primary manifestations of which include hemobilia or biliary obstruction. The association between portal hypertensive biliopathy and hemobilia is understudied. However, it has been reported in both patients with cirrhosis and those with chronic PVT with cavernous transformation, as seen in this case. The presence of AVMs complicated this patient’s course, giving rise to a second cause of hemobilia. Such AVMs are unusual in the liver, but likely similar to other AVMs found more commonly in portal hypertension such as those in the pulmonary or cutaneous vasculature, the latter of which we recognize as “spider angiomas.” This case reviews the literature on portal hypertensive biliopathy, an understudied clinical entity, and brings to light an area that needs further study and clinical recognition.
**OREGON POSTER FINALIST - CLINICAL VIGNETTE Caroline McCulley, MD**

**Got Rolaids? A Case of Calcium-Alkali Syndrome**

First Author: Caroline McCulley, MD Richard Wernick, MD

Calcium alkali (AKA milk alkali) syndrome (CAS) is the triad of hypercalcemia, metabolic alkalosis, and acute kidney injury in the setting of significant calcium-usually at least 4 g/d- and alkali ingestion. Diagnosis is confirmed by resolution upon stopping the ingestion. We report a case of CAS precipitated by only 2.7 g of calcium and which we believe occurred because of marked alkalosis and volume depletion from repeated emesis.

A healthy 53 year old male presented to the emergency department with a 3 day history of vomiting every 2 hours and burning epigastric pain, partially relieved by a total of 10 Extra Strength Rolaids (270 mg calcium per tablet) over 2 days. He denied milk or vitamin D ingestion. Physical exam was normal except for pulse of 102 and epigastric tenderness. Pertinent laboratory results included calcium 13.9, HCO3 39, phosphorus 3.4, intact PTH 7, 25-OH vitamin D 13.5, BUN 30, Creatinine 1.3, and pH 7.68. An abdominal CT scan showed diffuse mural thickening of the gastric antrum. EGD demonstrated multiple gastric ulcers and erosive esophagitis. With normal saline volume resuscitation, serum calcium improved to 8.3, HCO3 to 22, and creatinine to 0.70 over the course of two days. He was started on omeprazole for ulcers.

Although 90% of hypercalcemia is caused by primary hyperparathyroidism and malignancy, CAS is the third leading cause in hospitalized patients and more common than hyperparathyroidism in cases of severe hypercalcemia. Historically, milk alkali syndrome was first described in 1915 when significant amounts of milk, cream, and alkaline powder were used to treat peptic ulcer disease. A resurgence of CAS has occurred with the advent of over the counter calcium carbonate preparations and emphasis on calcium and vitamin D for osteoporosis and bone health. The pathogenesis of CAS is complex and multifactorial, involving increased intestinal absorption and decreased renal excretion of calcium. High levels of calcium induce diuresis and subsequent volume depletion by inhibiting a medullary co-transporter and causing natriuresis and blocking ADH-dependent water reabsorption. This volume depletion stimulates renal tubular absorption of HCO3-, leading to metabolic alkalosis, which maintains a cycle of hypercalcemia and volume depletion via a complex system of channels within the renal tubular system. Diagnosis is based on identifying calcium and alkali ingestion with resolution from simple withdrawal of the offending agents and fluid administration. Risk factors include older age, decreased GFR, thiazides, and repeated emesis, as in rare reported cases of pregnancy and bulimia. We believe our previously healthy male developed CAS despite a relatively low calcium ingestion because of his severe emesis which led to marked volume depletion and alkalosis, comparable to the mechanism postulated for women with emesis of pregnancy or bulimia. Calcium and vitamin D supplementation should be prescribed judiciously, especially in patients with risk factors for CAS.
OREGON POSTER FINALIST - CLINICAL VIGNETTE Drew Oehler, MD

In Defense of the Physical Exam

First Author: Drew Oehler Second Author: Andre Mansoor Third Author: Peter Sullivan

Introduction: Overuse of imaging technology has left the physical exam a globally neglected, poorly-instructed skill. Increasingly, advanced testing is obtained in lieu of basic physical examination. These studies are often performed remote from the bedside—which usually yields a result, some interpretation, and possibly a differential diagnosis. This perilous transition point where diagnostic query is outsourced to disconnected parties places the provider at risk for cognitive error and the patient in danger of a missed diagnosis.

Case Description: A 29 year-old Mexican woman with a history of chronic palpitations presented with right arm numbness. That evening, she acutely developed transient dysarthria and right sided paresthesias. A computed tomography (CT) scan of the head was unrevealing for evidence of acute stroke, and she was discharged without a clear diagnosis. Her cardiovascular exam was documented without abnormality. Two days later, she returned with acute right lower quadrant abdominal pain. Due to concern for appendicitis, a CT of the abdomen was obtained which revealed complete thrombus occlusion of the right renal artery. She underwent successful thrombectomy. After admission, new dyspnea and cough productive of pink sputum prompted a chest x-ray, revealing pulmonary edema. A chest CT angiogram was ordered due to concern for acute pulmonary embolism. The study demonstrated “patchy alveolar edema versus bleeding” which prompted bronchoscopy to evaluate for diffuse alveolar hemorrhage (DAH). The bronchoscopy lavage was not consistent with DAH. Throughout this time, multiple provider notes deny existence of any murmurs or other abnormal findings on cardiac exam. Finally, an echocardiogram was performed the day following admission, which revealed severe rheumatic mitral stenosis. She was transferred to a tertiary hospital for repair. The documented cardiovascular exam by the accepting physician included a 3/6 diastolic murmur best heard at the apex and a split S2 versus crisp opening snap best heard at the apex. Phonocardiography was performed which supported the exam findings and additionally revealed presystolic murmur accentuation. After the diagnosis of severe mitral stenosis was made, the patient underwent diuresis and was anti-coagulated for presumed valvular atrial fibrillation. Ultimately, she underwent successful mitral valve replacement.

Discussion: Despite convenient access to every contemporary imaging modality, the diagnosis in this case was considerably delayed. Ultimately, a series of cognitive biases left practitioners falsely reassured by heavy reliance on imaging reports. The physical exam—full of critical findings—could have been used to make the diagnosis sooner. A decline in physical exam use, training, and scientific query has been increasingly reported in recent decades. This case again calls attention to an education crisis where diagnostic testing and clinical reasoning drift away from the bedside and patient outcomes continue to suffer.
A Crystal Clear Moment

First Author: Kevin M Piro Second Author: Thomas Cooney, MD Third Author: Ken Scalapino, MD

A 65 year-old man presented to the ED with acute on chronic stabbing neck pain, subjective fevers, right jaw pain, and worsening right knee pain. He denied headache, vision changes, new rash, or neurological symptoms. One month prior, he was evaluated in the ED for an acutely swollen knee and clinically diagnosed with acute calcium pyrophosphate deposition disease (CPPD) without diagnostic arthrocentesis. Other past medical history was remarkable for atrial fibrillation with warfarin anticoagulation.

On initial evaluation, vital signs were normal. Exam was significant for jaw tenderness and restricted range of motion of his neck. Brudzinski’s sign was negative and his neurologic exam was normal. His right knee was slightly swollen without warmth or erythema. He had no rash. In the ED, he became febrile to 39.2 C; laboratory data revealed a leukocytosis (14,700) and a very elevated CRP (120 ; normal <3.0) and an INR of 2.8.

These findings suggested an infectious or inflammatory process, including meningitis, vertebral osteomyelitis, and epidural abscess. CT of the head and neck revealed multilevel degenerative changes of the cervical spine and a possible abnormality of the meninges. Due to risk for bleeding, lumbar puncture was not performed and an MRI was done that was unremarkable. Review of old radiographs of the knees showed bilateral chondrocalcinosis, indicating a risk for crystal arthropathy. Analysis of synovial fluid from an arthrocentesis showed positively birefringent crystals consistent with acute CPPD. As a result, CT imaging of the neck was re-reviewed and demonstrated calcification of the transverse ligament around the dens of C2. Treatment with naproxen resulted in rapid resolution of his symptoms. Given the neck stiffness, elevated inflammatory markers, demonstration of CPP crystals in the right knee, CT imaging showing microcalcification at C1-C2, and resolution of his neck pain with naproxen, a diagnosis of Crowned Dens Syndrome was made.

Crowned Dens Syndrome (CDS) is an under-recognized manifestation of CPPD characterized by episodes of acute neck pain associated with radiodense deposits of hydroxyapatite or calcium pyrophosphate dehydrate in the ligaments around the dens. Calcification of these ligaments creates the appearance of a crown on CT imaging. CDS is an inflammatory disorder that is frequently misdiagnosed, most often as meningitis, epidural abscess, polymyalgia rheumatica, or giant cell arteritis. Retrospective studies have revealed that patients diagnosed with acute CPPD regularly present with neck symptoms, suggesting that CDS may be more common than currently appreciated. In one study, half of patients presenting with acute CPPD also had periodontoid calcifications on CT imaging. This case highlights the clinical features of the Crowned Dens Syndrome and the importance of considering CDS in the differential diagnosis of acute neck pain of inflammatory or infectious etiology in patients who have risk factors for CPPD.
OREGON POSTER FINALIST - CLINICAL VIGNETTE Jennifer Lewis Rosenbaum, MD

Breaking the Spells: Pheochromocytoma as the Initial Presentation of Von Hippel Lindau at Age 80

First Author: Jennifer Lewis Rosenbaum, MD Second Author: Elizabeth Stephens, MD

LL, an 80-year old woman with a history of hypertension presented to her primary care provider with malaise. She was found to have elevated blood pressure of 188/80. She increased her single antihypertensive and began checking home blood pressure with SBPs generally between 110-130mmHg. Despite this, she presented to the emergency department three times over the next month with malaise, severe hypertension with SBP ranging from 180-200s, chest pain and headache.

Prior to these spells, her grandson was diagnosed with Von Hippel Lindau (VHL). Genetic testing revealed LL to be the proband. VHL results from a mutation in the VHL tumor suppressor gene resulting in a propensity towards benign and malignant tumor growth including pheochromocytoma.

Her PCP obtained 24hr urine 5-HIAA, VMA and metanephrine which were all within normal limits; however, urine and plasma normetanephrines were elevated at 377 (nl 0 - 247) and 2.41 (nl 0.00 - 0.89), consistent with pheochromocytoma. CT imaging revealed bilateral adrenal masses and multiple hemangioblastomas consistent with VHL. She underwent metaiodobenzylguanidine (MIBG) scanning which revealed pheochromocytoma from the paraganglioma of the pelvis and sacrum. She underwent surgical resection with resolution of her paroxysms.

Paroxysmal spells are challenging to diagnose. They have a broad differential including endocrine, cardiovascular, psychiatric, and neurogenic etiologies. Pheochromocytoma is a rare catecholamine secreting tumor generally diagnosed between the ages of 30-50. The classic triad of symptoms for pheochromocytoma is episodic headaches, sweating and tachycardia; however more patients present without those symptoms than with them. Sustained or paroxysmal hypertension are the most common signs of pheochromocytoma. Depending on the pretest probability of pheochromocytoma, different evaluation is recommended. For patients with a lower suspicion, a 24 hour urine fractionated metanephrines has sufficient sensitivity. However, in patients with a higher pretest probability, it is appropriate to get a 24 hour urine collection for fractionated metanephrines/catecholamines and plasma metanephrines to increase the sensitivity and specificity of testing. Given her known VHL mutation, it was appropriate to have a high suspicion for pheochromocytoma.

VHL is seen in approximately 1/36,000 people. It usually presents between the ages of 10 and 40 with a mean age of presentation of 26. VHL is autosomal dominant with different penetrance for different tumors, some up to 90%, however pheochromocytoma has a penetrance closer to 30%. This is a rare case of VHL presenting at age 80 with a symptomatic pheochromocytoma. It is likely she had the tumor for years but is unclear what triggered it to become symptomatic at such a late age.
OREGON POSTER FINALIST - CLINICAL VIGNETTE Amer F Salam, MD

You Think You Know, But You Don’t Know Behcet’s

First Author: Amer F Salam, MD

Introduction: The diagnosis of aseptic meningitis carries a broad differential including infectious, drug induced, malignancy, and autoimmune causes. Although uncommon, Behcet’s disease can present as aseptic meningitis. This case of Neuro-Behcet’s reinforces the importance of taking a detailed medical history.

Case Description: A 24 year old woman presented with a 1 day history of headache and neck stiffness. She had been hospitalized twice within the prior 6 weeks for similar symptoms and diagnosed with aseptic meningitis of unclear etiology.

Cerebrospinal fluid analysis revealed an elevated white blood count of 2,600 with a neutrophil predominance, elevated protein and low glucose, all consistent with bacterial meningitis. She was treated with Ceftriaxone and Vancomycin; however, cultures and PCR were negative for bacteria, fungi, and viruses. Her debilitating headaches persisted, so she underwent a brain MRI which revealed non-specific subtle leptomeningeal enhancement. A second lumbar puncture again showed pleocytosis with neutrophil predominance and elevated protein.

Further review of the patient’s history revealed recurrent episodes of oral and genital ulcers with a previous negative workup. Given this in conjunction with her clinical presentation, she was given a diagnosis of Neuro-Behcet’s disease. She was treated with high dose steroids and her symptoms resolved completely within 24 hours.

Discussion: Behcet’s is a multisystem disease of unknown etiology first described by Hippocrates in the 5th century. It was formally reported in 1937 by Turkish dermatologist, Hulusi Behcet, as a triple symptom complex of recurrent aphthous ulcers, genital ulcers, and uveitis leading to blindness. While the most common manifestations are recurrent and painful mucocutaneous ulcers, patient’s with Behcet’s can develop several systemic manifestations including ocular disease, skin lesions, gastrointestinal involvement, vascular disease, arthritis and even neurologic disease, including meningitis. The incidence of Behcet’s disease in the United States is estimated to be 0.38 per 100,000 population. Neurologic manifestations occur in less than 20% of patients with underlying Behcet’s disease. Symptoms can range from aseptic meningitis to behavior changes, psychiatric disorders, dementia, cranial neuropathies, and vascular thrombosis. As in this case, the CSF in patients with aseptic meningitis due to Behcet’s often mimics bacterial meningitis with increased protein and neutrophil predominant leukocytosis.

Behcet’s Disease is a clinical diagnosis; a detailed history is essential in avoiding expensive and redundant evaluations. This patient endured five lumbar punctures and associated CSF studies, blood tests, imaging, and multiple hospital stays with a monetary cost of slightly over 80,000 dollars. So while Neuro-Behcet’s is a rare presentation of an uncommon disease, a thorough clinical history and an appropriate exclusionary work-up can make the diagnosis and avoid unnecessary testing and treatment.
A Confounding Cavity: The Ellusive Diagnosis of and Invasive Fungal Infection

Mucormycosis is an invasive fungal infection that most commonly affects patients with hematologic malignancies, bone marrow transplants, and poorly controlled diabetes. We describe a case of delayed diagnosis of disseminated mucormycosis in a patient on long-term corticosteroids.

A 66 year old woman with rheumatoid arthritis on chronic prednisone, inflammatory bowel disease (IBD), and IBD-related lower extremity ulcers presented to the hospital with productive cough, fever, and hypoxemia. A chest CT revealed a right perihilar opacity with central cavitation and peripheral patches of consolidation with surrounding ground glass (halo sign). Bronchoalveolar lavage was significant for elevated aspergillus galactomannan antigen (GM). Two serum GMs were negative and serum 1,3 β-D-glucan assay (BDG) was mildly positive. Voriconazole was initiated for presumed invasive aspergillosis. Repeat CT showed enlargement of the pulmonary lesions after 14 days of voriconazole. She had a complicated hospital course including cellulitis, encephalopathy, renal failure requiring hemodialysis, thrombocytopenia, and lower gastrointestinal bleeding from a flare of her IBD requiring high dose steroids. The diagnosis of invasive aspergillosis was questioned and an open lung biopsy was pursued, but could not be performed due to the high operative risk due to the above-mentioned complications. The patient continued to deteriorate requiring mechanical ventilation. She underwent another bronchoscopy, which showed frank blood in her airways and a large fungating lesion in the right upper lobe bronchus. Soon after, she had a cardiac arrest and passed away.

Autopsy results from her lung showed large areas of hemorrhage and abundant large non-septate fungal organisms invading the vasculature; culture showed rhizopus spp. Multiple small bowel, stomach, cecal, and rectal ulcers demonstrated submucosal fungal angioinvasion consistent with disseminated mucormycosis infection

Invasive fungal infections are a considerable diagnostic challenge. There is no reliable antigen assay for mucormycosis; diagnosis is based on demonstration of the organism by fungal stains or culture. Aspergillus galactomannan antigen and 1,3 β-D-glucan are assays for invasive fungal infections, not including mucormycosis, that have good sensitivity and specificity for fungal disease in the populations for which they were validated. These tests have mostly been studied in patients with hematologic malignancies and bone marrow transplants. In low prevalence populations the positive predictive value of a GM or BDG is likely low and results should take into account the myriad causes of false positives. In this patient, both labs likely represented false positives which lead to treatment for invasive aspergillosis. In patients on chronic steroids with pulmonary lesions of unclear etiology and lack of response to antimicrobials, lung biopsy should be pursued for evaluation of pulmonary mucormycosis.
Malaria: A Case That Will Literally Take Your Breath Away

First Author: Peter M Smith, MD

Introduction: Malaria can cause severe disease in non-immune patients through vascular-mediated complications. Awareness and early interventions can prevent severe morbidity and mortality.

Case Report: A 28 year old female with no past medical history presented with 1 week of daily fevers to 104.4, headaches, and nausea. Two weeks prior to admission, she spent 3 weeks in her home town of Bangalore, India. On physical exam, she was febrile, tachycardic, tachypneic, hypotensive, febrile, diaphoretic and ill appearing. She had fine inspiratory crackles, and a palpable spleen tip. Admission labs were notable for thrombocytopenia and mild anemia. A blood smear revealed plasmodium (image 1). CXR on admission was grossly normal. She was treated with intravenous crystalloid and a course of malarone and chloroquine. PCR speciation revealed P. Vivax. Hospital course was complicated by acute hypoxic respiratory failure on hospital day #3 requiring BiPAP, intermittently, and ICU-level care. However, she recovered, and was discharged at baseline health. She was given primaquine for 14 days for terminal prophylaxis of latent infection. At follow-up blood smears showed no evidence of plasmodium.

Discussion: Acute malaria infections are generally separated into two categories, complicated vs. uncomplicated. Complicated infections are generally defined as infections with high parasite loads that lead to organ dysfunction. Many of the complications of malaria are thought to be caused by parasitized cells adhering to blood vessels which causes microinfarctions and capillary leakage leading to organ dysfunction. Most major organs can be involved, however this patient developed non-cardiogenic pulmonary edema as a result of this process occurring in the pulmonary vessels. Respiratory distress can occur in up to 25% of adult cases of malaria. Although aggressive hydration with intravenous fluids is a necessary aspect of supportive care for malaria patients, it can also exacerbate pulmonary edema. This elegantly demonstrates the need to closely monitor acutely ill patients, and to understand that even seemingly benign medical interventions are not without possible consequence. Complicated malaria, as experienced by this patient is rare with infection by non-falciparum plasmodium species. Complicated infections in such individuals may be caused by undetected co-infection with falciparum species.

Conclusion: Suspicion for malaria should be high for any patient presenting with fevers and recent travel to an endemic region. Although most infections are minor, an understanding of the mechanism of disease allows health care providers to monitor for potentially life-threatening microvascular infarction manifested as organ dysfunction.
Ovarian Vein Thrombosis: An uncommon cause of abdominal pain which led to a life threatening complication

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Introduction: Ovarian vein thrombosis (OVT) is an uncommon condition occurring mainly in the setting of pregnancy and it can lead to fatal outcomes. We present a case of OVT in a non-pregnant female who presented with nonspecific symptoms and subsequently developed pulmonary emboli.

Case description: A 29 year-old female presented to our emergency department with a two day history of fever, nausea, vomiting, and productive cough. She did not have abdominal pain, dysuria or vaginal discharge. She denied history of tubo-ovarian abscess, pelvic inflammatory disease or ectopic pregnancy. She had a temperature of 104°F and an elevated white cell count. Chest X-ray revealed a right lower lobe opacity and she was empirically started on antibiotics for pneumonia. Clinically, she reported symptomatic improvement. However, two days after starting antibiotics she developed hemoptysis, shortness of breath, and lower abdominal pain. Computer Tomography (CT) of the abdomen and pelvis revealed a left OVT and CT angiogram of the chest revealed multiple lung infarcts involving the posterior right lower lobe, lingula, and left lower lobe. Ultrasonography of the deep veins of the lower extremities was negative for thrombosis. She was started on heparin and then transitioned to warfarin for anticoagulation.

Discussion: OVT occurs in the right ovarian vein in 70-90% of cases and the typical presentation includes pelvic pain, fever, and right lower quadrant abdominal mass. The risk of pulmonary embolism is approximately 25% in patients with untreated OVT and the mortality in pregnancy approaches 4%. It is estimated that OVT occurs in 1/600 to 1/2000 pregnancies. Hypercoagulable state along with relative venous stasis at the vena cava due to compression from pregnant uterus predisposes to thrombosis. Other risk factors include malignancy, pelvic inflammatory disease, sepsis and recent pelvic or abdominal surgery.

The incidence of OVT outside of pregnancy is rare and has not been statistically evaluated. Our case was notable because the patient had left ovarian vein thrombosis outside the setting of pregnancy which led to pulmonary embolism. There are no specific guidelines for the treatment of OVT, but short term treatment with oral anticoagulation is recommended based upon expert opinion.

Thus, in female patients presenting with lower quadrant pain, with or without fever or palpable abdominal or pelvic mass, OVT should be considered in the differential diagnosis even in the absence of pregnancy. If left untreated it can lead to potentially fatal complications such as pulmonary embolism. Hence, prompt diagnosis of OVT requires a high index of suspicion.
An Anatomic Cause for Progression of Chronic Kidney Disease

Chronic Kidney Disease (CKD) presents frequently in US hospitals. Anatomical culprits of CKD should not be overlooked in disease workup and assessment of progression.

An 81-year old female with a history of CKD-III, diabetes mellitus, hypertension, tobacco use, aortic stenosis, and recently-noted right-sided hydronephrosis presented to the hospital for asymptomatic hyperkalemia. She had been called by her cardiologist for a potassium level of 7.4 earlier that day and was asked to present to the emergency department. There, her potassium was confirmed to be 7.2. She had no new symptoms, but did complain of occasional flank pain for approximately one month’s time. Her physical exam revealed no acute distress, with a regular rate and rhythm on cardiac examination. She had a 3/6 systolic ejection murmur in the right second intercostal space. Labs on admission revealed acute kidney injury with a non-gap, metabolic acidosis with hyperkalemia to 7.1. Urine anion gap was measured at 36, venous blood gas showed a pH of 7.24, and creatinine rose to 2.09 from her last assay of 1.3, a year and a half ago.

While in the hospital, her hyperkalemia required multiple doses of sodium polystyrene daily. While working up her kidney injury, ultrasound of her kidneys showed known moderate right-sided hydronephrosis with new blood clots in the collecting system of the kidney. Computerized non-contrast tomography (CT) of the abdomen was performed, disclosing hydroureteronephrosis extending to the level of a newly-identified right internal iliac artery aneurysm. This was suspected to cause compression of the ureter, with obstruction of normal kidney outflow and resultant unilateral hydronephrosis and worsening kidney disease, creating her clinical presentation.

Cystourethroscopy was performed by urology. The compressed section of ureter was located and stented open, with immediate return of purulent drainage. Over the next three days, her potassium returned to normal levels, and her creatinine trended down modestly. She was started on a seven day course of antibiotics and was eventually discharged with follow-up with her nephrolgist and primary care physician.

This case illustrates the value of investigating anatomic causes of CKD progression. In this patient narrative, iliac aneurysm caused one-sided stenosis of the ureter and resultant kidney injury. While many patients in US hospitals today have multiple chronic medical diseases often leading to progression, investigative vigilance is still required to clinch the diagnosis, and an especially high degree of suspicion should be maintained in cases of unilateral disease.
Living Diagnosable: Delayed Diagnosis of Cornelia de Lange Syndrome and Devastating Results

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A 21-year-old female resident of a nursing home for adults with mental disability was hospitalized due to multiple seizure episodes. She was born in the Department of Human Service custody. There was no available perinatal history, except the fact that her mother was mentally retarded. The patient had been diagnosed with fetal alcohol syndrome by her pediatrician. Besides profound mental retardation, she also had severe gastro-esophageal reflux disease (GERD) requiring gastrojejunal tube placement for feeding and difficult-to-control seizures on multiple antiepileptics and vagus nerve stimulation. The cause of seizure exacerbation was that her clogged feeding tube prevented her from receiving medications. After a thorough examination, we found that she had dysmorphic characteristics of Cornelia de Lange Syndrome (CdLS) including microcephaly, bushy eyebrows, synorphrys, anteverted nares, long smooth philtrum, thin curved upper lip, low set ears, micromelia with clinodactyly, and hirsutism. Considering that synorphrys, micromelia, and GERD are invariable features in CdLS, yet these findings do not support the diagnosis of fetal alcohol syndrome, we thus changed the diagnosis to CdLS. The patient had also been diagnosed with von Willebrand’s Disease (vWD), but did not have any bleeding complications during this admission.

This case represents a delayed diagnosis of CdLS due to patient being mislabeled as fetal alcohol syndrome. The lack of well-developed diagnostic criteria, overlapping features with other congenital disorders, and age-dependent characteristic manifestations such as bushy eyebrows, synorphrys and hirsutism preclude the correct diagnosis of CdLS. Mislabeling patients hinders them from appropriate investigation, management, and counseling. Severe GERD is a major problem in CdLS patients. Early recognition is vital as surgical intervention may be required to prevent failure-to-thrive and recurrent respiratory tract infection. The development of increased awareness among clinicians and a widely accepted criteria for diagnosis of CdLS are crucial to limit the consequences of delayed diagnosis. Interestingly, our patient had also been diagnosed with vWD. The coexistence of CdLS and vWD has been reported in literatures; however, we cannot establish the association between them because vWD is a relatively common genetic disease. Further study will help investigate their association and may expand the hematological manifestation in CdLS.
Not All Myasthenia Gravis Are Created Equal

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A 22-year-old female presented with generalized weakness and intermittent blurry vision. She had been previously healthy until two years ago when she first experienced weakness of her eyelids, which was rapidly progressing and was accompanied by blurry vision. Her symptoms was fluctuating during the day. She was seen by a neurologist who noticed bilateral ptosis and horizontal diplopia. Multiple tests, including CT scan of the chest, thyroid function test, and test for antibodies to acetylcholine receptors (AchR-Ab), were all negative. She was diagnosed with AchR-Ab-negative myasthenia gravis (AchR- MG) and was treated with pyridostigmine. Her symptoms slightly improved initially. However, she later developed worsening ptosis and severe diarrhea, which prompted her to stop taking the medication, and finally came to the hospital this time. Neurological examination revealed fatigable bilateral ptosis and bilateral lateral rectus muscles weakness. She was admitted and initially restarted on pyridostigmine, which caused her diarrhea again. Therefore, pyridostigmine was discontinued. She was then treated with intravenous immunoglobulin (IVIG), which was later switched to plasmapheresis plus oral prednisone. Her diplopia improved and she regained full function of lateral rectus muscles. However, she still had bilateral ptosis that was fatigable and fluctuated throughout the day. After discharge, the result of antibodies to muscle-specific tyrosine kinase (MuSK-Ab) came back positive. Upon follow up, the patient still had bilateral ptosis while on prednisone.

Our case represents a challenge in which detailed history is crucial to making the correct diagnosis. The fluctuation of weakness pointed towards a diagnosis of MG, even though the test for AchR-Ab was negative. Patients with suspected AchR- MG should be checked for serum MuSK-Ab, but this should not delay the treatment. Our patient had MuSK MG with a rare ocular manifestation at onset. Unlike AchR+ MG patients, most MuSK MG patients do not improve with acetylcholinesterase (AchE) inhibitor such as pyridostigmine. It can actually result in worsening symptoms. Moreover, some patients can develop cholinergic crisis due to severe cholinergic hypersensitivity following the administration of AchE inhibitor. Given that the risk of myasthenic crisis is higher in MuSK MG than in AchR+ MG, these patients need to be hospitalized and monitored for respiratory function during acute flare of the disease. High-dose steroids and immunomodulation with plasmapheresis or IVIG are the mainstay for the treatment of acute flare in these patients. Furthermore, chances of achieving complete remission are also lower in MuSK MG patients; therefore, they usually require long-term immunosuppression therapy with steroids. Steroid-sparing agents such as mycophenolate, azathioprine, and cyclosporine have been used but were generally found to be less effective than in AchR+ MG.
Granular cell tumor of common hepatic duct as an unusual cause of jaundice in a patient with acute hepatitis C: Looking beyond the tip of iceberg!

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Introduction: Granular cell tumor (GCT) is rare, benign neoplasm of Schwann cell origin. Most GCTs have been described in the dermis and oral area, with less than 1% of cases occurring in the biliary tract.

Case: A 33 year old Caucasian woman presented with new onset of jaundice, and fatigue and nausea for 7 days. Her social history was significant for IV cocaine abuse for 15 years with recent use 3 weeks prior to onset of the symptoms, as well as frequent binging of alcohol. Clinical examination was significant for jaundice with no stigmata of chronic liver disease. Significant laboratory results included a total bilirubin of 9.2, AST of 1677, ALT of 2071, and an alkaline phosphatase of 171. She had a positive HCV antibody, with a HCV PCR of 12,000,000 IU/mL (genotype 1A). She was presumed to have acute hepatitis C infection vs. an ischemic hepatitis from cocaine.

An abdominal ultrasound revealed a normal liver with patent hepatic vessels. In the mid common bile duct (CBD) there was a 1.9 x 1 cm isoechoic intraluminal lesion causing focal CBD expansion with no dilation of the proximal CBD. This finding was suspicious for a neoplasm. An MRI/MRCP verified a partially obstructing polypoid lesion (2 x 0.6cm) in the common hepatic duct (CHD). An ERCP with SpyGlass cholangioscopy identified a 1.5 cm friable, irregular polypoid lesion in the CHD, which was sampled with CHD brushings and SpyBite forceps biopsy. Brushings were negative for malignancy, and the biopsy was insufficient for evaluation. A liver biopsy revealed a biliary obstructive pattern of canalicular and hepatocellular cholestasis with bile ductular proliferation and acute pericholangitis. Trichrome stain revealed stage 1 portal fibrosis.

Complete surgical excision with cholecystectomy and hepaticojejunostomy was performed followed by histopathological examination, confirming the diagnosis of Granular Cell Tumor of CBD/CHD, Immunohistochemical staining of tumor cells were S-100 (+) and neurofilament, smooth muscle actin and c-kit (-). Postoperative course was uneventful. The patient was asymptomatic at one-month follow-up and was to receive outpatient management of her HCV infection.

Discussion: This case emphasizes the difficulty in diagnosing GCT of the biliary tree with radiographic and endoscopic techniques. While extremely rare, these benign lesions are more common in young women, especially in African Americans; clinicians should have a high index of suspicion when evaluating a biliary mass in this population. Surgical excision is both diagnostic and curative. However, if left untreated, these lesions can lead to secondary biliary cirrhosis and hepatic failure necessitating liver transplant.
A Rare Cause of Hypercalcemic Crisis: Chronic Myelogenous Leukemia Can Do That?

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A 44-year-old female with a past medical history of chronic myelogenous leukemia (CML) presented to the emergency department after she was found unresponsive at home. Her CML was diagnosed eight years ago, and was stable on imatinib therapy with full hematologic response and partial cytogenetic response. In the emergency department, she was hemodynamically stable but unresponsive and required intubation. Physical examination was unremarkable. Laboratory studies showed calcium level of 23 mg/dL (range 8.4-10.2 mg/dL) and leukocytosis of 44 K/ul (range 4.0-10.4 K/ul). A peripheral blood smear showed 10% blasts, suggestive of accelerated phase CML. Further workup of the hypercalcemia revealed an intact PTH level that was appropriately suppressed. Serum and urine protein electrophoresis were checked to exclude multiple myeloma and results were unremarkable. PTH-related protein (PTHrP) returned positive, which was suggestive of humoral hypercalcemia of malignancy. A subsequent CT scan of the chest, abdomen, and pelvis did not show any evidence of a mass. Given the presence of blasts on the peripheral smear, flow cytometry was done and showed myeloid blasts. A bone marrow biopsy showed 19% blasts and FISH was positive for BCR/ABL1 fusion, consistent with a CML blast crisis. The patient was treated acutely for the hypercalcemia with intravenous fluids, zolendronic acid, furosemide, and calcitonin. Following treatment, her calcium level normalized and her encephalopathy resolved. For the CML she was started on dasatinib, an oral tyrosine kinase inhibitor. Unfortunately the patient had a complicated hospital course and ultimately died of acute respiratory failure secondary to extensive tumor burden with a high blast count.

Hypercalcemia is a frequently encountered clinical problem by general internists. The most common cause in ambulatory settings is primary hyperparathyroidism, while the most common cause in the hospital setting is malignancy. Clinicians should suspect malignancy in patients who are symptomatic and have very high serum calcium levels, typically greater than 12 mg/dL. Hypercalcemia in malignancy can occur by one of three major mechanisms: osteolytic metastases, tumor secretion of PTHrP, and tumor production of 1,25-dihydroxyvitamin D. Common tumors that secrete PTHrP include solid tumors (e.g. breast, lung, renal, bladder) and hematologic malignancies (e.g. non-Hodgkin lymphoma). Prior to presentation, our patient’s CML was stable on imatinib. Therefore, she underwent workup to identify a possible second malignancy, however, lab studies indicated that her CML progressed to blast phase. PTHrp has been shown to be secreted in the blast phase of CML, however, there have only been a few cases reported. Despite treatment of the underlying cause, malignant hypercalcemia is a poor prognostic factor, as illustrated by our patient.
Novel use of total artificial heart: Terminating refractory arrhythmias in hypertrophic cardiomyopathy

First Author: Beth A Foreman, DO Second Author: Vincent Pinelli, DO Attending: Eric D. Popjes, MD

Hypertrophic cardiomyopathy (HCM) is an autosomal dominant disease primarily caused by mutations in cardiac sarcomere genes, with a prevalence of 1:500 in the U.S. population. It is characterized by hypertrophy of ventricular muscle and cardiac myocyte disarray, often resulting in outflow tract obstruction and altered electrical conduction. HCM is the most common cause of sudden death in young patients and athletes. Implantable cardioverter-defibrillator (ICD) placement can be effective at aborting potentially lethal ventricular arrhythmias and is used as primary and secondary prevention of sudden cardiac death. Patients with severe drug-refractory symptoms or arrhythmias and marked functional disability may be candidates for heart transplantation. Alternatively, some patients may be candidates for mechanical circulatory support with a left ventricular assist device (VAD) or total artificial heart (TAH), either as bridge to heart transplant or destination therapy.

We present a case of an 18-year-old man with severe HCM with recurrent syncope secondary to ventricular tachycardia/ventricular fibrillation (VT/VF). The patient was diagnosed with HCM at three years of age and underwent ICD placement at six years of age for primary prevention of sudden cardiac death. Since implantation, he has had four episodes of syncope; interrogation of ICD at each episode revealed VT/VF successfully converted to sinus rhythm. Despite treatment with multiple anti-arrhythmic regimens, including sotalol and amiodarone, the patient continued to have recurrent life-threatening arrhythmias. Echocardiogram revealed massive asymmetric septal hypertrophy of 60 mm and left ventricular intracavitary gradient of 40 mmHg. Given recurrent ventricular arrhythmias and high defibrillation thresholds making the patient extremely high risk for sudden death, he was evaluated for a TAH as a bridge to cardiac transplant. The patient underwent Syncardia TAH implantation and is currently awaiting heart transplantation.

Sudden cardiac death is the most feared complication of HCM; therefore, it is important to risk stratify patients for ICD placement. However, some patients continue to be symptomatic despite medical management and ICD therapy, and mechanical circulatory support and cardiac transplant serve as last resorts. To date, there are limited case reports regarding the use of TAH in HCM patients. Our case report demonstrates that using a TAH as bridge to transplant in HCM is an effective means of eliminating electrical dysfunction and decreasing risk of sudden cardiac death.
A case of unrecognized May-Thurner syndrome leading to recurrent pulmonary embolism

May-Thurner syndrome or iliac compression syndrome occurs as the result of repetitive compression of the left common iliac vein by the overlying right common iliac artery against the lumbar spine. Besides the physical compression this also results on a thickening or “spur” formation within the vessel due to inflammation. May-Thurner syndrome usually affects young women on their second to fourth decade of life, and presents with left leg swelling and pain resulting from chronic venous stasis and may progress to deep venous thrombosis (DVT). Less commonly this can lead to further complications including pulmonary embolism (PE).

We present an unusual case of a 45 year old female with recurrent pulmonary emboli despite anticoagulation and no findings of femoral or popliteal DVT on prior duplex ultrasound examinations. Her most recent PE led to chronic occlusion of her right lung at the distal right main pulmonary artery despite appropriate anticoagulation, necessitating inferior vena cava (IVC) filter placement and pulmonary thromboendarterectomy (PTE). Five months after the PTE, she presented with abdominal pain and back pain and was found to have complete IVC thrombosis at the level of the IVC filter extending into both iliac veins as well as evidence of a small peripheral acute PE. After catheter-directed thrombolysis was performed at the level of the IVC filter and iliac veins, a venogram confirmed the diagnosis of May-Thurner syndrome. The patient was successfully treated with endovascular stent and anticoagulation.

May-Thurner syndrome is a reversible but often under recognized condition leading to recurrent venous thromboembolism and should be considered in the setting of unprovoked or recurrent pulmonary emboli as well as unprovoked unilateral (left) DVT.
PENNSYLVANIA POSTER FINALIST - CLINICAL VIGNETTE Krithika Krishnarao, DO

COBALT CARDIOMYOPATHY - Blame it on the hips!!

First Author: Krithika Krishnarao, DO Triston Smith, MD George Sokos, DO Manreet Kanwar, MD

With the use of metal-on-metal hip arthroplasty, systemic toxicity has become of increasing concern. There have been a limited number of case studies describing organ damage, which may not be evident until irreversible damage has occurred.

We describe the case of a 55-year-old Caucasian male presenting with worsening dyspnea on exertion, fatigue, and lower extremity edema. Medical history included type 2 diabetes, hypertension, and osteoarthritis. Surgical history was notable for left and right metal-on-metal total hip arthroplasties in 2006 and 2007. Physical examination revealed volume overload. Transthoracic echocardiography (TTE) revealed depressed global left ventricular systolic function with a left ventricular ejection fraction (LVEF) of 30-35%, a new finding compared to a TTE from 2005. Coronary angiography did not reveal an ischemic cause for his cardiomyopathy. Cardiac MRI showed diffuse hyper-enhancement of the anterior, lateral, and apical walls consistent with an infiltrative process. Apical core endomyocardial biopsy was consistent with hypertrophic changes and focal interstitial fibrosis.

Given his history of metal-on-metal hip implants, serum levels of cobalt and chromium ions were measured and elevated at 120 mcg/L (normal < 1.0 mcg/L) and 108.8 mcg/L (normal <1.4 mcg/L), respectively. He was diagnosed with nonischemic cardiomyopathy, secondary to cobalt toxicity and underwent revision surgery of both hips. Measurements six months postoperative showed decreased serum cobalt and chromium levels to 16.6 mcg/L and 32.0 mcg/L. However, his heart function did not recover. He underwent LVAD implantation and is awaiting cardiac transplantation.

This case demonstrates the irreversible cardiac effects of metal toxicity following hip arthroplasty. Although there have been cases describing systemic effects, it is not readily recognized. Currently, there are no recommendations for serum metal ion screening following hip implants. These may need to be established in order to detect signs of toxicity earlier and undergo revision surgery prior to systemic manifestations.
Aortic Root Abscess without Aortic Valve involvement in an Elderly Male with Diffuse Large B-Cell Lymphoma presenting with persistent MSSA bacteremia

First Author: Marvin Louis Roy Lu, MD Irfan Khurram, MD Annupama Chennupati, MD Antonette Climaco, MD Alexander Rubin, MD

Introduction: Aortic root abscess without evidence of valvular involvement is extremely rare. It usually arises as a complication of aortic valve (AV) endocarditis or prosthetic valve placement. All cases in literature have been treated surgically after diagnosis. We present a case of an elderly male with persistent bacteremia found to have an isolated aortic root abscess that was treated with medical management alone.

Case: A 66-year-old man with chronic lymphocytic lymphoma with recent Richter transformation to diffuse large B-cell lymphoma presented with fever for three days. He had a port placed 12 days prior in anticipation for chemotherapy and has been complaining of pain and swelling on that area since. He also had coronary artery disease s/p coronary artery bypass graft, diabetes mellitus, hypertension and obstructive sleep apnea. Systems review was unremarkable. On exam, he was tachycardic at 110 beats/minute and febrile at 39.1°C. There was a warm, poorly-defined tender, indurated, erythematous rash on the chemoprot site. The port was removed and he was started on broad-spectrum antibiotics. His electrocardiogram showed sinus tachycardia with first-degree atrioventricular block. His blood cultures grew methicillin-sensitive staphylococcus aureus and antibiotics were deescalated to cefazolin. His hospital stay was complicated by a brief course of supraventricular tachycardia that converted to sinus rhythm with adenosine and he was started on diltiazem. He remained with persistent bacteremia for several days. A transesophageal echocardiogram (TEE) showed thickening of the aorta root and inter-annular fibrosa between the aortic valve and the anterior leaflet of the mitral valve with abnormal flow on color doppler suspicious for an aortic root abscess without valve involvement. A multidisciplinary approach together with the surgeons, oncologist, cardiologist, anesthesiologist, patient and his wife was done and we decided to for conservative management. He was given intravenous antibiotics for 6 weeks. He responded appropriately and showed clinical and laboratory signs of improvement. His blood cultures eventually cleared. A repeat TEE 3 weeks after showed resolution of the aortic root abscess. The patient was sent home stable and scheduled for chemotherapy.

Discussion: There is limited literature on isolated aortic root abscess with bacteremia to guide management but these cases generally require major cardiac surgery to replace the root. Because of his co-morbidities, he was a poor surgical candidate. A decision was made with the family to manage him medically with prolonged pathogen-guided antibiotic use because we believed that the disease was in its early stage given the lack of valvular involvement.
A Rare Cause of Heart Failure

This case describes a 32-year-old African American woman with a history only of palpitations treated with metoprolol succinate, who presented with progressive dyspnea on exertion, orthopnea, paroxysmal nocturnal dyspnea, nausea and intermittent vomiting. Her symptoms had progressed over a three-month time period, such that at the time of presentation she slept upright on a couch, and was dyspneic after walking few steps. She reported swelling of both legs as well as a 20-pound weight gain over three months. She noted early satiety as well as vomiting several times a week. She denied any alcohol or drug abuse. The patient had been adopted and did not know her family history.

Physical Exam: On presentation, her exam was notable for tachypnea with a respiratory rate of 30 and an oxygen saturation of 97% on room air. Her blood pressure was 154/115 and she was tachycardic at a rate of 118. She had elevated jugular venous pulsations to the angle of the mandible at forty-five degrees. Her lung exam revealed decreased basilar breath sounds as well as crackles half way up bilaterally. She had 3+ bilateral lower extremity pitting edema.

Hospital Course: A CT angiogram was performed to evaluate for pulmonary emboli and this revealed multiple segmental and sub-segmental pulmonary emboli in the right greater than the left lower lobes. Echocardiogram was then performed, which showed severely dilated left ventricle with a decreased ejection fraction of 10-15%. There were also prominent left ventricular trabeculations suggestive of LV non-compaction cardiomyopathy. She was started on unfractionated heparin as a bridging anticoagulant until her warfarin level was therapeutic. Her pulmonary emboli were felt to be a result of her cardiac non-compaction. She was also diuresed with furosemide and started on beta blocker and ACE-inhibitor therapy. An internal cardioverter-defibrillator was placed. Her shortness of breath as well as her nausea and vomiting resolved with optimization of her volume status as well as treatment for her pulmonary emboli.

Learning Objectives: Non-compaction cardiomyopathy (NCP) is a myocardial disorder thought to be caused by the failure of left ventricle compaction during embryogenesis leading to distinct morphological characteristics in the ventricular chamber. Clinical manifestations are variable, such that some patients are asymptomatic while others experience heart failure, arrhythmias as well as embolic events.

Optimal management has not yet been defined and there is controversy over how the condition should be treated. The need for long term anticoagulation and/or placement of ICD is especially debatable. Creation of national and/or international registries of patients with this rare cardiomyopathy would be helpful to develop best management practices.
Multiple neoplasms in a patient: Genetic association or coincidence?

First Author: Vivek Mehta, MD Additional authors: Nicholas Pozzessere DO, Abha Patel DO, Aasim Mohammed, MD, Aparna Basu, MD, Michael Rachshtut MD

There has been ongoing interest in the utility of the p63 gene in cancer development due to its fundamental role in epithelial growth. Studies have shown that altered expression of p63 is associated with the progression of cancer, particularly squamous cell cancer of head and neck, transitional cell cancer of the bladder, and Non-Hodgkin’s Lymphoma (NHL).

Our case report looks at an 81 year old male with a remote history of melanoma, papillary uroepithelial bladder carcinoma, squamous cell carcinomas of skin and vocal cord. All of these prior cancers were treated with definitive therapy. He initially presented with failure to thrive, but was later found to have innumerable pulmonary and lung nodules, along with hilar and mediastinal adenopathy. A subsequent staging PET-CT demonstrated diffuse metastatic disease involving the lungs, liver, bones, and lymph nodes. He was also noted to have a large ulcerating cecal mass.

Several lung and liver biopsies yielded a poorly differentiated carcinoma with atypical cells. The specimens were insufficient for further characterization. Given the history of multiple prior cancers, it was difficult to assess whether this was a new malignancy or a recurrence of prior disease. Eventually, a large core cecal biopsy demonstrated diffuse large B cell lymphoma. The lymphoid cells were positive for CD45, CD 19(focally), CD 20, PAX-5.

The patient was diagnosed with stage IVA lymphoma with a prognostic index of 4/5, classified as high risk. The patient completed a total of 8 cycles of R- “mini”- CHOP. He was subsequently found to be in complete remission.

Almost one year later, the patient was found to have Bowen’s disease. This was his fifth episode of squamous cell carcinoma and his eighth lifetime malignancy.

It has been suggested that altered expression of p63 can result in more aggressive, less differentiated tumors. Although we are far from having a clear picture of how p63 affects cancer development and progression, with continued research our understanding of the utility of this test grows. Further studies regarding p63 can identify whether testing for the p63 gene can assist in determining the appropriate management of patients with recurrent malignancy.
CML surfaces after completed course of treatment with Imatinib for gastrointestinal stromal tumor

First Author: Vivek Mehta, MD Additional authors: Uyen Hoang DO, Dhruvan Patel, Michael Rachshtut MD

Tyrosine kinase mutations represent the molecular hallmark of both gastrointestinal stromal tumors (GISTs) and chronic myelogenous leukemia (CML) allowing for targeted molecular therapy with tyrosine kinase inhibitors, such as Imatinib. We present an unusual case of CML masked by Imatinib.

A 50 year-old male who presented with abdominal pain was found to have a suspicious 8 x 6 x 9 cm mass in the left upper abdomen on imaging. The patient underwent complete surgical resection of the mass and pathology revealed GIST. The patient was started on adjuvant Imatinib following the resection according to guidelines.

Due to recurrent abdominal pain, seven months after his resection he had a PET CT performed which revealed an area of increased flurodeoxyglucose uptake. The patient subsequently underwent an exploration of the abdomen with subtotal gastric resection and excision of a right axilla mass. Pathology revealed no evidence of recurrent disease. He was continued on adjuvant therapy with Imatinib. Four years later, reimaging demonstrated no evidence of disease and adjuvant therapy was discontinued.

Nine months following discontinuation of Imatinib, routine blood work revealed marked leukocytosis. CML was diagnosed after further work-up. Imatinib was restarted and the patient’s blood counts returned to normal range in one months time.

There has been a reported association of patients with GIST that subsequently developed myeloid leukemia and a case report of simultaneously developing GIST and CML. None of these patients had received prior treatment. This is the first case report where CML was masked by adjuvant treatment of GIST with Imatinib. This raises the concern that treatment with Imatinib could increase the risk of secondary cancers. Further studies are needed regarding the long-term side effects of Imatinib including duration and risk for secondary cancers.
Prinzmetal Angina secondary to Haloperidol: A rare case

First Author: Aasim Mohammed, MD Co-author: Dhruvan Patel MD, Ankush Asija MD, Muznay N Khawaja MD, Eric Green MD.

Introduction: Haloperidol rarely leads to cardiac complications which typically occur among patients with underlying cardiac disease. Here we report a case of coronary artery vasospasm attributed to haloperidol.

Case Study: A 65 year old female presented with sudden onset of chest pain that awoke her from sleep. The chest pain was associated with dyspnea, diaphoresis and dizziness which resolved spontaneously within ten minutes. Her past medical history was significant for hypertension, diabetes mellitus, and schizophrenia and was managed with aspirin, lisinopril, metformin, simvastatin and haloperidol decanoate. On presentation, her physical examination was unremarkable and her initial electrocardiogram (EKG) demonstrated diffuse, nonspecific ST-T wave changes. Within minutes, she reported recurrent chest pain associated with dyspnea. A repeat EKG demonstrated ST-segment elevation in leads II, III and aVF and ST segment depression in reciprocal leads along with sinus bradycardia. Subsequent EKG after 15 minutes showed resolution of the inferior lead changes. Cardiac catheterization demonstrated 30% stenosis of RCA, normal LV function and normal wall motion. Subsequent labs included negative troponin, negative toxicology screen, normal Pro-BNP. On further questioning, she revealed that she had chest tightness, dyspnea and palpitations after her haloperidol injection each month. She had undergone cardiac catheterization for chest pain 4 years ago which was normal. During hospitalization, the patient was started on diltiazem, haloperidol was discontinued and she had no further episodes of chest pain. The patient remained chest pain free at subsequent follow up visits with her Cardiologist after 4 weeks and 9 months.

Discussion: The differential diagnosis included takotsubo cardiomyopathy, however an absence of apical ballooning and normal LV function on echocardiogram ruled against it. Prinzmetal angina precipitated by haloperidol use in unique to this case. It is believed that haloperidol causes vasospasm through its binding of alpha-1 receptors (1) and also by inhibition of nitric oxide synthase activity (2). Coronary vasospasm can lead to acute myocardial infarction, fatal arrhythmias, and sudden cardiac death, therefore, early identification and treatment is important. Calcium channel blockers and long acting nitrates are effective in treating coronary artery spasms and preventing future recurrence, however, nitrate tolerance may limit their use as a first-line approach.

References:

Atypical Hemolytic Uremic Syndrome secondary to Filgrastim: A case report

Aasim Mohammed MD, Co-authors: Aparna Basu MD, Dhruvan Patel MD, Vivek Mehta MD, Abha Patel MD, Kardie Tobb DO, Eric Green MD.

Introduction: Atypical hemolytic uremic syndrome (aHUS) is a rare thrombotic microangiopathy (TMA) characterized by a triad of hemolytic anemia, thrombocytopenia, and acute renal failure. Here we report a case of Filgrastim induced aHUS successfully treated with Eculizumab.

Case Description: A 74 year old male presented with nausea, vomiting, and right sided abdominal pain that had been ongoing for one day. His past medical history was significant for CAD, CVA, and gastric adenocarcinoma treated with hemigastrectomy, radiation, and chemotherapy. His last chemotherapy with 5-Fluorouracil was six days prior to admission. We obtained an MRI which showed cholecystitis and portal vein thrombosis. A subsequent EGD demonstrated esophageal and jejunal ulcers around the Billroth anastomosis site. On day three of admission, Filgrastim was initiated after a significant drop in the patient’s WBC count from 5,300 to 1,600 per cubic millimeter. On day four of admission, he had a cholecystectomy, but subsequently developed anemia, thrombocytopenia and acute kidney injury postoperatively. Further workup revealed an elevated LDH, a haptoglobin less than ten, and schistocytes on peripheral smear. Emergent daily plasmapheresis was initiated with minimal clinical and laboratory improvement after ten days of treatment. ADAMTS13 activity obtained prior to starting plasmapheresis was at 27%. As a result, Eculizumab treatment was started with marked improvement in his clinical condition and platelet count. He was discharged on outpatient Eculizumab infusions.

Discussion: During initial work up, our differential diagnoses included TTP; however, the ADAMTS13 activity was inconsistent with TTP and there was no improvement with plasmapheresis. The precipitation of aHUS following exposure to Filgrastim is unique to this case. Drug toxicity associated with aHUS has mainly been demonstrated with chemotherapy agents such as Cyclophosphamide, Cisplatin, and Mitomycin. We propose Filgrastim as a precipitating factor of aHUS in this case given its ability to directly activate the complement pathway by cleavage of C5. Release of C5b is instrumental in initiation of the membrane attack complex and subsequent endothelial injury and thrombosis. Surgery can also precipitate aHUS, but this patient’s uneventful hemigastrectomy five months prior, in addition to the pancytopenia prior to this cholecystectomy, argue against surgery as the precipitant of aHUS. Successful treatment of the patient with Eculizumab, a monoclonal antibody that prevents the cleavage of C5, further supports our hypothesis.

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Idiopathic Cardiomyopathy Following Metal-on-Metal Hip Arthroplasty: The New Face of "Beer Drinker's Cardiomyopathy"

First Author: Erik W O'Connell, DO Second Author: Nick Mead, DO Third Author: Henry Fesniak, MD

In 1966, the “beer drinker’s cardiomyopathy” was described in Quebec City, Canada among heavy drinkers following the addition of cobalt by breweries for foam stabilisation. Almost half of those affected died. A similar process has been proposed for cardiovascular periprosthetic metallosis in patients receiving cobalt-containing hip prostheses.

This case describes a young man with congenital osteonecrosis treated with cobalt containing prosthetic arthroplasty. Postoperatively, he developed pericardial effusion, dilated cardiomyopathy, polycythemia and lactic acidosis. His serum cobalt level was 156 mcg/L (normal 0.1 – 0.4 mcg/L).

Metal-on-metal hip implants have been associated with arthroprosthetic cobaltisim, a presentation indistinguishable from “beer drinker’s cardiomyopathy.” Up to 35% of hip replacements utilize metal-on-metal bearing surfaces, making this a potentially wide-spread and relatively underappreciated etiology of postoperative idiopathic cardiomyopathy. This clinical vignette emphasizes the importance of considering cobalt cardio-toxicity, or “beer drinker’s cardiomyopathy,” as a differential diagnosis of idiopathic cardiomyopathy following total hip arthroplasty.
Macrophages Gone Wild

First Author: Temitayo Odesanya, MD, Adil Manzoor, Medical Student, Shervin Daneshmand, MD, Brain Gable, MD

A 65-year-old female with stage 3B diffuse B-cell lymphoma being treated with R-CHOP was transferred to our institution for escalation of care after developing a multisystem syndrome characterized by fever of unknown origin, altered mental status, hemodialysis-dependent acute kidney injury due to rapidly progressive nephrotic syndrome, bicytopenia (hemoglobin 5.6; platelets 31), coagulopathy with low fibrinogen (81 mg/dL), and elevated liver function tests (alkaline phosphatase 960; AST 586; ALT 110). The physical examination was benign with the exception of a recurrent fever and an acute encephalopathy without associated focal neurological deficit. An extensive diagnostic evaluation to assess for underlying infection including blood cultures, urine culture, cerebrospinal fluid analysis, and cross-sectional imaging was negative. There were no schistocytes on the peripheral blood smear to suggest a microangiopathic hemolytic process such as thrombotic thrombocytopenic purpura-hemolytic uremic syndrome or disseminated intravascular coagulation. Given the constellation of findings, a diagnosis of lymphoma-associated hemophagocytic lymphohistiocytosis (HLH)/macrophage activation syndrome was entertained. This diagnosis was further substantiated by the presence of high triglycerides (1089) and markedly elevated ferritin levels (>100,000 ng/mL). A subsequent bone marrow biopsy revealed extensive erythrophagocytosis. The compilation of findings fulfilled the HLH-2004 diagnostic criteria for hemophagocytic lymphohistiocytosis (HLH) and treatment with the HLH-94 treatment protocol consisting of dexamethasone and etoposide was initiated. Unfortunately, the patient was unable to tolerate the therapy due to her debilitated condition and she ultimately succumbed to the disease. Of note, the result for the soluble CD25 (interleukin-2 receptor) test was made available in the post-mortem period and was found to be markedly elevated at 4906 U/mL (normal range 406-1100 U/mL, further confirming the diagnosis of HLH.

Discussion: Hemophagocytic lymphohistiocytosis (HLH) is an extremely rare, life-threatening diagnostic entity that manifests as a multisystem syndrome with progressive organ dysfunction. Most cases of HLH appear to be due to lymphocyte hyperactivation resulting in a macrophage-driven SIRS-like response that leads to multi-organ failure and a high mortality rate. Potential precipitating events include a hereditary predisposition, certain inciting infections, autoimmune diseases, or neoplastic disease as in our patient. This disease must be considered in the differential diagnosis of multisystem organ failure, but it is frequently overlooked and misdiagnosed as septic shock. Diagnosis is based on 8 clinical criteria for which at least 5 has to be met: (1) fever, (2) splenomegaly, (3) cytopenias affecting = lineages, (4) hypofibrinogenemia (<150 mg/dL) and/or hypertriglycerideremia (=265 mg/dL), (5) elevated ferritin (> 500 ng/mL), (6) hemophagocytosis, (7) low or absent natural killer cell activity, or (8) elevated soluble CD25 (= 2400 U/mL).

Conclusion: Although well-defined clinical criteria have been established, HLH’s rare and extremely variable presentation often delays the diagnosis resulting in an overall poor prognosis.
Refractory Case of Esophageal Web in Male Patient with Alcoholic Liver Disease

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**Background:** Plummer-Vinson syndrome (PVS) is the triad of dysphagia, iron-deficiency anemia and upper esophageal web formation typically occurring in Caucasian middle-aged females and responds to iron replacement therapy. It is relatively rare now and pathogenesis remains unknown, but is thought to be linked with chronic iron deficiency causing a loss of iron-dependent resulting in esophageal web formation, however data is conflicting. Other proposed causes are autoimmune and nutritional deficiencies. The major importance of diagnosis relates to the relative increase risk in development of squamous cell carcinoma and need for surveillance.

**Case:** We present a 69 year old white male who presented from his family doctor with a hemoglobin of 8.2 g/dL and complaints of decreased exercise tolerance, fatigue and mild dysphagia with mild weight loss and pertinent past medical history of gastrointestinal bleed and alcoholic cirrhosis without evidence of varices. Patient denies dizziness, dyspnea, abdominal pain, change in bowel habits, night sweats and is unable to appreciate melena/hematochezia due to color blindness, but stools were positive for microscopic blood. Laboratory studies revealed a macrocytic anemia, but a ferritin level of 14ng/ml and iron of 23ug/dL diagnosing iron deficiency. Patient underwent esophagogastroduodenoscopy (EGD) with no bleeding source, but an upper esophageal web that was easily traversed with a pediatric endoscope and dilated. Recent colonoscopy was positive only for diverticular disease. Patient was given iron infusions and discharged with oral iron supplementations. Follow up EGD a month later for persistent dysphagia identified diffusely ulcerated, friable, nodular-type mucosa with biopsies indicating necrosis and mild atypia at the esophageal web. Repeat EGD with dilatation was performed 2 months later; however only a guide-wire was able to traverse the web with dilation to only 8mm. Repeat EGD one week later was unable to dilate the web given the high risk of perforation. Patient is scheduled to follow-up with otolaryngologist for surgical approach or repeat EGD in the operating room.

**Discussion:** Despite PVS being a rare entity, it should be included in differential diagnosis of patients with fatigue and dysphagia in the background of a nutritional deficiency such alcoholism. Although there is little data relating alcoholism and PVS, it does have the potential to induce a nutritional deficient state. Laboratory studies in this patient population can be misleading as the evolving cirrhosis can lead to a macrocytic anemia. This case presents a particular challenge as the esophageal web is refractory to iron therapy and dilation. Fortunately, esophageal varices have yet to form, which would only complicate the treatment options. Additional therapy for refractory webs include endoscopic incision, laser therapy, chemotherapy injections or surgical evaluation in addition to diet modification. Proper follow-up for resolution of symptoms and surveillance for esophageal cancers is imperative.
A Rare Cutaneous Harbinger of Acute Leukemia: A Case Report

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Background: Acute myeloid leukemia (AML) is a common leukemia in adults defined by arrested maturation and uncontrolled proliferation of a group of hematopoietic progenitor cells. Clinical presentation typically results from complications of pancytopenia and rarely present in extramedullary tissues such as the skin. Leukemia cutis (LC) is the invasion of neoplastic precursors into different layers of the skin, most commonly seen with an established underlying systemic disease. LC can rarely develop prior to leukemic blasts appearing in the peripheral blood or bone marrow, an entity known as aleukemic leukemia cutis (ALC). ALC is extremely difficult to diagnose clinically and its early recognition is essential in the prompt initiation of treatment for AML.

Case: We present a 59 year-old-female with generalized weakness, low grade fevers and weight loss over 2 months. In the last 2 weeks, she developed bilateral ankle arthralgias along with a maculopapular, nonpruritic rash (see image) on her abdomen and back which persisted despite treatment with systemic steroids. Peripheral blood showed leukocytosis with 70% monocytes with flow cytometry showing fully mature cells with no aberrant phenotype. The leukocytosis was thought to be reactive to either infectious or rheumatologic process; however a comprehensive rheumatology, autoimmune and infectious work-up were negative. A skin biopsy showed a mononuclear cell infiltrate, medium in size with round to slightly convoluted nuclei, moderately dispersed chromatin and inconspicuous nuclei with immunohistochemistry positive for CD 68, CD 45, CD 33, CD 4, MPO and negative for B- cell markers, findings consistent with leukemia cutis. A bone marrow biopsy showed 82% blasts mostly expressing monocytic markers consistent with acute monoblastic M5 leukemia positive for FLT3-ITD, NPM1 and negative for CEBPA, CD34. Patient was started on 7+3 induction chemotherapy with cytarabine and idarubicin. At 3 month follow-up, patient is in complete remission and is receiving high dose Ara-C as a bridge to allogeneic stem cell transplant.

Discussion: ALC is a rare skin manifestation of AML that is most commonly seen in the acute monocytic leukemia/M5 subgroup. Skin lesions vary in color, distribution and size making diagnosis difficult without a skin biopsy. AML should be suspected in patients presenting with skin lesions and other vague symptoms like fatigability, low grade fevers and weight loss and questionable leukocytosis despite peripheral blood smears that lack evidence of leukemic cells. Treatment should be initiated based on skin biopsy with chemotherapy and stem cell transplantation as skin involvement tends to signify aggressive disease with a poor prognosis.
Fighting against all odds- a case of complicated ST elevation myocardial infarction

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Background: Management of STEMI with acute severe mitral regurgitation (MR) from papillary muscle dysfunction can be challenging. Therapeutic dilemmas to intervene an acute MR multiply in presence of cholesterol emboli and cerebral aneurysms.

Case: A 61-year-old diabetic female, presented with lethargy. She had acute inferior-posterior wall STEMI, cardiogenic shock with pulmonary edema; urgently required mechanical ventilation, and primary PTCA/stenting of totally occluded left circumflex artery (LCx) with IABP support [CI- 1.36ml/min/m2; PCWP- 44mmHg]. Echocardiogram showed inferior wall motion abnormality, preserved EF, and severe MR. Post-procedure, she developed cholesterol emboli to digit, kidneys, and brain. Incidentally, 2 cerebral artery aneurysms(6mm,4mm) were detected on MRI. She had recurrent pulmonary edema, necessitating intensive medical therapy, tracheostomy, and ventilator support. Concurrently, she had bilateral yeast pyelonephritis in infarcted areas, requiring Fluconazole. The ongoing sequel of insults prevented her from undergoing mitral valve (MV) surgery. Over next 2 weeks, she made remarkable progress with medical management, and rehabilitation was commenced.

Discussion-making: Primary PTCA of culprit vessel in STEMI with cardiogenic shock, within 12 hours of symptoms is appropriate as per current guidelines [class 1 indication ACC/AHA guidelines 2013]. Complications like acute MR, refractory pulmonary edema and extensive systemic cholesterol emboli are independently predictive of poor prognosis. Acute MR calls for an early valve replacement (~20% surgical mortality risk) Presence of significant cerebral aneurysms precludes use of anticoagulation, if MV is replaced. MV repair may be performed to avoid anticoagulant use, though results can be suboptimal. Equally challenging is appropriate timing of surgery. An alternative strategy is coil closure of cerebral aneurysms prior to valve replacement.

Conclusion: This case illustrates the need for careful, step-wise approach and multidisciplinary teamwork to complex cases of STEMI with acute MR, refractory pulmonary edema, iatrogenic cholesterol emboli and incidental cerebral aneurysms.
Levamisole induced vasculitis: is it a relegated diagnostic possibility?

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INTRODUCTION: Levamisole, a veterinary anti-helminthic, is a common adulterant in cocaine. US Drug Enforcement Agency estimates 69% of illicit cocaine reaching the USA is adulterated with Levamisole. Levamisole–induced vasculopathy (LIV) is a relatively new entity, and is being increasingly recognized since first reported in 2010. Although cutaneous findings, agranulocytosis, and positive Antineutrophil cytoplasmic antibodies (ANCA) are characteristic, full clinical picture and appropriate management remains unclear.

CASE-VIGNETTE: A 38year-old African-American female with history of substance-abuse (nasal-insufflated cocaine), presented with dark, painful discoloration of two fingertips for 2weeks, and a one-day history of malaise, pruritic, painful rash on all extremities and right ankle pain. She denied fevers. Last cocaine use was 2 months prior to presentation. Vitals were normal. Multiple coin-like, erythematous tender indurations with central pustule/vesicle were noted, predominantly on lower extremities. She had right ankle arthritis with effusion and decreased range of motion. Right 2nd and 3rd digits appeared necrotic distally, with superimposed infection. Chest and abdominal examinations were unremarkable.

Metabolic panel and complete blood picture were normal (including Neutrophil-counts). Blood, urine, throat, and vaginal cultures were negative. Hepatitis panel and Urine Gonococcal and Chlamydia DNA PCR were negative. Joint fluid analysis was negative for infection or crystals. Rheumatological studies showed negative ANA, positive perinuclear ANCA (1:640), Antiproteinase3 (18.8 units/ml). Anti-human elastase (anti-HNE) is unavailable.

DISCUSSION: LIV may mimic other vasculitides, cryoglobulinemia, disseminated gonococcal infection, septic emboli, and tick-borne illnesses. About 60% cases of LIV have neutropenia. Reticulated purpurae and hemorrhagic bullae are characteristic cutaneous findings affecting lower limbs (84%) and ears (73%), and sometimes upper limbs, face, trunk, nose and mouth. Necrotic lesions may be seen on digits. Biopsy often shows thrombotic vasculopathy, vasculitis or combination of both. Although Anti-HNE antibodies are specific for LIV, ANA, PR3, ANCA, dsDNA and lupus anticoagulant may be positive. Nearly 88% may have perinuclear-ANCA, 21% cytoplasmic-ANCA, positive anti-MPO (>50%), anti-PR3 (>50%), usually in combination. Positivity of p-ANCA, anti-MPO or anti-PR3 antibodies strongly suggest LIV.

Management is supportive. Corticosteroids are used in refractory cases, effective response is seen in 26% within few weeks.

CONCLUSIONS: Arthritis-dermatitis syndrome in cocaine users should raise suspicion for LIV. Although some features are characteristic, the full clinical spectrum is yet to be described.
Imatinib mesylate: a novel treatment option for Bleomycin induced lung injury?

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Introduction: Idiopathic pulmonary fibrosis (IPF) is a condition which encompasses multiple probable causative agents. The prognosis of this condition being guarded has led to many studies on new therapeutic options. One of the potentially life-threatening complications of Bleomycin is pulmonary fibrosis which occurs in 10-20% of treated patients.

Case Report: We report a case of a 21 year old male with recently diagnosed Stage 4B Hodgkins Lymphoma of Nodular sclerosing type who presented with mildly productive cough and shortness of breath progressing in severity since 1 week. He was started on ABVD regimen for his Lymphoma one month before presentation and had received 2 doses of Bleomycin. During this admission the patient went into hypoxic respiratory failure requiring intubation. Imaging during the admission showed bilateral diffuse ground glass opacities predominantly in upper lobes suggestive of Pneumocystis pneumonia (PCP)/viral pneumonia versus drug toxicity. Nasopharyngeal lavage and bronchoalveolar lavage were negative for PCP but considering poor sensitivity he was started on a course of Bactrim and steroids. Blood cultures showed no growth and viral studies showed no growth. The patient was started on high dose of steroids as a management for both possible PCP and drug toxicity. The initial high dose of steroids improved the status of the patient and he was extubated. But once the steroids were tapered the patient’s conditioned worsened again requiring high flow oxygen. At this point an ECHO was done which showed acute and severely increased Pulmonary artery systolic pressure which made any surgical intervention to obtain a lung biopsy risky. A presumptive diagnosis of Bleomycin induced lung fibrosis was made and he was started on Imatinib Mesylate along with steroids. This was based on the proven effect of tyrosine kinase inhibitors in preventing fibrotic factors. The patient is currently on his third month of Imatinib and follow up CT scan has showed marked clearing of ground glass opacities with residual reticular scarring. He is currently ambulatory and maintains saturation on room air.

Discussion: The efficacious use of tyrosine inhibitors such as Nintedanib in IPF opens doors to the possibility of using similar drugs in drug induced Pulmonary fibrosis and hence decrease mortality. Imatinib mesylate is a tyrosine kinase inhibitor chemotherapeutic agent which has been used as per one other reported case for successful treatment of Bleomycin induced lung injury. Bleomycin is a chemotherapeutic antibiotic used commonly in the treatment of Hodgkin’s Lymphoma, testicular cancer, squamous cell cancers and ovarian germ cell cancer. Although Bleomycin induced fibrosis has been shown to be responsive to steroids in most cases, there is a need for other antifibrotic agents with faster and better results especially in steroid unresponsive patients.
Primary Hyperaldosteronism: Reassessing a “Negative” Work up

Jessica Schwartz

Although previously thought to be a relatively rare cause of secondary hypertension, hyperaldosteronism is now believed to be present in 5-13% of cases making it the most common endocrine cause of uncontrolled blood pressure.

A 59 year-old male with 10 years of worsening resistant hypertension was seen at a specialist’s office and noted to have a blood pressure of 219/122 mmHg. His hypertension had remained uncontrolled despite three medications, including a diuretic, which was discontinued due to persistent hypokalemia. Even off of the diuretic, the patient required potassium supplementation to maintain normokalemia. History included no tobacco use and good medication compliance. Workup to date had included a normal serum cortisol, 24-hour urine for catecholamines, renal duplex ultrasound, and an undetectable serum renin level (<0.06 ng/mL) leading to an EMR entry documenting “negative secondary hypertension workup”. Upon discovery of this incomplete evaluation, a repeat renin with serum aldosterone found renin <0.06 ng/mL and aldosterone 26 ng/dL (normal: 8-20 ng/dL), aldosterone to renin ratio > 25 which led to an adrenal CT which discovered a 7mm nodule on the left adrenal gland. The patient was referred for definitive adrenal vein sampling and consideration for surgery.

As only 9-37% of patients demonstrate hypokalemia, a higher index of suspicion to test for aldosteronism should be uncontrolled hypertension. Correct identification of a secondary hypertension cause can lead to definitive therapy that can result in long-term hypertension control. Physicians caring for patients with resistant hypertension should review the previous ‘workup’ to re-consider whether hyperaldosteronism could have been overlooked as it was here.
LOOK WHAT I FOUND! Coexistent Ehrlichia chaffeensis infection with Klebsiella pneumoniae UTI, bacteremia and liver abscess.

First Author: Supriya Sekhar

Introduction: Pyogenic liver abscesses have been increasingly prevalent in the tri-state New Jersey area, which is also an endemic area for tick borne infections. The classic symptoms of liver abscess are fever, chills, right upper quadrant pain and altered liver function tests. Ehrlichia Chaffeensis also presents with similar symptoms of fever, chills, rash and elevated liver function tests. However the presence of a rash is very atypical for gram negative bacteremia infections. The following case was an amalgamation of the above symptoms which prompted a broader horizon of thinking. Case: A 48 year old Hispanic male with no medical history presented with fever and chills for more than 2 weeks, dysuria and burning urination, redness of both palms which he said was resolving. He was seen a week prior in the ER with similar symptoms and was discharged on Ciprofloxacin. The patient was employed as a landscaper.

On physical examination he had a fever of 101 F, and other vital signs were normal. There was redness of both palms and the rest of the examination was unremarkable. Labs showed a WBC 13.2, Platelets of 71, and urinalysis showed WBC > 100 hpf, positive nitrates, and few bacteria, AST 85, ALT 121 and Alkaline Phosphatase 517. At the prior ER visit, his LFTs were similarly abnormal. Blood and urine cultures showed K.Pneumoniae, however, the presence of a palmar rash, altered liver function tests, thrombocytopenia and the patient’s occupation as a landscaper drove a high index of suspicion for the presence of tick borne fevers and hence titres were drawn. The patient was empirically started on cefepime and doxycycline. A right upper quadrant ultrasound showed a complex cyst measuring 3.4x2.7x3.6 cm in the liver. For better definition, a CT showed an enlarging hypodense multi-septated cystic mass in the right hepatic lobe suggesting an abscess. Metronidazole was added to the regimen. The patient improved symptomatically after an ultrasound guided percutaneous drainage of the hepatic cyst and an in situ drain left in place. The abscess aspirate also revealed K. pneumoniae. In addition, Ehrlichia chaffeensis titres returned elevated at the same time. Patient followed up 2 weeks later and had completely recovered with all lab values at baseline.

Conclusion: This patient was demonstrated to have coexistent Ehrlichia Chaffeensis infection and Klebsiella UTI, bacteremia and liver abscess. Although the signs and symptoms of both infections overlap, certain features such as rash, prompted further investigation with appropriate management of the two processes. Clinicians must be prepared not to stop at the first plausible diagnosis (anchoring bias) and continue until all abnormalities are explained.
Fever with rigors following cardiac catheterization – an unusual case of infective endocarditis

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Introduction: Infective endocarditis is a serious illness with a five-year mortality approaching 40%. There is an increasing incidence of health care-associated endocarditis; however, it rarely presents as a complication of cardiac catheterization.

Case Presentation: A 68-year-old female with hypertension, hyperlipidemia and coronary artery disease presented to the emergency department with a three-day history of fever with rigors, six days after left heart catheterization with drug-eluting stent placement in the first diagonal branch of the left anterior descending artery. She denied chest pain, cough, abdominal pain or dysuria. On physical exam, her heart rate was 100 beats per minute, temperature 39.2° C and respiratory rate 19/min. Lung, heart and abdominal exam were unremarkable. White blood cell count was 12.1 with 91% neutrophils, and troponin levels were undetectable. Urinalysis showed large leukocyte esterase. Chest X-ray and EKG were unremarkable. Within twelve hours of admission, blood cultures grew gram positive cocci in clusters. Intravenous Vancomycin was initiated, and repeat cultures were sent. Transthoracic echocardiogram showed no vegetations or valvular abnormalities. On day three, blood cultures grew methicillin resistant Staphylococcus aureus. On day four, the patient developed acute heart failure and a new diastolic murmur was noted on physical exam. Blood cultures remained positive despite treatment with vancomycin at therapeutic levels; therefore, daptomycin was started. Transesophageal echocardiogram showed severe aortic regurgitation. The patient was transferred to the intensive care unit for monitoring and cardiothoracic surgery evaluation. On day ten, she underwent aortic valve replacement. Intraoperatively, it was found that the commissure between the right and the noncoronary cusp was perforated, with prolapse of both cusps, and vegetations at the commissure site. A 5mm defect was also found in the aortic intima, containing a vegetation right above the noncoronary cusp. The patient had an uneventful postoperative course and was discharged home to complete the antibiotic therapy.

Discussion: Bacteremia with endocarditis is a rare complication of cardiac catheterization. A literature review revealed less than 10 similar cases. It is impossible to prove that staphylococcal bacteremia occurred during the catheterization; however, the temporal association between the two events indicates that most likely the procedure was either directly or indirectly (e.g. endocardial damage predisposing to endocarditis) linked to the development of the disease.

Conclusion: Although this case illustrates a life-threatening complication, the rarity of infective endocarditis occurring after cardiac catheterization does not justify the use of periprocedural antibiotics. The adherence to sterile technique and rapid identification should be the mainstay for the prevention and treatment of catheterization-related infectious complications.
A Rare Case of Abdominal Pain due to Spontaneous Isolated Celiac Artery Dissection.

First Author: Sandhya Sharma, MD Second Author: Jocelyn Taylor, MD Third Author: Kevin Charles, MD Fourth Author: Abhash Joshi, MD

Introduction: It is quite rare to discover spontaneous dissection of visceral arteries such as the celiac. Very few cases of isolated celiac artery dissection have been reported in literature. Many patients are asymptomatic, but patients may present with abdominal pain or symptoms of ischemia, infarction or hemorrhage. This case presentation discusses how an incidental finding on imaging directed the management of this rare case.

Case Presentation: A 46-year-old gentleman presented to the ED with one day history of acute onset epigastric pain. He is a nonsmoker and nonalcoholic, with past medical history of hypertension. His abdominal pain was sharp and radiating to the back associated with nausea and vomiting. Vital signs were stable and physical exam revealed a well-developed male with hyperactive bowel sounds and tenderness to palpation of epigastric area. Initial laboratory examination was unremarkable with normal amylase and lipase. Computerized Tomography (CT) scan revealed peripancreatic inflammation tracking along retroperitoneum suggesting pancreatitis with hyperdense fluid compatible with blood products in the pelvic cul-du-sac. Because of the findings suggestive of blood products, computerized tomography angiogram (CTA) was done which showed isolated celiac artery dissection with extension up to common hepatic artery. All the other visceral arteries were intact. The patient was managed conservatively with bowel rest, IV hydration, adequate blood pressure control and pain control. On the third day of admission, he started having several episodes of bright red bleeding per rectum after which a flexible sigmoidoscopy was done which revealed left sided ischemic colitis which was also managed conservatively. Patient was discharged home on the fifth day on a b-blocker and pain medications. The patient is being followed regularly with serial angiograms which showed no progression and patient remains stable and asymptomatic.

Discussion: Isolated Celiac Artery dissection is extremely rare, with incidence of 4% of total visceral artery dissections. While majority of artery dissections present asymptptomatically, a few patients may present with symptoms of intestinal angina. Celiac artery give rise to branches which supplies major organs in the body. Abdominal pain in our patient was secondary to disruption in the perfusion to the pancreas, leading to pancreatic inflammation and ischemia. Gastrointestinal bleeding was secondary to non-occlusive mesenteric ischemia (NOMI) due to intestinal hypoperfusion from the dissection. The diagnosis is usually done by CTA. Treatment is usually individualized. Conservative management is done if the patient is stable; however, surgery and endovascular procedures may be considered if the patient is unstable. Sometimes, there is risk of thromboembolism which requires 3-6 months of anticoagulation.
Arthroprosthetic Cobaltism Masquerading as Pulmonary Embolism

First Author: Nawang Sherpa, DO Rohit Rattan, MD Shiva Shashidharan, MD Mockus Linas, MD

There has been a growing number of case reports on arthroprosthetic-related cobalt toxicity, but there is still a lack of consensus regarding guidelines for toxic levels and a lack of awareness of the seriousness of the condition. Cobalt toxicity can present with multitude of symptoms including cardiomyopathy, neuropathy, erythrocytosis, and even carcinogenesis.

A 65 year old woman with a history of arthritis and a right hip replacement was evaluated by a primary care provider for shortness of breath and flu-like symptoms. Her chest x-ray and basic blood work were unremarkable. Two weeks later, she presented to the ER with worsening shortness of breath and an acute episode of painless right hip instability. Her chest CT angiogram showed a bilateral pulmonary embolism. She was stabilized and discharged on anticoagulant for PE, but a constellation of other secondary symptoms—weight loss, hearing deficit, metallic taste, a new onset cardiomyopathy with global hypokinesis—prompted checking for cobalt levels. Subsequent to her discharge, the results showed very high serum cobalt levels of 817 mcg/L. Additional chart review revealed a right hip revision a year prior. The ceramic liner had fragmented, with metallosis around the joint. At that time full revision was not performed as the femoral stem and acetabular component were fully ingrown. Instead, a polyethylene liner was placed between the metal components.

Ten days later the patient was readmitted for hip dislocation and underwent a closed reduction. This admission was complicated by worsening heart failure and lactic acidosis, leading to her death.

As illustrated in our case, cobalt toxicity can lead to rapid deterioration. Ubiquity of metallic hip prosthesis demands greater awareness, high suspicion, and vigilance for cobaltism. In addition, guidelines are unclear regarding the management of acute cobalt toxicity indicating a need for further work in this area.
Borrelia That Takes Your Breath Away

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This case describes a 60 year old male with past history of sick sinus syndrome who presented with ten days of a burning pain in the T4 dermatomal distribution and one day of presyncope and left facial paralysis, ultimately found to have radiculoneuritis and meningitis due to neuroborreliosis, also known as Bannwarth syndrome.

Physical Exam: On presentation, exam was notable for orthostatic hypotension as well as a left VII cranial nerve palsy and paresthesias along bilateral T4 dermatome. Abdominal exam revealed hypoactive bowel sounds. Exam was notably absent for meningeal signs.

Hospital Course: There was initially concern for a possible cerebrovascular event as an explanation for his facial paralysis and paresthesias, as well as some reported word finding difficulties. However, stroke evaluation was negative. Lyme disease was initially not considered likely as he had negative serologies performed within the prior week as an outpatient. The working diagnosis was idiopathic Bell’s palsy. Serologies were repeated and were positive with an elevated IgM. A lumbar puncture was then performed, which revealed lymphocytosis with plasmacytoid lymphocytes as well as elevated IgM, IgG and IgA antibodies to Borrelia. The patient’s clinical course was complicated by colonic ileus, worsening painful radiculoneuritis in the T4 dermatome, as well as a sensation of an inability to breathe deeply or cough. The patient had decreased negative inspiratory force (-40 cmH20); pulmonary function testing revealed decreased total lung capacity in the absence of underlying lung disease. All of these clinical findings were likely due to neuroborreliosis and, in fact, constitute the findings of Bannwarth syndrome (painful radiculoneuritis, meningitis and cranial neuropathy). The patient was treated with intravenous ceftriaxone, with moderate improvement in his symptoms; a three week course was planned.

Learning Objectives: This case demonstrates the importance of recognizing the clinical manifestations of neuroborreliosis including a combination of cranial neuropathy as well as painful radiculoneuritis. Patients may lack meningeal signs. Nerve inflammation from Borrelia may also result in diaphragmatic weakness as it did in this case. Finally, this case reinforces the teaching that lyme titers may be negative at the time of initial presentation.
Hemobilia can arise where a fistula develops between vasculature and the biliary tree. The predominant causes are percutaneous liver biopsy (65%), followed by vascular abnormalities such as ruptured aneurysm (7%) and malignancy (7%). Hemobilia due to HCC invasion rarely precipitates acute pancreatitis. Only four cases are documented in English literature. Management has been surgery in one case while ERCP and sphincterotomy successfully treated the other three patients.
Unusual cause of Bone Pain

Primary bone lymphoma (PBL) is an extremely rare tumor accounting for less than 1% of all non-Hodgkin’s lymphoma. Diffuse large-B-cell lymphoma accounts for the majority of cases, and may present with localized bone pain, swelling or pathologic fractures. As a result of the rarity of this disease, specific diagnostic and treatment protocols are lacking. Here we present a patient with PBL of the proximal right humerus and review the related literature.

Introduction-A 52-year-old man without comorbidities presented with progressive pain along the lateral aspect of his right upper arm since 4 months. Pain initially thought to represent a musculoskeletal injury due to strenuous exercise. X-ray of the right humerus showed moth-eaten appearance involving the proximal half of the right humeral diaphysis. Magnetic resonance imaging revealed markedly heterogeneous enhancement within the proximal two-thirds humeral shaft. Laboratory workup only revealed slightly increased alkaline phosphatase. Open biopsy of the lesion was done. Histopathological examination showed large atypical cells. Immunohistochemistry of the lesion showed positivity for CD20, Pax5, Bcl6 and CD10. No staining for CD5, CD3, and Mum1 for small T-cells. Further workup including bone marrow aspiration and biopsy, CT scan of neck, chest, abdomen/ pelvis was normal. PET scan demonstrated increased F-18 FDG accumulation only involving right humerus. Final diagnosis was diffuse large B cell lymphoma of right humerus. He was treated with six cycles of R-CHOP followed by radiotherapy with complete response to the therapy.

Conclusion-The diagnosis of primary bone lymphomas may be challenging, often misdiagnosed as rheumatic diseases. Thus, regardless of the absence of lymphadenopathy, it should be considered in the differential diagnosis of patients over the age of 30 with bone pain not relieved by rest and radiological evidence of bone lesion. Although the prognosis is generally good, disease progression or relapse, especially in patients = 60yrs, confers a very poor prognosis. Studies on this disease should be carried out to clarify the optimal treatment in the future.
Introduction Systemic mastocytosis is a myeloproliferative neoplasm characterized by infiltration of multiple tissues by clonally derived mast cells. We present a patient with systemic mastocytosis with abdominal pain, episodes of flushing with axillary lymphadenopathy, hepatic and spleen enlargement.

Case Presentation: A 49-year-old salesman with herniated lumbar disks was evaluated by his primary physician because abdominal pain, a sensation of fullness and episodes of flushing of one week duration. There was no fever or diarrhea. On physical examination: T 37.1 °C, P 96, RR 20, BP 120/60, Wt 180, Ht 78” and BMI 28Kg/cm². No skin rash or jaundice was evident. There was bilateral axillary lymphadenopathy. The liver span measured 12 cm and the spleen tip was palpable. The rest of the physical examination was within normal limits. The admission Hgb was 13.5gm, WBC 5.6x10³ (67 % neutrophils, 19% lymphocytes, 5% monocytes and 9% eosinophils) and PLT 268x10³. The basic metabolic panel was normal. The ALT was 65U/L, AST 38U/L, ALP 240U/L, GGTP 73U/L, LDH 109U/L, and globulins 4.3 g/dL. The total bilirubin was 0.8, calcium 8.8, and TSH 3.1. Abdominopelvic CT scan showed hepatosplenomegaly. Repeated blood counts during the next 2 months demonstrated persistently increased lymphocytes counts from 19% to 56%. Bone marrow aspiration showed markedly hypercellular marrow with myeloid and megakaryocytic hyperplasia and 30% mast cells. Mast cells were positive for CD2, CD117 and CD25. The serum tryptase was 147 ug/L (normal 20 ng/ml) and the abnormal expression of CD2, CD117 and CD25 on bone marrow mast cells.

Tryptase is a marker for mast cell degranulation release serving as a biomarker for systemic mastocytosis. Even though systemic mastocytosis is rare, it is important to recognize this condition in the differential diagnosis of patients who presents with lymphocytosis associated with abdominal pain and episodes of flushing.
Abdominal pain due to perforation: An atypical presentation of Acute Myelogenous Leukemia

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Acute leukemia may present in a variety of extramedullary (EM) tissues with or without bone marrow disease. EM involvement by acute leukemia is a relatively rare, but clinically significant, phenomenon that often poses therapeutic dilemmas. Myeloid sarcoma (MS), also termed extramedullary acute myeloid leukemia, extramedullary myeloid tumor, and granulocytic sarcoma or chloroma, is a rare manifestation that is characterized by the occurrence of 1 or more tumor myeloid masses occurring at an extramedullary site. Granulocytic sarcoma develops in 2% to 8% of patients with acute myeloid leukemia and can occur virtually anywhere in the body. Most common sites being the skin (13%–22%), bone/spine (9%–25%), and lymph nodes (15%–25%). Involvement of the gastrointestinal tract is rare with the commonest site being ileum (10%–11%) followed by stomach and large intestine.

This is the case of a 70 year-old-male with past medical history of hypertension, dyslipidemia, diabetes mellitus type 2 and gastroesophageal reflux disease. Patient presents with a history of 3 weeks of general malaise, fatigue, fever, chills, diarrhea, loss of appetite and a 12-pound weight loss. Patient also complained of intermittent right-sided abdominal pain. CBC showed leukopenia (WBC 1.3 x 10³/µL) with neutropenia (segmented neutrophils 5%) and lymphocytosis (lymphocytes 85%) as well as anemia (Hgb 10.1 g/dL). An abdominopelvic CT-scan was performed revealing an asymmetric mass-like wall thickening or mass in the sigmoid colon. Small gas within the thickened wall of the sigmoid colon was evident, possibly representing a necrosis mass or abscess within the wall or within the diverticular contained perforation. Surgical pathology report of sigmoid colon specimen revealed perforated viscus and immature, neoplastic mononuclear cells consistent with leukemic infiltrate (chloroma). Bone marrow aspirate and biopsy revealed 79% blasts and hypercellular marrow with elongated clusters of immature cells along the para-trabecular region. Cytogenetic analysis revealed t(8;21) with 90% metaphase cells.

Chloromas are more common in patients with the FAB classification class M2, those with specific cytogenetic abnormalities t(8;21) or inv(16), those whose myeloblasts express T-cell surface markers, CD13, or CD14 and those with high peripheral white blood cell counts. However, even in patients with the previously mentioned risk factors, chloromas continue to be an uncommon complication of AML. Patients with an acute myeloblastic leukemia associated with t(8;21) and presenting with myeloid sarcoma have a low rate of complete remission, and overall survival is poor. Physicians should be aware of the different presentations of acute myeloid leukemia as well as the fact that not every mass in colon is adenocarcinoma. Our patient presented with a granulocytic sarcoma in sigmoid colon, the most uncommon site for extramedullary involvement. To the best of our knowledge this is the first case reported in the medical literature in the Hispanic population.
Atypical Autoimmune Hepatitis in an elderly patient

First Author: Jeffrey Maldonado, MD

Autoimmune hepatitis (AIH) is a chronic inflammatory disease of unknown etiology characterized by the presence of circulating autoantibodies, hypergammaglobulinemia, necroinflammatory changes on hepatic histology, and a dramatic response to immunosuppressive therapy. The disease is rare with a mean incidence of 1-2 per 100,000. About 72.22% of people with autoimmune hepatitis are women, usually between the ages of 15 and 40. This is a case of a Latin American 88 year’s old male who developed AIH.

An 88 year’s old Latin American Male with a medical history of Diabetes Mellitus Type 2, diagnosed 1 year ago, presented to the hospital with complaints of icterus, itching, and general weakness. Physical examination was remarkable for icterus. Laboratory findings, demonstrate increase in AST and ALT more than 13 times the upper limit, augmented Bilirubin, and positive ANA test. Abdominal CT-Scan, Magnetic Resonance Imaging, and Sonogram, resulted negative for any intrabdominal pathology. MRCP was performed and resulted negative for sclerosing cholangitis. Hepatitis B and C serology rules out acute or chronic hepatitis. Considering patient signs, symptoms, imaging studies and laboratory findings he was admitted with an exclusion diagnosis of autoimmune hepatitis. The condition was further confirmed by histologic sample with lymphoplasmacytic infiltration with predominance of plasma cells. Aggressive hydration and high dose corticosteroids were given for treatment. On Hospital day 5, the hepatic enzymes and bilirubin levels started to decline. Within two days after the first prednisone treatment the patient decreased the liver enzymes and returned to his baseline within a week. Considering patient’s marked improvement he was discharged home after eight days of treatment.

This illustrates a rare and atypical case of autoimmune Hepatitis in an 88 year old man. This case report could aid physicians to identify future cases of this uncommon condition and its treatment. Since, there is a possibility that physicians could be overlooking suspected cases of Autoimmune Hepatitis as reported in some of the related literature. To our knowledge this is the second case report of AIH in an elderly patient. Interestingly, the patient also developed Diabetes Mellitus at his 87 years of age, just one year before this clinical presentation. Both conditions could be related to autoimmune pathologies. Patient’s excellent response to treatment is remarkable considering his age.
MDR TB an Old Disease a Continuous Thread

Multi-drug resistant tuberculosis (MDR-TB) is defined as a Mycobacterium tuberculosis Strain resistant to two or more first-line antituberculous drugs. Multi-drug resistance can be primary or acquired. Primary when there is no history or evidence of previous antituberculous drug treatment and acquired in previously treated subjects for at least one month and those with treatment failures or relapses.

We present a 59 year old male patient who develop shortness of breath, dry cough and associated weight loss of 55kg in the last 7 months. Medical history pertinent for diabetes mellitus. He used to work at a healthcare facility, lived in a concrete house with no pets and frequently travel to Ecuador. PPD skin test was performed on a yearly basis with negative results. Chest X-ray reveal a right upper lobe opacity for which flexible bronchoscopy was done yielding aerobic non-motile bacillus. Sputum for acid fast bacilli(AFB) were positive and patient was treated for superimposed pneumonia and with the four recommended drug regimen for tuberculosis. After 3 weeks of treatment the patient continued with chills, poor appetite and general malaise. Sputum samples were send to the Centers of Disease Control and found a MDR tuberculosis resistant to isoniazid, rifampin, ethambutol and streptomycin. Genotyping was done for further classification and a newly discover genomic G24767 strain, was reported. Considering this complicated case of Tuberculosis, treatment secondary lines drugs were used Amikacin, Linezolid, Levofloxacin, and Cycloserine. Patient continued in airborne isolation for 84 days until clinical improvement of patient’s symptoms and three straight negative sputum samples. Patient is expected to complete 18 months of treatment recomended by the CDC.

Tuberculosis is a global threat to society despite improvement in therapy as it continues to be an economic burden especially in underdevelop countries. The downfall of global economics and growing travel destinations in developing countries has escalate the exposure of organism not previously encountered in industrialized nations. Most cases of MDR-TB are reported on immunosuppressed patients with risk factors and from endemic areas. Nevertheless new strains with higher transmission degree are emerging as a threat in patients who have low risk factors for the development of MDR-TB. MDR-TB patients have three times higher transmission rate than non MDR-TB patients. The strain G24767 is the first genomic sequence not classified in the known TB cluster of the United States and Puerto Rico population. Its genomic pattern of resistance for first line drugs and borderline resistance to secondary drug is an alarming feature for the development of XDR-TB on US territory.
Aspergillosis in a Hairy Cell Leukemia Patient

A 58 year-old male with history of hyperlipidemia and depression presented with hepatosplenomegaly and bicytopenia on routine studies. An abdominal CT scan was remarkable for upper abdominal and retroperitoneal nodes. The patient underwent a bone marrow aspirate and biopsy with flow cytometry studies consistent with a diagnosis of hairy cell leukemia. Once diagnosis was confirmed, the patient was admitted for cladribine therapy for seven days. The patient tolerated therapy with no major complications and was discharged home with prophylactic antibiotics as well as with granulocyte-colony stimulating factor. The day after discharge the patient returned to the emergency room with fever, chills, generalized weakness, chest pain and shortness of breath. The patient was admitted with the diagnosis of neutropenic fever and he was started on broad spectrum antibiotics as well as antifungal therapy. The patient’s clinical course was complicated with profound neutropenia and thrombocytopenia. In addition was found with painful, ulcerated lesions on periubilical area and left forearm as well as a black crusted lesion on the left fourth toe. A chest CT scan showed a "tree in bud" pattern as it may be seen in a systemic fungal infection. The patient was started on amphotericin B, which was later changed to voriconazole due to a severe reaction. The patient experienced a dramatic clinical recovery as well as improvement in white blood cell count. Cultures of skin biopsy specimens were positive for Aspergillus fumigatus. The patient was discharged home to continue voriconazole therapy.

Hairy cell leukemia is a rare leukemia, comprising only 2% of all leukemias and approximately 8% of all lymphoproliferative disorders. At the time that this disease was first described by Bouroncle in 1958, the clinical course was typically fatal, mostly attributable to infection. However, due to the enormous progress that has been made over the past two decades, the majority of patients with classic hairy cell leukemia may now expect to live a near normal live span. As a consequence of chemotherapy, patients with hairy cell leukemia can experience profound neutropenia for an extensive period of time predisposing them to opportunistic infections. Invasive fungal infections are important causes of morbidity and mortality in these patients. In disseminated infections or persistent neutropenia the overall case fatality rate exceeds 50% and can reach a 100%.

In the setting of profound neutropenia, superficial skin infections can be the initial manifestation of a disseminated fungal infection. It is imperative that every febrile neutropenic patient receives a thorough examination, including the skin. This approach may result in early diagnosis of opportunistic infections and lead to institution of expedited treatment resulting in a more favorable outcome.
A 34 year-old woman with a medical history including systemic lupus erythematosus with associated dialysis-dependent end-stage renal disease, lupus anticoagulant (LA) positive antiphospholipid syndrome with multiple thrombotic events, and two episodes of antibody-confirmed heparin induced thrombocytopenia (HIT), presented to hospital with sub-acute shoulder pain and swelling.

Physical exam was notable for a swollen, tender right upper extremity. Laboratory data revealed an INR of 2.2. A venous doppler revealed an occlusive thrombus in the right innominate vein, at the site of her tunneled hemodialysis catheter. The patient reported compliance with her long-term warfarin regimen, but was known to have unstable INRs requiring frequent dose adjustments. Warfarin was initially held pending possible catheter directed thrombolysis, which was ultimately deemed unnecessary. Due to her acute thrombosis, additional anticoagulation was indicated. Given her history of HIT, argatroban was initiated.

The interesting challenge of this case lay in determining appropriate laboratory monitoring for anticoagulation. This patient’s baseline PTT measurement was elevated to 74.0 seconds, precluding routine argatroban monitoring, as the goal rise in PTT of 1.5–2.0 times above baseline, while not exceeding 100 seconds, was unattainable. Her baseline elevated PTT and history of fluctuating INRs was suggestive of a reported phenomenon of interference of LA with PTT and PT/INR assays.

Binding between LA and phospholipid in PTT and PT/INR assays can lead to falsely elevated, unreliable results (1,2). In this case, argatroban dosing was monitored by thromboelastogram, which measures the time to clot formation and strength of clot. Warfarin therapy was monitored by a chromogenic factor X assay, which involves minimal phospholipid (1). This assay is known be a more accurate in LA patients with falsely elevated PT/INR, and is largely unaffected by argatroban (3). Given this patient’s history of recurrent thrombosis, a supra-therapeutic factor X target of 10-20% was set, knowing that a range of 25.5-35.5% correlated with a therapeutic INR of 2-3 (3). Once at goal, argatroban was discontinued, and a follow-up factor X level 4 hours later was 20%. A corresponding INR drawn 9 hours later was 5.0. This elevated INR suggested that the patient’s anticoagulation monitoring with a traditional goal of 2-3 had likely been truly sub-therapeutic. It underlined the importance of considering alternative means of anticoagulation monitoring in patients on warfarin with known LA and baseline elevated PTT.

Post-partum hypervagotonia leading to symptomatic sinus bradycardia

Rajesh Shrestha, MBBS, Fatima Hamid, MBBS, Diana Silva Cantillo, MD, Abdullah Quddus, MD, Sajid Saraf, MD

Background: Sinus bradycardia occurs in normal children and adults especially during sleep. The heart rates can drop up to 30 beats per minute. Up to 35 percent of healthy individuals below 25 years of age, trained athletes, and rare form of familial syndrome with potassium/sodium hyperpolarization-activated cyclic nucleotide-gated channel 4 (HCN4) mutation may have asymptomatic sinus bradycardia without any heart diseases. Increased vagal tone has been associated with profound sinus bradycardia in various pathophysiologic settings including pain. Herein, we report a case of young Caucasian woman with symptomatic bradycardia due to hypervagotonia.

Case report: A 28 year-old Caucasian woman presented to the emergency room with complaints of 3-day history of palpitation and exertional dyspnea. She was discharged in stable conditions 10 days ago following uncomplicated lower segment cesarean section under spinal anesthesia at 38 weeks of gestation. She complained of significant pain in lower abdomen after discontinuing opioids prescribed for pain but denied any fever, discharges from the wound or abnormal lochia. She did not have any significant past medical history. She used to smoke half pack of cigarettes but quit before pregnancy. Family history was unremarkable. Physical examination revealed a heart rate of 31/min, blood pressure of 150/63 mm Hg and tenderness in lower abdomen. Laboratory investigation revealed normal hemogram (hemoglobin of 11.6 g/dl, hematocrit of 33.1 g/dl, platelets 217,000 per litter), normal electrolytes including magnesium and calcium, normal thyroid, liver and kidney function tests. Electrocardiogram revealed sinus bradycardia without any atrioventricular block and ST segment and T wave changes. Cardiac enzymes and chest radiograph were normal. She was admitted to the telemetry floor with the diagnosis of post-partum symptomatic bradycardia secondary to hypervagotonia likely due to postpartum pain. Echocardiogram revealed normal ejection fraction without any signs of cardiomyopathy. She was subsequently discharged home. A 30-day outpatient hotler monitor was unremarkable without any atrioventricular blocks and pauses. At a 6-week follow-up, bradycardia and clinical symptoms had resolved.

Conclusion: Sinus bradycardia can occur in normal individual and in various pathophysiological settings including the situations where vagal (parasympathetic) tone is increased. Any unpleasant or painful stimuli can increase the vagal tone, which can inhibit the firing of the sinoauricular node and can lead to bradycardia. Understanding basic pathophysiology can be helpful to lessen anxiety among patients and physicians and can prevent unnecessary but expensive tests.
RHODE ISLAND POSTER FINALIST - CLINICAL VIGNETTE Liza Valdivia, MD

Pulmonary Manifestations of Secondary Syphilis: an atypical presentation of the great masquerader

First Author: Liza Valdivia, MD

Syphilis, the sexually transmitted infection caused by the bacterium Treponema Pallidium, is a catch-all term used to describe a wide array of clinical syndromes, each varying with respect to presentation, morbidity and infectivity. Though the various stages of the disease have been well documented in literature dating back to the 15th century, there remain atypical presentations that have been described only within the past few decades. We present a case of the extremely rare pulmonary secondary syphilis.

A 27 year old male who has sex with men presented to an emergency department with two weeks of fevers, nonproductive cough and malaise. He originally presented to a walk in clinic four days prior and was treated with a three-day course of Ciprofloxacin without improvement in his symptoms. Of note, the patient had participated in an unprotected sexual encounter six weeks prior to the onset of his symptoms.

His physical exam was notable for a fever documented up to 105.1F and a respiratory rate of 26. He was noted to be diaphoretic with decreased bibasilar breath sounds on auscultation. He had an unremarkable skin and genitourinary exam.

Initial work up was notable for imaging findings of an early lingular pneumonia. His blood work revealed a normal WBC count with a normal differential. He was admitted to the general medical service and treated with Ceftriaxone and Azithromycin. Despite antibiotic treatment, the patient continued to have daily fevers with interval development of a new supplemental oxygen requirement. He underwent additional testing including a CT scan of his chest, abdomen and pelvis which revealed multifocal ground glass opacities in a tree-in-bud pattern with associated hilar lymphadenopathy as well as numerous hepatic hypodensities concerning for microabscesses. After one week of hospitalization, he underwent a bronchoscopy. The BAL fluid was negative for pathogen specific testing for bacterial, fungal or mycobacteria infection. A transbronchial biopsy revealed necrotizing granulomas with pathology staining negative for fungi or AFB. Following this result, the remainder of the patient’s work up returned, including an RPR of 1:256 with a positive FTA-ABS. With this result in hand, the lung tissue was tested with Warthin-Starry staining which was negative for spirochetes. The patient was started on treatment for presumed secondary syphilis with intramuscular benzathine penicillin G. His clinical status improved and the patient was discharged to home one week later. Following completion of his antibiotic therapy, the patient was lost to follow up for one year. Upon returning to clinic, he underwent testing which revealed a negative RPR.

This case demonstrates the importance of recognizing atypical presentations of common pathogens, particularly with respect to those with broader public health implications.
New Rash with Ankylosing Spondylitis

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Introduction: Infliximab, a chimeric monoclonal antibody against tumor necrosis factor alpha (TNFa), has been FDA approved for treatment of many rheumatological conditions including rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis (AS). Infliximab is generally well tolerated, however a wide spectrum of side effects have been reported, including de novo psoriasis.

Case Description: We report a case of a 59-year-old female with HLA-B27 positive erosive AS and anterior uveitis who was treated with methotrexate and infliximab infusion. Her physical examination was significant for synovitis of bilateral second and third metacarpophalangeal joints and mild tenderness over lumbosacral spine and sacroiliac joints but with full range of motion. Laboratory and radiographic findings included sedimentation rate of 66mm/hr (0-30mm/hr), C-reactive protein of 21 mg/dL (0-10mg/dL), and bilateral grade 2 sacroiliitis on MRI of the sacroiliac joints. Overall, she responded well to immunosuppressive therapy. Then two months after her last infliximab infusion (5mg/kg, every eight weeks), she developed pustular plaques with silvery scales, ranging from 2 to 5cm over the palmar surface of hands and soles of her feet. She has no family or personal history of psoriasis. Dermatology was consulted and palmoplantar pustular psoriasis was diagnosed both clinically and histologically. Infliximab was discontinued, methotrexate was increased from 10mg to 15mg weekly, and topical steroid was also started with moderate efficacy initially. A few months later, her symptoms started to show improvement and she continued to do well on the new regimen.

Discussion: Though less common, TNFa inhibitors can induce psoriasis in 3-5% of patients with spondyloarthropathy. Palmoplantar pustular psoriasis is found in 33.3-42.9% of the TNFa inhibitor-induced psoriasis cases and patients with seronegative spondyloarthritides tend to develop pustular lesions more frequently than those with other autoimmune and inflammatory conditions. De Gannes et al. hypothesized that TNFa inhibition promotes the proliferation of plamacytoid dendritic cells that produce cytokines such as interferon-a (IFNa), a key factor in psoriasis induction. Studies showed that patients receiving TNFa inhibitor indeed have increased IFNa expression in psoriatic lesion biopsies. Collamer et al. also suggested that increased IFNa level will increase the expression of chemokine receptor CXCR3 on T-cells, which in turn induces the homing of Th1 lymphocytes to cutaneous site. However other studies speculated that other cytokines including interleukin (IL)-17 and IL-22 also play a key role in addition to decreased TNFa levels due to TNFa-inhibitors. These have all been postulated as potential and probable mechanisms for paradoxical de novo psoriasis in patients undergoing TNF antagonist therapy. However further research is required to gain a better understanding of the microbiome and relationship between TNF-inhibition and cutaneous eruptions. This report serves as a reminder to clinicians that paradoxical psoriasis can happen in patients receiving TNFa inhibitors and be vigilant in monitoring and reporting adverse reactions of such cutaneous eruptions.
SOUTH CAROLINA POSTER FINALIST - CLINICAL VIGNETTE Sargam Saksena, MD

MYCOBACTERIUM BOVIS SEPTIC ARTHRITIS OF A NATIVE JOINT AFTER TREATMENT WITH INTRA-VESICULAR BACILLE CALMETTER-GUERIN (BCG).

First Author: Sargam Saksena, MD Anthony W. Baffoe-Bonnie, MD

We present a 74 year old with a complaint of pain, swelling and purulent left knee drainage. Two months prior he developed these symptoms, night sweats and weight loss. Synovial fluid WBC was 22K with neutrophilic predominance but no growth. Two weeks later he developed fever and hypotension. Emergent arthroscopy revealed purulent synovial fluid but cultures were again negative. Despite broad spectrum antibiotics the purulent drainage and swelling persisted. Culture of the first synovial fluid subsequently grew Mycobacterium Tuberculosis complex after six weeks. Further testing confirmed Mycobacterium bovis, Bacille Calmette-Guerin (BCG) strain. Patient had a history of bladder cancer and had intravesical (BCG) therapy eight months prior to onset of symptoms. He was started on a three drug anti tuberculosis regimen but was unable to tolerate it and opted for palliative care. BCG is prepared from a strain of attenuated live bovine tuberculous bacillus and has become the standard of care for treating early bladder cancer.

Septic arthritis has rarely been reported as a complication of this therapy. Published cases have been in prosthetic joints that were placed six to sixteen years prior to their infection. To our knowledge our case could be the first reported case of Mycobacterium bovis (BCG) septic arthritis in a native joint. Mycobacterium bovis (BCG) septic arthritis has been seen as early as during treatment and up to two year following completion of treatment with BCG. All cases presented with joint symptoms and X-ray findings consistent with failure of prosthesis or evidence of joint destruction. All cases reported purulent joint fluid with no growth initially but subsequently grew Mycobacterium bovis two to six weeks later. It is postulated that dissemination of Mycobacterium bovis occurs hematogenously. Immunocompromised states, traumatic instillation, cystitis during instillation or urologic procedures during and after treatment increases the risk. There is evidence that BCG can remain in the bladder for sixteen months following treatment and reactivation of dormant BCG can explain late presentation. All cases were treated surgically with drainage, debridement or revision of failed prosthesis. A three drug anti tuberculosis regimen for at least nine months seemed to be most successful. Mycobacterium bovis septic arthritis of either the native or prosthetic joint can occur as a complication of treatment with intravesical BCG. The timeline for this is highly variable, hence clinicians faced with culture negative joint infections should consider this diagnosis if their patient has had such therapy in the past. Early surgical treatment and prompt initiation of an appropriate anti tuberculosis regimen seems to be most successful.
SOUTH DAKOTA POSTER FINALIST - CLINICAL VIGNETTE M Azhar Gangat, MD

A Fungal Cause of ARDS In an Immunocompetent Patient

M. Azhar Gangat, Jeremy Storm

Introduction: Blastomycosis is a systemic pyogranulomatous fungal infection caused by thermally dimorphic fungus *Blastomyces dermatitidis*. The most common site affected by blastomycosis is lungs, followed by skin, bones, genitourinary system and central nervous system. The clinical manifestations of blastomycosis include: asymptomatic infection, acute pneumonia, chronic pneumonia and extrapulmonary disease. Pulmonary blastomycosis can be severe in immunocompromised patients with very high morbidity and mortality rates. Immunocompetent hosts are uncommonly affected by pulmonary blastomycosis and can rarely progress to acute respiratory distress syndrome (ARDS) with significant risk of mortality. We present a case of an immunocompetent host with acute respiratory failure progressing to ARDS due to blastomycosis along with epidemiology, pathogenesis, virulence factors, diagnosis and treatment options.

Case Presentation: A 31-year-old previously healthy man from Brookings, SD, with no history of lung disease or smoking, presented to an outpatient clinic with fever, productive cough, shortness of breath and fatigue. He was prescribed oral antibiotic therapy with a presumptive diagnosis of acute bacterial bronchitis. With continued symptoms and X-ray showing a left lower lobe consolidation, he was given another course with no avail. He had continued high grade fevers, productive cough, shortness of breath, hemoptysis and weakness. The physical exam revealed grossly decreased breath sounds and egophony along with significant dullness to percussion on the left side. X-ray showed significant progression of his left lower lobe consolidation. Community acquired pneumonia was suspected and he was empirically started on broad spectrum IV antibiotics; vancomycin, doxycycline and cefepime. The investigative workup returned negative for: sputum gram stain and culture, viral DFA panel, mycoplasma IgM, urine legionella and streptococcus antigens, TB and HIV screens and fungal serologies. Despite the aggressive medical therapy, the patient continued to worsen and progressed to septic shock, worsening leukocytosis, acidemia and finally ARDS. With worsening status, intubation was required, bronchoscopy was performed and bronchoalveolar lavage was obtained, which showed fungal elements with broad-based budding that were morphologically suggestive of the blastomycosis species. He was started on liposomal amphotericin B. He survived after an extensive and complicated hospital course.

Discussion: *B. dermatitidis* is endemic in the southeastern and south central states along the Mississippi and Ohio River basins, midwestern states and Canadian provinces bordering the Great Lakes. The outbreaks of blastomycosis are associated with exposure to soil and waterways. *B. dermatitidis* is a dimorphic fungus, growing as a mycelium at 25°C and as a yeast at 37°C. It is transformed into yeast form in the human tissue. After the conversion, *B. dermatitidis* is found as round yeast cells with a thick wall with the cells forming a broad-based bud. This resistance to phagocytosis of yeast cells is due to the thick cell wall, which contains lipid and phospholipid. Blastomyces adhesion 1 (BAD-1) acts as an immunomodulator for the fungus and allows adhesion and binding to cluster of differentiation-14 (CD14) of macrophages. The expression of BAD-1 adhesin is thought to be the most important virulent factor along with the thick cell wall, which allows the fungus to cause an infection even in an immunocompetent host. Genetic predisposition as a contribution to blastomycosis may be a possibility in selected hosts. The clinical manifestations include asymptomatic infection, acute or chronic
pneumonia and extrapulmonary disease, such as verrucuous or ulcerative skin lesions and osteomyelitis. The lungs are the most common site of infection (91%), followed by skin (18%), bones (4%), genitourinary system (2%) and central nervous system (CNS) (1%). ARDS is the rarest pulmonary presentation of blastomycosis. The mortality in patients with ARDS is over 50-89% and even higher in immunocompromised patients. The definitive diagnosis of blastomycosis is obtained by culturing the organism, however, it is more practical to get a presumptive diagnosis by visualizing broad-based budding yeast in clinical specimens, such as sputum, bronchial washings or tissue sample. Due to the high cross-reactivity with *Histoplasma capsulatum*, serologic or antigen testing is not useful. The treatment depends on the clinical form, severity of the disease and the immune status of the patient, with amphotericin B and itraconazole being the mainstay of treatment. Glucocorticoids are employed with anti-fungals in severe cases with ARDS, however, the benefit of this adjunctive therapy is debated.

**Conclusion:** Blastomycosis is a systemic pyogranulomatous fungal infection caused by *Blastomyces dermatitidis*. Although it is more common in immunocompromised patients, immunocompetent hosts can be affected as well. The clinical manifestations include asymptomatic infection, acute pneumonia, chronic pneumonia and extrapulmonary disease. The diagnosis is made by visualizing broad-based budding yeast in body specimens. The virulence factors of this organism include the thick cell wall and BAD-1 adhesin. Amphotericin B and itraconazole are the mainstay of treatment. Undiagnosed blastomycosis can progress to ARDS and is associated with very high mortality. More research is needed to ascertain why blastomycosis can progress to a severe disease in some immunocompetent patients. Our patient’s difficult clinical course highlights the need to maintain high index of suspicion for blastomycosis in endemic regions.
The great imitator: What started as a gastroenteritis and ended up as a type I aortic dissection

Aortic dissection (AD) is a life threatening condition characterized by intimal tear of the aortic wall, with mortality rates estimated at 50% by 48 hours if undiagnosed. It is often considered the great imitator because of its myriad of varied presentations. Depending on the branch vessels involved, AD may manifest with myocardial infarction, pericardial tamponade, neurological events including syncope or stroke, intestinal or spinal cord ischemia, or renal insufficiency.

A 37 year old African American female with a history of hypertension and gastroesophageal reflux disease, presented with 1 day history of non radiating abdominal pain, nausea, non-bilious vomiting, and diarrhea. On exam, she appeared comfortable. Vital signs appeared stable with blood pressure of 136/61 mm Hg. Physical examination showed dry oral mucosa and mild epigastric tenderness. Admission labs were notable for metabolic acidosis with bicarbonate of 18 mmol/l, anion gap of 17 and creatinine of 1.59 mg/dl. EKG was normal and two sets of troponins were negative. A chest X ray was normal. A non-contrast computed tomography was only significant for fluid filled loops of small bowel. Patient was admitted for viral gastroenteritis and managed with pantoprazole, IV fluids and antiemetics with plan to discharge home next morning. Over the next 2 days, patient’s condition worsened with episodes of hypoglycemia, worsening metabolic acidosis (bicarbonate 7 mmol/l), worsening creatinine (2.24 mg/dl) and markedly deranged liver function tests (ALT > 2000 U/l, AST > 3500 U/l, ALP 68 U/l and INR 4.0). Workup of liver dysfunction was unrevealing. The patient was subsequently transferred to our facility with a diagnosis fulminant hepatic failure of uncertain etiology. She was evaluated by the transplant hepatology team and an echocardiogram was ordered as a part of the transplant workup. Transthoracic Echocardiogram revealed dilated aortic root and focal linear calcification of the ascending aorta suspicious for dissection. This was followed up with an urgent contrast CT of chest, abdomen/pelvis which showed acute type 1 aortic dissection that extended from aortic root to the bifurcation of abdominal aorta with occlusion of the right renal, celiac and superior mesenteric artery. Patient was urgently taken to the operating room and is currently undergoing further treatment in the ICU.

Our case illustrates an atypical presentation of aortic dissection in a young female. The patient never had chest pain, and manifested with organ injuries with sequential obstruction of superior mesenteric, renal, celiac and common iliac arteries respectively. Absence of chest pain and a normal chest X ray may not sufficiently rule out aortic dissection, and a high index of suspicion remains a key to the diagnosis.
Subclavian Steal Syndrome: A rare but important cause of dizziness.

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Subclavian steal syndrome (SSS), also called subclavian steal phenomenon or subclavian steal steno-occlusive disease, is a rare condition of reversal of vertebral blood flow due to severe occlusion or stenosis of proximal subclavian artery resulting in significant vertebrobasilar insufficiency which can cause dizziness, ataxia, presyncope and syncope. It also can lead to infrequent left arm claudication with weakness and paresthesia due to ischemia. We report a case of high grade/near complete occlusion of the origin of the left subclavian artery in which initial presentation was severe dizziness.

56 year-old female presented to our emergency room for evaluation of severe dizziness for one and a half weeks. She described feeling very lightheaded with changing position from supine to standing, and with walking, leading to unsteadiness. Patient denied headache, blurred vision, tinnitus, chest pain, palpitation, shortness of breath, presyncope or syncope. Medical history included longstanding hypertension, hyperlipidemia, seizure and tobacco use disorder. She had a 40 pack-year history of tobacco use but never used alcohol or illicit drugs. Family history was pertinent for heart attack, stroke and diabetes mellitus on maternal site. On physical examination, she was found to have a blood pressure of 81/58 mmHg in the left arm and 131/69 in the right arm and barely palpable left radial and brachial pulses. A systolic bruit was heard at the base of the neck, just above the clavicle on the left side. Complete blood count, chemistry panel, cardiac enzymes, electrocardiogram and chest radiograph were all unremarkable. Non-contrast CT of the head was negative for hemorrhage, infarct, or mass effect. Doppler ultrasound of carotid arteries showed reversal of blood flow in left vertebral artery with low velocity blood flow in left subclavian artery consistent with severe subclavian stenosis. Diagnosis of subclavian steal syndrome was confirmed by CTA aorta that showed high-grade stenosis with near complete occlusion of the origin of the left subclavian artery with 1.6cm stenotic segment proximal to the vertebral artery. The patient had left retrograde transbrachial angiogram with subsequent correction of stenosis with a bare metal stent. The symptoms completely resolved after the intravascular intervention and the patient remains free of the symptoms through 8 months of follow up.

This case underscores the importance of recognition of subclavian steal syndrome in patients who present with dizziness and significant difference of the brachial artery blood pressures between the two extremities. Although subclavian steal syndrome is rare, a high index of suspicion is warranted in the presence of suggestive history, risk factors and physical findings.
Macrolipasemia in a 40 year old with SLE: Is it Pancreatitis?

First Author: Poojitha Valasareddy, MD Second Author: Hieu Vo, MD

Introduction: We report a case of a 44-year-old female patient with Systemic Lupus Erythematosus who presented with abdominal pain, nausea and vomiting initially thought to be pancreatitis. At presentation, she had an elevated lipase level with normal amylase level but did not have pancreatitis on CT or Ultrasound imaging. She was subsequently found to have Macrolipasemia, which was believed to be secondary to her autoimmune disorder. Our case suggests that in patients with Lupus, it is important to consider macrolipasemia as a cause of isolated elevation in serum lipase.

Case Description: Patient is a 44-year-old Caucasian female with past medical history consistent with Systemic Lupus Erythematosus, Lupus Nephritis, Systolic congestive heart failure with EF of 20-25%, Diabetes Mellitus and Hypertension who presented with abdominal pain, which was periumbilical in origin. She reported that her pain did not radiate and she rated the pain to be 7/10 on admission. Associated symptoms included nausea and vomiting. Her vitals were as follows: Temp 36.4 C, Blood pressure 85/67, Pulse 100, Respiratory rate 24, Oxygen saturation on room air 100%. Her other pertinent labs were Total bilirubin 2.3, Alkaline phosphatase 173, Lipase 732, urinary lipase <10 and WBC 12.3.

Physical examination revealed an obese Caucasian female with tenderness to deep palpation in her periumbilical region and also malar rash on her cheeks. A CT scan and Ultrasound of the abdomen were obtained, as symptoms seemed consistent with pancreatitis. Both imaging studies showed no signs of pancreatitis and/or liver cirrhosis.

Discussion: Diagnosis of acute pancreatitis has proved to be a challenge to many clinicians. Although diagnosis depends on a combination of clinical history, radiographic imaging and biochemical tests, it is important to realize the limitations of these tests. Lipase is now considered as a more specific test for pancreatitis, but there are several conditions that present with elevated lipase and it is imperative to diagnose these conditions correctly. Macrolipasemia was reported in patients with liver cirrhosis, celiac disease, lupus and Crohn’s disease[1, 2]. Most of these cases have reported macrolipasemia in combination with macroamylasemia[3].

Our case reports isolated macrolipasemia in a Lupus patient. Although this patient has an elevated lipase levels in her serum, her urine studies suggested that her lipase level was less than 10. Increased blood amylase levels with normal to low urine amylase levels may indicate the presence of a macroamylase, acomplex of amylase and other proteins that accumulates in the blood. Kidney usually does not clear high molecular weight immunoglobulins, which can lead to diagnostic and therapeutic errors, like having elevated lipase levels. Having macroenzymes is regarded as being benign and usually does not require any treatment, however, it is important to diagnose appropriately because unnecessary and invasive investigations can be avoided[4]. In conclusion, macrolipasemia should be considered in patients with Lupus if they present with elevated lipase levels.

References

Successful transcatheter transapical mitral valve-in-valve implantation in an end-stage renal disease patient

First Author: Kongkiat Chaikriangkrai MD Coauthors: Su Min Chang MD, Stephen Little MD, Collin Barker MD

Introduction: Transcatheter mitral valve-in-valve implantation (TMVIV) is a relatively low-risk option for patients with mitral prosthetic valve dysfunction who are at high-risk for surgical valve replacement.

Case description: A 49-year-old man with hemodialysis-dependent end-stage renal disease and infective endocarditis underwent surgical mitral valve replacement 3 years ago with a 27-mm pericardial Edwards bioprosthetic valve. He presented with pulmonary edema and cardiogenic shock due to severe bioprosthetic mitral valve stenosis which required mechanical ventilation and vasopressor support. His cardiac examination revealed grade 3 diastolic rumbling murmur in the cardiac apical region. Transthoracic and transesophageal echocardiography showed mean pressure gradient of 18 mmHg across the mitral valve without associated significant regurgitation. His left ventricular ejection fraction was >70%. Despite optimal medical therapy, he was unable to be wean off of mechanical ventilation and vasopressor support. His surgical risk was deemed very high (Society of Thoracic Surgeons predicted risk of mortality = 22%, Logistic EuroScore = 14%). Therefore, he underwent TMVIV by the anterograde transapical approach performed under local anesthesia and conscious sedation. A 26-mm Sapien XT valve was placed within the old valve successfully without major technical difficulty. Intraprocedural transesophageal echocardiography revealed mean pressure gradient of 3 mmHg across the mitral position without perivalvular regurgitation. The patient tolerated the procedure well and was extubated and off vasopressor in postoperative day 1.

Discussion: At present, the most recent cardiology guideline for mitral valve surgery in patients with significant mitral stenosis generally recommends mitral valve replacement for acceptable-risk patients and valvuloplasty for higher-risk ones for palliative purposes. Evidence of TMVIV for mitral stenosis, as well as for mitral regurgitation, is at its early stages. All of the published evidence are case reports/case series. Feasibility of TMVIV has been demonstrated for the first time in 2009 in Canada. TMVIV-associated early mortality ranged from 0 to 33% depending on case series. The longest follow-ups has been reported as a median of 357 days (interquartile range 244-454 days). TMVIV with transapical approach, as in our patient, has been demonstrated to have favorable outcomes. To the best of our knowledge, our patient is the first successful TMVIV performed in a patient with dialysis-dependent ESRD which theoretically poses greater challenges in fluid and electrolyte management as well as overall increased risk for postoperative mortality and morbidity.
TEXAS POSTER FINALIST - CLINICAL VIGNETTE Gregory Constantine, MD

Spontaneous Intra-abdominal Hemorrhage: A Rare Cause of Acute Abdominal Pain

First Author: Gregory Constantine, MD

Introduction: Spontaneous omental hematoma and associated intra-abdominal hemorrhage is a rare cause of acute abdominal pain. Initial presentation may be catastrophic requiring aggressive resuscitation and intervention. CT imaging provides an accurate and rapid method of diagnosis.

Case Presentation: The patient is an 18-year-old Asian male who presented with the sudden onset of constant sharp non-radiating 8/10 epigastric abdominal pain. Symptoms began after routine exercise and have progressed since their onset. Now associated with severe nausea without episodes of emesis the pain is exacerbated in the supine position and improved when seated leaning forward. He did not suffer from diarrhea/constipation, or dysuria. No association with shortness of breath or chest pain. He denies any preceding trauma or falls. CT scan of the abdomen and pelvis revealed a moderate amount of ascites as well as a large confluence of omental masses measuring up to 11.3 x 7.5 x 5 cm. Laboratory values including coagulation tests were within normal limits. Further evaluation was performed via CT-guided biopsy. Pathologic review of the specimen revealed both fresh and degenerated blood consistent with a hematoma. The patient’s symptoms improved with supportive measures and he was successfully discharged home. Follow up CT imaging approximately one month following his hospitalization noted absence of the previously seen free peritoneal fluid. The left omentum contained a now resolving 4.5 x 3.4 cm non-enhancing lesion measuring 55 Hounsfield units.

Discussion: Spontaneous hemoperitoneum is a rare cause of sudden abdominal pain from non-traumatic or iatrogenic events. Visceral organs including the liver, spleen, kidneys, and adrenals are common sites of spontaneous intra-abdominal hemorrhage. Rupture of hepatic tumors, particularly hepatic adenomas are responsible for a majority of cases. Additional etiologies and risk factors include the presence of coagulopathy in the form of bleeding diathesis or anticoagulant medications. Reports of spontaneous intra-abdominal hemorrhage have been described involving the epiploic, splenic, and gastric vessels that supply the omentum. The majority of vascular etiologies such as aneurysms, arteriovenous malformations, pseudoaneurysms, mycotic aneurysms, or arterial dissection typically present as a catastrophic event. Rapid diagnosis is paramount with the initial therapeutic goals aimed at resuscitation. CT is the preferred method of diagnosis as it provides information regarding the area of extravasation. Once an active site of hemorrhage has been identified further management via embolization or surgery may be pursued.
Leukemia Cutis: an Uncommon Presentation of AML

First Author: Crystal Hlaing, MD Second Author: Ravina Patel, DO Third Author: Susan Huynh, DO Fourth Author: Leslie Cler, MD

Acute myelogenous leukemia (AML) can manifest at any site in the body. Dermal manifestations occur in only about 13% of patients with AML. When present, this uncommon condition is called leukemia cutis.

A 35 year-old African American male with history of treated AML presented to the emergency department with chief complaint of a diffuse skin rash. The rash first involved his face, and then spread over his entire body. The patient denied any pain, pruritus, fever, night sweats, or weight loss. Differential diagnosis included: infectious, reactive, and autoimmune processes. Physical exam revealed a diffuse, nodulo-papular skin rash that involved the patient’s entire body, except his genitals, palms, and soles. Labs showed: CBC within normal limits, RPR non-reactive, HIV-1/2 antibodies negative, Gonorrhea and Chlamydia undetectable, and ESR and CRP only mildly elevated. Patient was sent home with a 2-week prednisone taper.

The patient stated the steroids made the rash subside. One month later, however, he returned to the ED with worsening of the rash. The patient’s mother, a retired nurse, told him he likely had leprosy. The patient was quite convinced he did. On physical exam, the patient was afebrile, non-tachycardic, and non-toxic appearing, but his rash was impressive. The amount of swelling of his face was akin to severe angioedema, but his skin was slightly erythematosus, firm, and thick. The swelling of his ears gave them the appearance of “cauliflower ears.” Labs now showed the patient was pancytopenic.

As the rash had supposedly improved with steroids before, the patient was given IV methylprednisolone. This did not help. Dermatology was consulted, and a skin biopsy was performed. Due to the patient’s history of leukemia, hematology/oncology was also consulted. A peripheral blood smear and a bone marrow biopsy were obtained. The biopsy showed 47% blasts, with immunophenotype being most consistent with acute monocytic leukemia (AML-M5). Results of the skin biopsy came back and confirmed leukemia cutis. The patient was started on cytarabine and idarubicin (“7+3”) chemotherapy. Patient’s facial swelling improved over the next few days on chemotherapy. Steroids were stopped. After a few weeks, his entire rash went away, and his skin texture was back to baseline.

This case illustrates how skin changes can be a manifestation of underlying malignancy. Although infectious, autoimmune, vascular, and allergic etiologies all more commonly cause dermal rashes, clinicians must remember that cancers such as leukemia may initially present with findings such as this.
More than Just a Scar: Violaceous Rash after Liver Transplantation

Satoko Kanahara, MD Gagan K. Sood, MD Lee B. Lu, MD

**Introduction:** Skin metastasis of hepatocellular carcinoma (HCC) is exceedingly rare but associated with high morbidity. Surgical seeding during liver transplant may cause metastasis of HCC to the skin.

**Case Report:** A 53-year-old male with alcoholic cirrhosis and chronic hepatitis C underwent successful liver transplant. The MRI prior to transplant revealed 2cm HCC without any vascular or nodal involvement. Post-transplant, he received immunosuppression with tacrolimus and prednisone and maintained good allograft function. Four weeks later, he developed recurrent ascites and nodular, mildly violaceous erythematous skin lesions around the well-healed surgical incision scar, which were initially concerning for atypical fungal or bacterial infection. Labs revealed WBC 9.5 K/uL, Cr 3.53 mg/dL, and normal liver function test. An abdominal CT and ultrasound showed normal appearing liver with patent hepatic and portal vasculature and mild thickening of the parietal peritoneum. Ascitic fluid examination revealed blood-tinged aspirate with 100 WBCs, 190,000 RBCs with a serum ascitic albumin gradient of 1.0. The peritoneal fluid cultures were negative for bacterial, fungal and mycobacterial infection. Skin biopsy of the nodular lesions around the surgical scar showed metastatic hepatocellular carcinoma. Cytological examination of ascitic fluid was also positive for malignant cells. Patient was diagnosed with metastatic HCC to skin and peritoneum post liver transplantation. Review of explant pathology revealed solitary HCC in the right lobe without metastatic lymph nodes but with focal disruption of the capsule.

**Discussion:** Skin metastasis of HCC, as a complication from liver transplant, is exceedingly rare, and has a very poor prognosis with a median survival of less than 5 months. Although there are over 6000 liver transplants performed in the U.S. annually, there have been only three case reports of cutaneous metastasis from HCC post liver transplant reported in the literature. Of these, two patients had the cutaneous metastasis along the surgical scar, similar to our patient. One had skin metastasis at 35 months and the other at 18 months post-transplant. Our patient developed skin lesions at 4 weeks post-transplant. In all cases, skin lesions were the first sign of recurrence of HCC. Although our patient had a small solitary HCC within Milan criteria for liver transplant, focal disruption of the capsule unrecognized by MRI prior to transplant might have led to cutaneous and peritoneal metastases. However, there was no evidence of recurrence in the transplanted liver. These findings suggest the possibility of surgical seeding. Hence, this case highlights the importance of recognizing cutaneous metastasis of HCC as a complication of liver transplantation and patients should be informed of this potential risk.
TEXAS POSTER FINALIST - CLINICAL VIGNETTE Kelvin J Lee, MD

From Salt-and-Pepper to Dyspnea and Missed Opportunity – A Case of Rapidly Progressing Systemic Sclerosis and Rheumatoid Arthritis Overlap Syndrome

First Author: Kelvin J Lee, MD Co-Author 2: Alisha Y. Young, MD Co-Author 3: Carolina Mejia-Otero, MD Co-Author 4: Rosa Estrada-Y-Martin, MD Co-Author 5: Gloria Salazar, MD

Introduction: Systemic sclerosis (SSc) is an autoimmune collagen-vascular disease characterized by fibrosis and vascular abnormalities in the skin and internal organs. One of the SSc manifestations is a progressive skin pigment loss with perifollicular hyperpigmentation, mimicking the appearance of vitiligo (“pseudo-vitiligo”). Emerging evidences link the severity of skin involvement to lung disease progression, especially among males, African Americans, and certain biomarkers. Improved survival relies on early diagnosis, prompt referral, and treatment initiation.

Case Description: A 45 year-old African-America male nonsmoker, who was initially referred to a dermatology clinic for progressive skin discoloration, presented to the rheumatology clinic with Raynaud’s phenomenon and diffuse pseudovitiligo. Patient denied prodromal viral illness, eczema, psoriasis, photosensitivity, malar rash, or oral lesions. Skin examination revealed depigmented patches surrounding perifollicular hyperpigmented macules, leading to a “salt-and-pepper” appearance of his trunk, arms, and thighs. Anti-topoisomerase I (Scl-70), anti-nuclear (ANA), and anti-cyclic citrullinated peptide (CCP) antibodies were positive; rheumatoid factor (RF), anti-Ro/La, anti-double-strand DNA (dsDNA), and anti-ribonucleic protein (RNP) antibodies were negative. Patient was diagnosed with diffuse cutaneous systemic sclerosis (dcSSc) and rheumatoid arthritis (RA) overlap syndrome; low-dose prednisone was started for seropositive/erosive synovitis. Screening pulmonary function test (PFT) showed moderately severe restrictive lung disease with reduced diffusion capacity at 46%. CT-chest revealed extensive ground-glass opacities and traction bronchiectasis in the lower lobes without obvious honeycombing, concerning for interstitial lung disease (ILD). Echocardiogram showed normal cardiac functions without evidence of pulmonary hypertension. Patient was lost to follow up and presented five months later with worsening dyspnea, volume overload, and right ventricular dilatation on echocardiogram. Repeat CT-chest showed persistent bibasilar traction bronchiectasis and confluent reticulonodular opacities. Patient was placed on oxygen and underwent diuresis. A right heart catheterization and the initiation of cyclophosphamide were delayed by MRSA bacteremia.

Conclusion: In patients presenting with progressive skin depigmentation, dcSSc should be suspected and screened with proper initial diagnostic tests, including PFT’s and at least a CXR. Although not completely understood, the perifollicular pigment retention in pseudovitiligo may be due to the richer capillary network around the hair follicles, allowing preserved melanogenesis relative to the surrounding tissue. In patients presenting with symptoms atypical for seropositive RA, such as skin thickening and dyspnea, screening for overlapped autoimmune illness, including SSc, should be considered. The incidence of ILD approaches 70% in patients with SSc and RA overlapped syndrome, higher than either autoimmune disease alone. Effective treatments are available for rapidly progressive skin disease, ILD, and pulmonary hypertension associated with dcSSc, if diagnosed early. All patients with rapidly progressing dcSSc or overlapped syndrome should be referred promptly and considered for clinical trials, with frequent visits and screenings for internal organ involvements.
Stringing the Liver and Eye: A Case of Near Eye Loss from Klebsiella Pneumoniae

Presenting Author: Kelvin J Lee, MD Co-Author 2: Philip C. Johnson III, MD

Introduction: Klebsiella pneumoniae (KP) is a commonly encountered opportunistic and nosocomial pathogen in healthcare. Classically, the most common clinical syndromes due to KP are pneumonia, urinary tract infection, abdominal infection, wound infection, soft tissue infection, and subsequent bacteremia. However, over the past 2 decades, a new hypervirulent strain of KP has emerged. These infections are characterized by bacteremia, liver abscesses, and metastatic infections in younger patients who often lack comorbidities. An unusual laboratory feature is the appearance of hypermucoviscous colonies on agar plate, which semiquantitatively generates a positive “string” test. A common and often devastating complication is endophthalmitis leading to loss of vision and catastrophic neurologic sequelae. Improved morbidity and mortality relies on early recognition and initiation of aggressive treatment.

Case Description: A 41-year-old Hispanic man presented with a 3-day history of rapidly progressing blurry vision and pain in the left eye, associated with fevers. He had not experienced trauma. The patient had a past medical history of gout and alcohol drinking but no history of hepatobiliary disease. On presentation he was febrile to 102.7°F. Physical exam revealed left periorbital cellulitis and chemosis with profuse lacrimation. Ocular exam revealed visual acuity of 20/30 in the left eye (right eye: 20/20). Pupils, extraocular movement, confrontation fields, and intraocular pressures were normal. Fundoscopic exam showed panuveitis with multiple white-centered preretinal hemorrhages in the left eye. Remainder of the physical exam was otherwise normal. Laboratory studies revealed leukocytosis with elevated ESR and CRP. CSF studies were unremarkable. Blood culture grew KP. Echocardiogram, chest xray, and urinalysis were unrevealing. The patient was started on broad spectrum antibiotics – intravenous cefepime with intravitreal vancomycin and ceftazidime. He also underwent vitrectomy. Because of the suspicion for endogenous endophthalmitis without an explained source for KP bacteremia, CT abdomen was performed to look for underlying abscess. The patient was found to have a 9.2 cm liver abscess, which was subsequently drained. Microbiologic analysis ultimately showed KP (hypermucoviscous strain) in all his cultures: blood, vitreous fluid, and liver abscess. With aggressive treatment, we were ultimately able to salvage the patient’s left eye and vision. Repeat CT 1 month after antibiotic treatment demonstrated complete resolution of his liver abscess.

Conclusion: In this case, the presentation of endophthalmitis was one of the first hints that something was different in an otherwise relatively healthy, young patient. Another lesson in KP highlighted by this case is the need to recognize an emerging hypervirulent form of KP. First described in Asia, more cases are now appearing in Western countries to suggest a global spread. Effective treatments are available for endophthalmitis and liver abscesses associated with these aggressive strains, if recognized and initiated early.
TEXAS POSTER FINALIST - CLINICAL VIGNETTE Pratik Naik, MD

The Body Doesn’t Lie! A Case of Pulmonary Foreign Body Granulomatosis.

First Author: Pratik Naik, MD

Introduction: Pulmonary foreign body granulomatosis is a rare disorder characterized by the development of granulomatous inflammation secondary to foreign bodies lodged in the pulmonary capillaries. This disorder is caused by intravenous (IV) injection of medications intended for oral administration and has been reported involving multiple organ systems. We present a case of this rare disease in a patient with initial presentation of hypoxemia, hemoptysis, and syncope.

Case Presentation: A 27 year old male with no significant past medical history presented for recurrent syncopal episodes, hypoxemia and hemoptysis for 3-months. Outpatient medications included Percocet, Ambien and Prozac. The patient was active duty military and denied smoking or IV drug use. Laboratory results including CBC, renal function and liver function were all within normal limits. Urine drug screen was positive for opiates. A chest X-ray was unremarkable and a CTPA was negative for pulmonary embolism but showed diffuse micronodular infiltrates. The patient underwent cardiac and neurologic workup for syncope that included an echocardiogram, rhythm monitoring, cardiac stress test, brain MRI & MRA, EEG and carotid ultrasound, all of which were unremarkable. Syncope was attributed to vasovagal related to cough and hypoxia. Bronchoscopy with bronchoalveolar lavage (BAL) was performed and was significant for progressively bloodier return on BAL consistent with alveolar hemorrhage. BAL cultures were negative. Due to the unclear etiology of the lung pathology, a lung biopsy was performed which showed numerous peri- and intravascular collections of exogenous material morphologically consistent with crospovidone (PVP), microcrystalline cellulose and starch collocated within foreign body type granulomas and associated polarizable birefringent foreign bodies. All three materials were inactive ingredients of oral medications and the collocation of this material within pulmonary blood vessels was consistent with IV injection of medications intended for oral administration.

Discussion: Pulmonary foreign body granulomatosis is a rare complication of IV injection of medications intended for oral administration. The exact pathophysiological mechanism of foreign body granulomatosis is unknown. Foreign body embolization results in an initial inflammatory arteritis and granulomas later develop after migration of particles to the surrounding perivascular and pulmonary interstitial tissue. Patients with foreign body granulomatosis can range from asymptomatic to fulminant disease. Symptomatic patients typically present with non-specific complaints including progressive exertional dyspnea or dry cough. Less typically they may present with weight loss, hemoptysis and night sweats. Confirmation of the disease by biopsy is essential, but unfortunately there are few successful proven management options for patients with worsening disease.
TEXAS POSTER FINALIST - CLINICAL VIGNETTE Veena A Patel, MD

If it isn’t ITP, what could it be? A Confusing Case of Primary Splenic Angiosarcoma

First Author: Veena A Patel, MD

Splenic angiosarcoma is the most common primary cancer of the spleen, but overall a very rare disease. There are not many reported cases and it does not have a classic, distinct presentation making it difficult to diagnose.

A 51 year-old Hispanic woman presented with thrombocytopenia and an enlarged spleen. She has a pertinent medical history of gastric bypass surgery that was complicated by multiple hospitalizations due to gastrointestinal bleeds from anastomotic ulcers.

The patient’s thrombocytopenia was first noted when she was hospitalized for a GI bleed seven months prior to presentation at our institution. Her platelet count was 70,000/microliter at that time. A few months later she was found to have a platelet count of 50,000/microliter and was referred to a hematologist, who performed a bone marrow biopsy which was deemed inconclusive, but showed no malignancy or excess of blasts. Her platelet count continued to drop and she was given a provisional diagnosis of immune thrombocytopenic purpura and was given intravenous immunoglobulin and prednisone with no subsequent improvement in her platelet count. She complained of night sweats, fatigue, left upper quadrant pain, easy bruising and yellowing of her skin.

On physical exam, she was visibly jaundiced with scleral icterus. Her abdominal exam revealed tenderness to palpation in the left upper quadrant and the spleen was palpable 7 cm below the left costal margin. No hepatomegaly, rebound tenderness or guarding was appreciated. Lower extremities showed trace edema with ecchymosis.

Lab data were as follows: platelet count of 20,000/microliter, normal liver function tests except for a total bilirubin on 2.9 mg/dL. Peripheral blood smear showed nucleated RBCs and Howell-Jolly bodies. Direct antiglobulin test and indirect Coombs tests were negative. Imaging revealed focal, hypodense splenic lesions and an enlarged spleen at 21 cm.

The patient was initially given intravenous immunoglobulin with a thrombopoietin mimetic agent, but platelet count did not respond. Another bone marrow biopsy was performed and showed 51% normal blasts, normal megakaryocytes and reticulin and collagen fibrosis. JAK-2 mutation was negative. The decision was made to perform a splenectomy. Spleen was removed and patient was found to have primary splenic angiosarcoma with BM involvement.

This case exemplifies the confusing nature of diagnosing primary splenic angiosarcoma. This was illustrated by the initial diagnosis of ITP followed by a bone marrow biopsy which was more suggestive of myelofibrosis, although neither of these were the correct diagnosis. The rarity of this disease along with a lack of a distinct presentation shows that primary splenic angiosarcoma continues to be a diagnostic challenge.
The Warburg effect in the medicine floor

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In 1924, the German physiologist Otto H. Warburg discovered that malignant cells preferentially metabolize glucose via glycolysis resulting in lactic acid (LA) production, rather than through oxidative phosphorylation of pyruvate, even in the presence of oxygen. Known today as the “Warburg effect,” this phenomenon has important clinical implications. Herein, we describe a case in which this biochemical principle was manifest in clinical practice.

A 53 year-old African American man with chronic kidney disease and hypertension presented with progressive malaise and dyspnea. On admission, he was tachycardic, tachypneic, blood pressure was 134/96 mmHg, and temperature was 37.2 °C. The rest of the physical exam revealed dry mucous membranes, abdominal distention and an irregular anterior liver edge that was palpable 8 cm below the right costal margin. Laboratory data were remarkable for bicarbonate of 9 mEq/L, anion gap of 32, LA of 4.2 mMol/L, pH 7.34, PaCO\textsubscript{2} 28 mmHg, PaO\textsubscript{2} 121 mmHg and ScvO\textsubscript{2} 73%. CT of the abdomen revealed hepatomegaly with innumerable hepatic masses. He was started on an intravenous bicarbonate infusion with improvement of acidosis and symptoms. A colonoscopy revealed a 3 cm mass in the cecum. Biopsies were consistent with poorly differentiated adenocarcinoma of colonic origin. Despite aggressive fluid resuscitation, thiamine replenishment and assurance of adequate oxygen delivery to peripheral tissues, elevated LA levels persisted. After other etiologies of lactic acidosis, such as mesenteric ischemia, alcoholism, CO intoxication, drug toxicity, sepsis, or inborn errors of metabolism were excluded, the diagnosis of type B lactic acidosis due to malignancy was established. Given the extent of the disease, goals of care were discussed, and the patient was referred for hospice care.

This case illustrates one interesting relationship between biochemical principles and clinical observations. The molecular basis of the Warburg effect is hypothesized to depend on the increased expression of the M2 isoform of pyruvate kinase (PKM2) in malignant cells. PKM2 allows aerobic glycolysis and increases availability of intermediate metabolites that can be used for the synthesis of nucleotides, lipids and amino acids with the ultimate goal of cell proliferation. This phenomenon has important diagnostic implications in day-to-day practice, since 2-deoxy-2-[\textsuperscript{18}F]fluoro-D-glucose uptake is used to detect malignant cells aggregates with positron emission tomography. In addition, it may also have therapeutic significance, since pyruvate kinase inhibitors like dichloroacetic acid promote pyruvate oxidation in the Krebs cycle, decrease LA production, and induce apoptosis in cancer cells. When facing a patient with lactic acidosis, the physician should consider the Warburg effect in the differential diagnosis.
TEXAS POSTER FINALIST - CLINICAL VIGNETTE Quintana Quezada A Raymundo, MD

Exophthalmos – is it always Graves’ disease?

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Introduction: Erdheim-Chester disease (ECD) was first described in 1930. Since then, around 500 cases have been documented. The disease is a non-Langerhans histiocytic disorder characterized by osteosclerotic long bone lesions as well as cardiac, pulmonary, central nervous system, retro-orbital and retroperitoneal soft tissue involvement. Infiltration by foamy histiocytes and Touton giant cells with surrounding fibrosis is seen on histopathology. Non-Langerhans histiocytes differ from Langerhans cells in the lack of expression of CD1a and S100 in addition to the absence of Birbeck granules on electron microscopy.

Case description: A 71-year-old woman was seen for severe proptosis, chemosis, and complete blindness. She had a history of papillary thyroid cancer for which total thyroidectomy had been performed and she also had central diabetes insipidus. Her medications included levothyroxine and desmopressin. Approximately 1 year prior to presentation she developed exophthalmos and decreased visual acuity. She also complained of diffuse arthralgias and bone pain. She had no signs or symptoms of thyrotoxicosis. She was seen by an ophthalmologist and prescribed oral prednisone, with no improvement in the exophthalmos. Subsequent retrobulbar radiotherapy failed to impede exophthalmos progression and deteriorating vision. Laboratory evaluation revealed thyroid stimulating hormone (TSH) level of 3.35 mU/L and undetectable thyroid stimulating immunoglobulin (TSI). CBC was unremarkable. Abdominal CT showed bilateral hydronephrosis with a soft tissue density material infiltrating the retroperitoneum and she had biochemical parameters consistent with chronic kidney disease stage 3. Orbital MRI demonstrated markedly increased retro-bulbar soft tissue. Bone scan revealed increased tracer uptake in both distal femora and proximal tibiae. Surgical orbital decompression with biopsy was performed. Histopathology showed foamy histiocyte infiltration with admixed Touton giant cells in a fibrotic background and immunostaining confirmed non-Langerhans histiocytosis. She refused therapy with interferon alpha and systemic chemotherapy and was discharged to hospice.

Discussion: Bilateral exophthalmos with negative TSI presents a diagnostic challenge. Literature review suggests roughly 10% of Graves’ disease is TSI negative. However this patient had additional clinical features described above that warranted consideration of an alternative diagnosis. The natural progression of exophthalmos and disappearance of serum TSI, features sometimes reported post total thyroidectomy in Graves’ disease, were red herrings in this case. Although the patient had classical features of ECD, diagnosis was missed until after blindness had ensued. Unfortunately, current treatment of ECD with steroids, interferon alpha and systemic chemotherapy have only limited benefits.
A Rare Infectious Complication Secondary To A Left Ventricular Assist Device

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Left ventricular assist devices (LVAD) are mechanical pumps that are used in the management of patients with refractory heart failure. Associated complications include ventricular arrhythmias, thrombus formation, thrombocytopenia, thromboembolic complications and most commonly infection.

A 55-year-old male presented with right-sided headache that had been worsening for the past month. His past medical history was significant for coronary artery disease, congestive heart failure requiring LVAD placement, CVA, chronic subarachnoid hemorrhage (SAH) and recurrent bacteremia. His physical examination, electrocardiogram and chest radiograph were unremarkable. Computed tomography (CT) of the head without contrast showed an interval increase in the amount of supratentorial subarachnoid hemorrhage compared to previous studies. The SAH was determined to be chronic by neurosurgery. Given the patient’s history of bacteremia and subarachnoid hemorrhage, CT angiography of the head was performed to assess the intracranial vasculature. CT angiography of the head showed a new 7.5 x 4.8 x 5.1 mm saccular aneurysm arising from a cortical temporal branch of the right middle cerebral artery. The presence and location was suggestive of a mycotic aneurysm. Blood cultures were positive for Klebsiella rhinoscleromatis sensitive to Imipenem. On day 6 of hospitalization the patient developed left hand weakness and a transient generalized seizure. Repeat CT angiography of the head showed an increase in the size of the aneurysm to 10.5 x 9.1 x 6.9 mm. Successful onyx gel embolization of the aneurysm was performed. The patient was then transferred to a cardiac transplant center for further evaluation and treatment possibilities.

Intracranial mycotic aneurysms are very rare phenomenon (0.7%) and this is the first case report of successfully treated mycotic aneurysm with endovascular approach. As clinicians it is important to have a high index of suspicion in patients who present with bacteremia with or without headache and other neurological symptoms. Patients with LVADs are at an increased risk for infection. In this population infection of the internal parts of the device can lead to a presentation similar to prosthetic valve endocarditis, predisposing these patients to complications such as mycotic aneurysms.
Too Blue Not to Be True: A Night Float's Diagnostic Dilemma

M.A. Shah, J.T. Bates.

Introduction: The diagnosis of methemoglobinemia is can be easily missed because of the subtle clinical presentation and the limited identification of etiologic agents.

Case: A 61-year-old female developed a small bowel obstruction after a pelvic surgery. She complained of a sore throat, so benzocaine was administered prior to nasogastric tube insertion. Following insertion, her oxygen saturation was measured at 77%. She was asymptomatic. The pulse oximeter was repositioned with no change in oxygen saturation. Examination revealed tachycardia, clear lungs and cyanosis of the lips and extremities. Her saturation remained unchanged on 100% oxygen. An arterial blood gas was drawn and noted to be dark brown. The results were pH 7.45, pCO2 of 37, paO2 of 355, and an oxygen saturation of 100%. Given the cyanosis, dark brown arterial blood, and saturation gap, methemoglobinemia was suspected. The methemoglobin level returned at 57.7%. Methylene blue was infused, and the patient improved. Chart review revealed the only oxidizing agent she had received was benzocaine spray.

Discussion: Patients with methemoglobinemia may have tissue hypoxia with no symptoms. Additionally, subtle signs of tissue hypoxia such as mild cyanosis can be missed if emphasis is only placed on the chest examination. Tissue hypoxia can occur even in the setting of a normal blood gas. This patient had a >5% difference in the measured oxygen saturation and the calculated saturation indicating a saturation gap. This finding should prompt evaluation for methemoglobinemia. Internists should recognize the medications that induce methemoglobinemia, given the rare but life-threatening complication of methemoglobinemia.
Mycobacterium Tuberculosis Arthritis Masquerading as a Post-traumatic Joint Effusion

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Tuberculosis is one of the most common infections worldwide, however osteoarticular involvement is not common and involvement of the wrist is rare.

A 53 year old African American female initially presented with a painful, swollen left wrist after hitting her forearm on a countertop. Left wrist radiographs were unremarkable. Five months later she presented with cough and mild shortness of breath. Chest radiograph revealed a left sided pleural effusion but the patient declined additional imaging or thoracentesis and did not return for further evaluations. Eight months from her initial presentation, she returned with no pulmonary symptoms but continued to have persistent pain and swelling of the left wrist. Imaging of the left wrist was significant for periarticular erosions and demineralization of the carpal bones and extensive wrist synovitis with a large effusion. Arthrocentesis revealed a normal cell count and no uric acid crystals. No specimens were sent to microbiology at that time. She was again lost to follow up, but presented 14 months later with persistent pain and swelling of her left wrist including swelling extending to her left arm and a draining sinus tract over her left wrist. On review of systems she noted weakness and numbness of her left hand. She denied fever, chills, night sweats, unexpected weight loss, cough, hemoptysis, lymphadenopathy, autoimmune disease, other arthralgia or joint effusion, alopecia, vitiligo, sicca, oral ulcers, skin rashes, foreign birth, travel, or known TB exposures or incarceration. She worked as a home health nurse for multiple years but had not been working for the last few years. Repeat imaging showed interval progression of destructive and lytic changes of the carpus, distal radius and ulna, and proximal metacarpals. Rheumatological and HIV studies were negative. She underwent a second left wrist arthrocentesis and a bone biopsy. Three weeks after the procedure, Mycobacterium tuberculosis grew from the cultures of the wrist fluid.

This case exemplifies an uncommon presentation of Mycobacterium tuberculosis infection. Bone and joint tuberculosis represents about 20%- 30% of extrapulmonary cases, but monoarthropathies are a small subset with carpal bone involvement a rarer entity. Classic tuberculous monoarthropathy presents in weight bearing joints, such as the knee and hip. Interestingly, as seen in our patient, 30% of cases report a history of joint trauma, which can confound and delay the diagnosis. Atypical infectious processes should be considered with persistent monoarthropathy, especially in cases with evidence of synovitis and bony destruction. The differential for chronic infectious monoarthropathies include Nocardia, Mycobacterial species, T Whippelii, Brucella, Coccidiodes and Blastomycetes. Joint aspiration and bone biopsy for infectious diagnostic studies are essential for prompt diagnosis and treatment.
Copycat Pancreatitis: A Case of Autoimmune Pancreatitis and the Importance of Early Diagnosis

First Author: Adil Sulaiman Zahiruddin, MD Second Author: Andrew Caruso, M.D.

Introduction: Autoimmune pancreatitis (AIP) is an IgG4 associated disease (systemic fibroinflammatory disorder) that has pancreatic and extrapancreatic manifestations. The similarity in clinical presentation to pancreatic cancer makes for a significant diagnostic challenge and significantly alters therapy.

Case Description: A 67 year old African American male presented with two weeks of painless jaundice, darkening urine, and light-colored stools. Patient denied abdominal pain, fevers, chills, night sweats, or significant weight loss. Laboratory studies revealed a total bilirubin of 12.6 mg/dl, elevated alkaline phosphatase, normal serum transaminases, and elevated IgG levels (but not in the IgG4 subclass). Abdominal CT revealed a soft tissue mass in the proximal common bile duct causing intrahepatic biliary ductal dilatation concerning for cholangiocarcinoma. The pancreas was not diffusely enlarged. ERCP revealed diffusely dilated intrahepatic bile ducts without beading, a tight stricture within the distal common hepatic duct, and mid-common bile duct approximately 1 cm in length. Biliary sphincterotomy was performed with common bile duct biopsies and a plastic biliary stent placed with prompt drainage of bile and contrast. An EUS revealed heterogeneous and edematous pancreatic head parenchyma with no discrete mass. There was heterogeneous and hypoechoic circumferential thickening of the mid and distal common bile duct. Several core needle biopsies of the pancreatic head revealed a dense lymphoplasmacytic infiltrate organized in a storiform pattern with obliterative phlebitis and negative for malignant cells. Prednisone therapy was initiated (40mg/day for six weeks with a subsequent slow taper). At discharge, the total bilirubin decreased to 3.6 mg/dl with improvement in symptoms. Biliary stent is to be exchanged in three months with repeat CT abdomen with pancreas protocol at that time. Serum IgG4 subclass antibodies were not elevated.

Discussion: AIP was first recognized as a distinct form of chronic pancreatitis in 1995. Obstructive jaundice is the most common presenting symptoms. For physicians, it is crucial to recognize this disease as the presentation is very similar to that of malignancy. In contrast to malignancy, AIP responds dramatically to steroids. Studies have shown that about one third of patients undergoing pancreatic resection for possible cancer were ultimately found to have benign disease with the characteristic lymphoplasmacytic infiltrate of AIP. Furthermore, about 30% of patients with autoimmune pancreatitis relapse. Recognition of autoimmune pancreatitis is crucial in both prognosis and defining therapeutic options.
Metastatic melanoma and fever: A case of Clostridium septicum sepsis

First Author: Capt Matthew Thomas Koroscil, MD

Introduction: Clostridium septicum is known to cause bacterial sepsis in patients with gastrointestinal malignancy. We describe a case of C. septicum sepsis secondary to metastatic melanoma.

Case Description: A 41 year-old male with history of stage IV melanoma presented to the emergency department the day after experiencing high fevers, malaise, and crampy abdominal pain. He reported his pain was slightly worse than baseline. He denied nausea, vomiting, or diarrhea. Vital signs showed a temperature of 101.7°F and tachycardia. Physical examination was remarkable for mild abdominal tenderness to palpation without peritoneal signs. Labs were significant for leukocytosis (12.4K) along with baseline microcytic anemia (Hgb 11.0). Urinalysis and chest radiography were unremarkable. Right upper quadrant abdominal ultrasound was within normal limits. The patient was admitted to the internal medicine team and broad spectrum antimicrobial therapy was initiated along with crystalloid resuscitation. Abdominal CT showed a new 5x6 cm left lower quadrant mass. The contrasted abdominal CT showed multiple loops of small bowel with wall thickening and surrounding inflammatory changes suggesting metastatic disease. Two sets of blood cultures grew Clostridium septicum within 14 hours. After a multidisciplinary discussion, the patient underwent urgent bowel resection for intussusception and bowel perforation secondary to obstructive mass which was found to be metastatic melanoma confirmed on pathology.

Discussion: Clostridium septicum infections have a high likelihood of associated malignancy. To the best of our knowledge, this is the first documented case of C. septicum sepsis secondary metastatic melanoma. Though surgery for malignant small bowel obstruction is palliative, our case warranted urgent surgery for recrudescent infection risk.
Two cases of ACE-inhibitor induced visceral angioedema

First Author: Ross Pinson

**Intro:** A well-known adverse effect of angiotensin converting enzyme inhibitors (ACEi) is angioedema, which presents as a non-pruritic swelling of the lips, face, and/or tongue. However, this occurs in only 0.1-0.7% of patients who take this medication. A much rarer, and likely underdiagnosed, variant of this reaction is ACEi induced visceral angioedema which presents with acute onset, severe abdominal pain and characteristic CT findings. Less than 40 such cases are described in current literature. The authors present two cases of ACEi induced intestinal angioedema at San Antonio Military Medical Center from 2009-2014. The goal of this report is to raise awareness of this rare condition given the significant morbidity delayed diagnosis can cause patients who take this ubiquitous medication.

**Case Descriptions:** The first patient is a 40 year old Caucasian female who presented to the outpatient clinic with 2 years of episodic, severe abdominal pain and nausea/vomiting. Her CT scan showed small bowel wall thickening and ascites. Laboratory evaluation revealed leukocytosis. Her course included multiple ER visits, hospitalizations, CT scans, paracentesis, antibiotics, endoscopies and exploratory laparoscopy. It was only after a negative workup for other etiologies and a temporal relationship between her ACEi and her symptoms was discovered that the medication was discontinued and her symptoms abated.

In the second case, a 34 year old African American female who had been on ACEi therapy for hypertension for three years developed severe, recurrent abdominal pain and nausea/vomiting. Her CT scan showed small bowel wall thickening and ascites. Laboratory evaluation showed leukocytosis. She was evaluated in the Gastroenterology clinic and initially treated symptomatically. She endured multiple ER visits, laboratory draws, CT scans, endoscopic procedures and biopsies en route to her diagnosis, 3 months after her initial symptom presentation. She has been symptom free since discontinuation of ACEi.

**Discussion:** Review of medical literature identified 35 case reports of ACEi induced visceral angioedema. The vast majority of these patients were middle aged, female, and African American. These patients all presented with abdominal pain and often with nausea, vomiting, and/or diarrhea. Laboratory evaluation showed a leukocytosis in a majority of the cases. CT findings included small bowel wall thickening in all cases and ascites was present in over 85%. On average, patients were continued on ACEi for 7.6 months after initial symptom presentation. 40% of patients received antibiotics, endoscopy, and/or exploratory surgery. Clinicians should have a high level of suspicion for this condition as delays in diagnosis can lead to significant harm through medication continuation and by diagnostic and therapeutic interventions.
Cough Cardioversion of Ventricular Tachycardia

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Introduction: Cough cardioversion of ventricular tachycardia has been reported previously although is poorly understood and rarely reported. Here we present the first report of cough cardioversion with simultaneous intracardiac electrogram (EGM) obtained from an implantable cardioverter defibrillator and telemetry recordings at the time of cardioversion and review the available literature.

Case Report: Patient is a 75 year old male with history of severe ischemic cardiomyopathy (CCS III, NYHA III) with ejection fraction of <20% admitted with mechanical fall complicated by cerebral contusion. Patient was without neurologic deficits, though given mild hemorrhagic transformation of his contusion was being monitored in the ICU. During a one hour period, the patient developed 10 episodes of monomorphic, sustained ventricular tachycardia (VT). During these events, the patient was presyncopal and the episodes resolved immediately when the nurse had the patient to cough. Intravenous amiodarone was given which decreased the frequency of the arrhythmias but the patient had 3 more episodes over the next two hours for which he cough cardioverted himself. Device interrogation confirmed these episodes as VT and we able to pace terminate subsequent episodes by decreasing the threshold for anti-tachycardial pacing from 181 to 166bpm.

Discussion: Cough cardioversion was first reported in the medical literature in 1980. They reported a patient ischemic cardiomyopathy who required daily cardioversion with external electric counter shock or chest thump except for days when he was able to cough, at which times he was able to convert himself to normal sinus rhythm with repeated forceful coughs. Subsequently, 316 consecutive patients treated for VT or Ventricular fibrillation with cough or precordial thump found 6 patients converted with coughing, one multiple times. The mechanism for cough cardioversion is poorly understood and is likely related to cough mediated increases in coronary perfusion pressure; however, decreases in LV filling leading to changes in conduction and conversion of mechanical input into electrical energy may also have a role.

To our knowledge this the third patient reported in the medical literature with multiple successful cough cardioversions of VT and first patient with simultaneous intra-cardiac EGMs, both of which make a spurious temporal association unlikely.

Conclusion: In patients in whom the onset of VT is witnessed, forcible attempts at coughing are reasonable while preparations for defibrillation are made.
US ARMY POSTER FINALIST - CLINICAL VIGNETTE Ryan Burkhart, DO

First Case Report: Sildenafil Induced Acute Interstitial Nephritis

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Introduction: Acute interstitial nephritis (AIN) is characterized by an inflammation of the renal interstitium, most often mediated by a drug induced hypersensitivity reaction. Multiple medications are known to cause AIN. Drug induced AIN usually occurs in a temporal relationship with the medication and polypharmacy may complicate the diagnosis. We present the first case report of sildenafil induced AIN in an 81 year old male.

Case: An 81 year old Asian male with a history of erectile dysfunction, chronic kidney disease stage 3a, hypertension, hyperlipidemia, coronary artery disease, gout with chronic allopurinol use for three decades, and osteoarthritis with remote NSAID use was admitted with generalized edema, rapid weight gain over the previous month, nephrotic range proteinuria (14.7 g/day recorded two weeks prior), and acute kidney injury. The patient reported an acute change in physical appearance and symptomatology the day after the ingestion of a single dose of sildenafil four days prior to his admission. A renal biopsy was performed in the setting of nephrotic range proteinuria and acute kidney injury with a peak serum creatinine of 6.1 mg/dL (baseline serum creatinine 1.4 mg/dL). The biopsy was notable for minimal change disease with acute on chronic interstitial nephritis. Renal replacement therapy was initiated simultaneously with glucocorticoid therapy. Renal recovery within six weeks permitted discontinuation of dialysis and steroid dose reduction.

Discussion: The temporal association and the absence of any new drugs suggest that the AIN was most likely due to the sildenafil. AIN superimposed on minimal change disease is a known association of NSAID induced nephropathy. However, in this case NSAIDs are less likely to have caused the AIN given their remote use. The ease of steroid responsiveness would also suggest another cause as NSAID induced AIN is often steroid resistant. The chronic interstitial nephritis is likely due the allopurinol and remote history of NSAID use. Prior NSAID use may have contributed to the minimal change disease. Sildenafil use is common for the treatment of erectile dysfunction as well as pulmonary arterial hypertension. The true incidence of renal issues with sildenafil is unknown as there is minimal published data or post marketing renal adverse events. As the number of sildenafil prescriptions increases, more cases of AIN may be identified and physician awareness for this drug disease association is necessary.
Transfusion Transmitted Malaria Not Preventable by Current Blood Donor Screening Guidelines

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Transfusion transmitted malaria is a well-known, though rare entity in the United States with only one hundred cases reported in the past fifty years. Although instituted in many other non-endemic countries, there are currently no FDA approved screening tests of donated blood for malaria in the US. As a result, prevention relies solely on donor deferral with durations ranging from one to three years based on self-reported symptoms, foreign travel and immigration status.

We present a case of transfusion transmitted malaria not preventable by these guidelines. A 76 year old male presented to the emergency room with fever, hypotension, tachycardia, and a urinalysis indicative of a urinary tract infection. He was admitted to the ICU for sepsis of urinary origin and initiated on broad spectrum antibiotics. On the morning after admission, he was incidentally found to have intra-erythrocytic parasites on a peripheral smear, identified as Plasmodium malariae by PCR. Atovaquone-proguanil was added to his regimen with documented clearance of his parasitemia and full clinical recovery. In conjunction with the Center for Disease Control, a full investigation was initiated. The patient was a Georgia resident without history of travel since the 1980s or prior diagnosis or symptoms of malaria. However, his history was significant for transfusion of fifteen units of packed red blood cells in the past six years. Index samples from ten of these units were obtained, with one testing positive via ELISA for P. malariae. The donor was identified as a twenty year old active duty male, born in Liberia, who immigrated to the United States at the age of five. He denied any current or prior symptoms of malaria, other foreign travel or recent exposure to malaria. He was treated with chloroquine and never developed symptoms of malaria.

In review of the 101 cases of transfusion transmitted malaria since 1963, the majority (71%) occur from imperfect application of the current deferral guidelines. However, in this case, fifteen years had elapsed between the donor’s immigration and the transmission of the disease, placing him well outside any current deferral period. This asymptomatic carriage is thought to arise from partial immunity which prevents clinical symptoms while still allowing a persistent low grade parasitemia. This case is remarkable as it shows that our current guidelines are unable to prevent all transfusion transmitted malaria, even with optimal adherence to strict donor selection. As such, it demonstrates the need for continued development of highly sensitive and cost effective laboratory screening for high risk donors.
A DAB OF DANGER: A CASE OF SEVERE RESPIRATORY FAILURE FOLLOWING INHALATION OF BUTANE HASH OIL

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Introduction: Butane Hash Oil (BHO or Dabs) is a highly efficient delivery method for administering cannabinoids among marijuana abusers. We seek to illustrate a potential health risk of BHO by presenting a case of severe respiratory distress following its inhalation.

Case: A 19-year-old male with a history of daily marijuana use presented to the emergency department with worsening shortness of breath. Six days prior, he had smoked 2 “dabs” of BHO and immediately developed a burning sensation in his chest with chest tightness. He endorsed prior use of BHO, rare cigarette use, and moderate alcohol use, but denied other drug use. At presentation he noted dyspnea with exertion, cough, pleuritic chest pain, and trace hemoptysis. The patient’s symptoms continued to progress and he was transferred to the Intensive Care Unit. Chest CT demonstrated worsened bilateral infiltrates and he was intubated for severe acute respiratory distress syndrome (ARDS) with hypoxemic respiratory failure. Bronchoscopy with bronchoalveolar lavage (BAL) was performed. The BAL cultures and gram stain were negative for bacterial, fungal, or viral infection and alveolar cell count revealed a non-specific alveolitis with eosinophils <10%. High dose corticosteroids were given for non-specific inflammatory inhalational injury and antibiotics were stopped. After 2 days, the patient was able to be extubated with slow improvement in hypoxia and clinical status. He was discharged home with supplemental oxygen.

Discussion: BHO is an increasingly popular form of cannabis with THC content upwards of 60-90%, giving the user a more intense intoxication. This concentrated resin is produced by passing butane through a container filled with cannabis, creating a THC-rich solvent, which is vacuum purged, eliminating the butane, and leaving a waxy substance that can be “dabbed” on a metal surface, vaporized, and inhaled by the user. To our knowledge, this represents the first reported case of ARDS following the inhalation of BHO. Rare cases of severe respiratory disease have been reported with marijuana use, including eosinophilic pneumonia and two cases of ARDS. Although the exact pathophysiological mechanism remains unclear, one hypothesis is that residual butane or other impurities in the BHO may have caused a direct inhalation injury. Alternatively, a maladaptive host immunologic response may explain the delay between the insult and the culmination of his respiratory disease. This case raises important questions about the potential life-threatening risks that may be associated with concentrating marijuana. Given recent legislation legalizing marijuana, it is likely reported toxicities from marijuana will increase.
Sarcoidosis Related Pleural Effusion Treated with Infliximab Monotherapy

First Author: CPT Zorana Mrsic Second Author: MAJ Samuel Burkett

Introduction: Pleural effusions are a rare manifestation of pulmonary sarcoidosis with a prevalence of 1-2%. The treatment of sarcoidosis related pleural effusions is not well defined and recommendations mirror that of other manifestations of sarcoidosis. We present a rare case of a sarcoidosis related pleural effusion treated with Infliximab monotherapy.

Case Presentation: A 42 year-old female with biopsy-proven, stage I pulmonary sarcoidosis presented with one month of right sided, pleuritic chest pain. The patient denied fever, chills, night sweats, or cough. The patient received an empiric course of Levofloxacin for presumed pneumonia without symptomatic improvement. A computed tomography (CT) scan of the chest was obtained and demonstrated a right sided pleural effusion with hilar lymphadenopathy. A diagnostic thoracentesis revealed a lymphocyte predominant, exudative pleural fluid with cultures and cytology being negative for infection or malignancy. A presumptive diagnosis of a sarcoidosis related pleural effusion was made. The patient refused treatment with corticosteroids or methotrexate for symptomatic pleural sarcoidosis. Alternatively, Infliximab was initiated with 5mg/kg infusions at 0, 2, and 6 weeks, then every 8 weeks subsequently. Her symptoms resolved quickly with near complete radiographic resolution of her pleural effusion at three months.

Discussion: Sarcoidosis is multisystem, immune-mediated inflammatory disorder of unknown etiology characterized by the formation of noncaseating granulomas in affected organs. Tumor necrosis factor (TNF)-a plays a critical role in the pathogenesis of granulomatous inflammation and the literature supporting the treatment of sarcoidosis with TNF-a antagonists is growing. While TNF-a antagonists are commonly used as an adjuvant therapy to corticosteroids or cytotoxic agents in refractory cases of sarcoidosis, we report this case to demonstrate that Infliximab can be effective as monotherapy in the treatment of sarcoidosis in patients whom corticosteroids or cytotoxic agents are either ineffective or are associated with unacceptable side effects.
A CASE OF SUPPLEMENT-ASSOCIATED ACIDEMIA AND ACUTE KIDNEY INJURY IN AN ACTIVE DUTY SOLDIER

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INTRODUCTION: We present a case of N.O.-Xplode™-associated acidemia and acute kidney injury (AKI) in a previously healthy active duty soldier.

CASE REPORT: A 31 year-old Caucasian male with a history of occasional tension headaches presented following the Army Physical Fitness test. He took 975 mg of aspirin for headache the previous evening, and consumed the dietary supplement N.O.-Xplode™ on the morning of the test. He developed dyspnea and leg and lower back pain during the run portion of the test, and lost consciousness. Initial evaluation revealed severe increased anion gap metabolic acidosis with pH of 6.9, serum bicarbonate of 6 mmol/L, lactate of 28 mmol/L, and anion gap of 41 mmol/L. Treatment included administration of isotonic sodium bicarbonate followed by 0.9% sodium chloride. Serum creatinine (SCr) at presentation was 1.9 mg/dL and peaked at 3.2 before decreasing prior to discharge. UA showed 100 mg/dl protein and small blood. Serum uric acid was 16.5 mg/dL and subsequently normalized; neither hyperkalemia nor hyperphosphatemia were present. The urine uric acid to creatinine ratio was 1.2. Peak creatine kinase was 788 units/L.

DISCUSSION: This patient presented with life-threatening acidemia and nonoliguric acute kidney injury following heavy exertion, in the setting of N.O.-Xplode™ supplement use. Volume depletion likely contributed, and could have been exacerbated by methylxanthine, a diuretic in N.O.-Xplode™. Cyclooxygenase (COX) inhibition by aspirin and rutaecarpine, a non-selective COX inhibitor contained within N.O.-Xplode™ likely caused renal afferent arteriolar vasoconstriction, contributing to pre-renal AKI. N.O.-Xplode™ contains creatine, which has been associated with AKI in case reports. Nicotinic adenine dinucleotide from the supplement may have contributed to lactic acidosis, by increasing substrate for the conversion of pyruvate to lactate. Although uric acid crystals were not directly visualized in our patient’s urine, his marked elevation of serum uric acid and elevated urine uric acid to creatinine ratio suggests possible uric acid nephropathy. L-arginine from N.O.-Xplode™ could have contributed to increased uric acid production, particularly in the setting of strenuous exercise and salicylate use. In conclusion, there are several mechanistic possibilities for how N.O.-Xplode™ may have contributed to this soldier’s severe illness. N.O.-Xplode™ has been associated with palpitations, dizziness, hepatotoxicity, and one other reported case of AKI; but remains on the market and available for purchase at our local Exchange store. Physicians should query their patients about supplement use, and should consider counseling patients to avoid use of N.O.-Xplode™, especially during times of heavy exertion.
CAPECITABINE INDUCED ARRHYTHMIA

First Author: CAPT Bernadette Villarreal, Second Author: COL Eric Shry

Introduction: Capecitabine is an oral prodrug of 5-fluorouracil (5FU) that has become integrated into the treatment of multiple cancers due to its ease of administration and favorable balance of efficacy and toxicity. Cardiotoxicity is a well described adverse event reported with 5FU, but has been rarely reported with capecitabine.

Case: An 87-year-old male with history of hypertension, but no other cardiac history was diagnosed with low rectal T3N1 adenocarcinoma. The patient was started on neoadjuvant capecitabine and local radiation. Four days into therapy he presented with substernal chest pain consistent with angina, which resolved prior to presentation. Initial CXR was unremarkable, troponins were negative, and EKG demonstrated peaked T waves with resolving ST segment depression. The patient had 4 additional episodes of chest pain associated with dynamic EKG changes in a pattern consistent with posterior ST elevation and hyper-acute T waves which degenerated into sustained ventricular tachycardia with fusion beats captured on telemetry. The patient underwent cardiac catheterization which demonstrated mild large vessel coronary disease and branch-vessel disease without a culprit lesion. An echocardiogram demonstrated left ventricular hypertrophy with normal systolic function. Based on temporal association with starting capecitabine, his angina, EKG changes, and ventricular tachycardia were felt to be due to capecitabine induced vasospasm. The capecitabine was stopped and he was started on metoprolol, amlodipine, and isosorbide mononitrate without recurrence.

Discussion: Capecitabine is a prodrug which is orally administered and is converted to 5FU primarily in tumor cells and the liver. It has a milder toxicity profile as compared to 5FU; however cardiotoxicity has been observed including MI, angina, dysrhythmias, EKG changes, and cardiomyopathy. Chest pain is reported in approximately 6% of patients and dysrhythmias are reported in <5%. The mechanism of the symptoms and dysrhythmias are unclear; both coronary thrombosis and vasospasm are proposed causes. Capecitabine should be considered to have cardiotoxic potential and warrants further investigation into the exact mechanism.
Hoarse of course: are we underdiagnosing laryngeal Cryptococcus?

First Author: LT Clete Barrick Kristina J. St. Clair, LCDR, MC, USN

Hoarseness, or change in voice quality, is a common complaint in Primary Care and has a variety of functional and organic causes, including acute viral laryngitis, post-nasal drainage, laryngopharyngeal reflux, vocal cord stress, conversion disorders, neoplasms, neurologic diseases, rheumatologic conditions and chronic fungal infections. Recognition of common causes, empiric therapy based upon likely etiology and close follow-up with timely evaluation by an Otolaryngologist is prudent for symptoms lasting longer than three weeks.

We present the case of a 52-year-old female with a past medical history of adult onset asthma, paradoxical vocal cord movement, laryngeal candidiasis and acid reflux who presented with twelve months of worsening hoarseness, decreased asthma control, and globus sensation. Her medications included inhaled budesonide 160mcg/formoterol 4.5mcg, cetirizine 10mg, esomeprazole 40mg daily and oral prednisone as needed for severe asthma exacerbations. Physical exam was unremarkable except for expiratory wheezing. Vocal cord dysfunction was confirmed by fiber optic laryngoscopy and a posterior glottic mass with adjacent scarring was visualized. The lesion was excised via CO2 laser and the patient experienced significant improvement in her hoarseness and dyspnea following resection. Biopsy results demonstrated proliferative granulation tissue and abundant fungal elements identified as Cryptococcus. Computed tomography of the chest demonstrated two stable pleural-based nodules without evidence of parenchymal involvement. Serum cryptococcal antigen was negative. The patient was started on oral fluconazole 400mg daily with intended treatment duration of 24 months. To date she has had no evidence of disease recurrence.

Cryptococcus is a ubiquitous yeast found worldwide in soil, plant matter and pigeon excreta and typically causes mild pulmonary infections but can affect nearly any organ system. It is well known to be neurotropic; cryptococcal meningitis is the second leading cause of death in patients with Acquired Immunodeficiency Syndrome (AIDS) worldwide. Cryptococcal laryngitis is a rare presentation with only 17 cases reported to date. Laryngeal Cryptococcus remains a poorly characterized disease entity, however inhaled corticosteroids are the most common associated risk factor, implicated in 39% of cases. Other documented risk factors include AIDS (22%), systemic corticosteroids (11%) and diabetes mellitus (11%). Of note, 11% of cases have occurred in immunocompetent individuals without clear risk factors. Treatment options include amphotericin B, fluconazole and itraconazole. The azoles are favored due to their oral administration and less toxic side effect profile. Ideal duration of treatment has not been established and has ranged from 4 weeks to 24 months. Given the commonplace use of inhaled corticosteroids and the distribution of Cryptococcus throughout the world, laryngeal Cryptococcus is likely an under-recognized disease. Laryngeal Cryptococcus should be present on the differential diagnosis of patients with laryngeal disease, particularly in the setting of immunosuppression.
Why is my Hyperparathyroid Patient Itching?

First Author: LCDR Amie L Harvey Karen Kaufman, DO, LCDR, USN, Jason Daily, MD, CDR, USN

Chronic urticaria (CU), defined as daily or near daily urticaria for greater than 6 weeks, has been rarely documented in conjunction with primary hyperparathyroidism. In three previous case reports, CU resolved following surgical correction of disease. (1,2,3) While the mechanism of CU in primary hyperparathyroidism is unclear, it has been theorized to occur secondary to antigen-antibody complex formation, or chronic autoimmune urticaria (CAU). (1) We present the case of primary hyperparathyroidism with an initial presentation of urticaria in a patient with positive IgE receptor antibodies, consistent with CAU.

A 37-year-old female presented to the emergency department with a 2 week history of daily, pruritic, transient erythematous confluent wheels without obvious trigger on trunk and extremities with normalization of skin on wheel resolution. The patient also endorsed preceding symptoms of fatigue, headaches, nausea, decreased appetite, constipation and decreased exercise tolerance. There was no known family history of thyroid or parathyroid disease. Physical exam was significant for erythematous, edematous wheels without central pallor on lower back, chest and upper extremities without facial, periorbital or mucosal swelling. Lungs were clear to auscultation bilaterally. Laboratory results were significant for elevated serum calcium of 11.4 mg/dL with a normal complete blood count and differential. Treatment was provided with solumedrol, diphenhydramine and 2 liters of normal saline with symptom resolution. She was discharged with prednisone, ranitidine, cetirizine with recommended follow-up in endocrinology and allergy clinics. Further lab testing revealed an elevated intact parathyroid hormone level, normal 25-hydroxy-vitamin D level, normal thyroid studies with negative thyroglobulin and thyroid microsomal antibody testing. At the time of evaluation in allergy clinic, the patient endorsed greater than 6 weeks of daily hives responsive to cetirizine therapy. CU index was positive and the patient was diagnosed with CAU. She was treated with ranitidine and cetirizine, with medications titrated to effect. A thyroid ultrasound study and sestamibi scan were obtained with localization of a left posterior parathyroid adenoma. Three months after her initial presentation, the patient underwent a left parathyroid adenoma resection with postoperative normalization of her parathyroid hormone and serum calcium. Pathology revealed a 1.2 gram homogenous adenoma with an inconspicuous capsule. Antihistamines and H2 blockers were discontinued post operatively without CU recurrence. Repeat CU index testing is negative.

Conclusion: Our case suggests that the CU associated with hyperparathyroidism in three previous literature case reports may be of the subgroup CAU. This association is supported not only by symptom resolution as in previous case reports, but also by laboratory correction of CU index positivity post operatively. Further studies of possible subclinical antibody presence in hyperparathyroidism may be warranted.

References:
US NAVY POSTER FINALIST - CLINICAL VIGNETTE Dani Leary, DO

Life-Threatening Complications from a Life-Saving Device

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Although implantable cardioverter-defibrillators (ICD) are first line therapy for secondary prevention in patients surviving cardiac arrest due to ventricular fibrillation, they do carry significant risks. We present a case highlighting two separate life threatening complications of this life saving device in a patient with a rare underlying disorder.

A 48 year old woman suffered a ventricular fibrillation arrest in 2009. She received bystander CPR and was defibrillated with an Automatic External Defibrillator. An ICD was placed. After four years, she underwent generator change for battery depletion. Six months later, she presented to our institution with multiple ICD shocks in the setting of fever and mental status changes. Blood cultures grew *Staphylococcus aureus*, and transesophageal echocardiogram demonstrated a one centimeter mobile vegetation attached to the ICD lead. She underwent lead extraction and was treated with 6 weeks of IV antibiotics while wearing an external cardioverter defibrillator. At the end of the antibiotic course, a new ICD was placed. One week later she presented to our hospital with multiple ICD shocks. While being evaluated in the Emergency Department, she developed repetitive sustained ventricular fibrillation requiring multiple defibrillations. Chest x-ray and device interrogation identified ICD lead dislodgement, and she underwent emergent lead revision. Immediately after the lead was removed from the right ventricle, the ventricular fibrillation subsided. The lead was repositioned and the patient was admitted to the intensive care unit. She continued to have frequent salvos of nonsustained polymorphic ventricular tachycardia all preceded by the same short-coupled PVC. These events were not responsive to escalating beta blocker dosage, and she was diagnosed with the short-coupled variant torsades de pointes (TdP). Verapamil was begun and the arrhythmia subsided. The patient was offered catheter ablation but elected to continue medical management and has had no further ICD shocks in two years.

This case illustrates the lifesaving benefits of ICD therapy while also warning of the potential severe complications. Infection occurs at a rate of one to two percent and is more common after generator change, but lead endocarditis and severe sepsis is rare. Lead dislodgement occurs in less than two percent of cases but is associated with increased mortality. To our knowledge this is the first reported case of incessant ventricular fibrillation due to lead dislodgement. Short coupled variant TdP is a rare cause of idiopathic ventricular fibrillation characterized by early coupled monomorphic PVCs inducing TdP in setting of a normal QT interval. Short coupled variant TdP caused this patient to develop incessant ventricular fibrillation due to ventricular ectopy from lead dislodgement. This rare cardiac arrhythmia is not responsive to beta blocker, but can be treated with verapamil. Recognition and treatment of these complications and the underlying disease led to a full recovery without long term sequelae in this patient.

Views expressed herein are those of the authors and do not reflect the official policy/position of the Navy.
Percutaneous and Invasive Management of a Rare Congenital Pulmonary Malformation in an Active Duty Service Member

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Bronchopulmonary sequestration (BPS) is an extremely rare congenital malformation of the lower respiratory tract and consists of a non-functioning mass of lung tissue that lacks normal communication with the tracheobronchial tree, and is perfused by systemic arterial circulation. Bronchopulmonary sequestration can be intralobar (ILS) or extralobar (ELS) and predisposes patients to recurrent infections, hemoptysis, and respiratory distress. This case report describes percutaneous prophylactic embolization of the anomalous feeding artery to decrease intraoperative bleeding during removal of abnormal lung tissue.

A 26-year-old active duty male was referred to the cardiology department at Naval Medical Center San Diego after an incidental vascular abnormality was noted on computed tomography imaging for hematuria. History was significant for recurrent pulmonary infections, intermittent dyspnea, chest discomfort, and episodic hemoptysis for 12 months prior to presentation. An initial chest radiograph was unremarkable, however, computed tomography of the chest revealed a right-sided ILS with left-to-left shunting from an anomalous 6-mm systemic arterial vessel arising from the distal thoracic aorta, and venous drainage to the left atrium via the right inferior pulmonary vein. After an extensive multidisciplinary discussion, it was determined that corrective therapies were warranted due to the risk of recurrent pulmonary infections and possible high-output heart failure from left-to-left shunting. The surgical team requested prophylactic embolization of the systemic feeder artery to reduce intraoperative blood loss. The patient had successful percutaneous embolization of the anomalous arterial supply with an Amplatzer® vascular plug. He then underwent successful right lower lobe resection using video-assisted thoracoscopic surgery with minimal intraoperative blood loss. Sixteen months after treatment, the patient has been well without subsequent pulmonary infections and complete resolution of his dyspnea.

The incidence of BPS is estimated to be between 0.15 to 6.45% of all congenital pulmonary malformations. Case reports suggest a diagnosis rate of less than one case per year in the United States. Intralobar sequestration is the more common form of BPS and results in an abnormal region of non-functioning cystic lung tissue within normal lung parenchyma without its own pleural covering. Approximately 60% of cases are located in the posterior basal segment of the left lower lobe. Treatment of BPS is contingent on several factors including symptomatic vs. asymptomatic clinical presentation, pediatric vs adult patient, and ILS vs. ELS. This patient is the first documented case of prophylactic transcatheter anomalous feeding artery embolization by vascular plugging prior to video-assisted thoracoscopic wedge resection. Our case supports the use of percutaneous treatment in addition to surgical intervention for the management of intralobar bronchopulmonary sequestration.
I Have Walked 10,000 Miles and I Will Walk 10,000 More

Case Presentation: The patient is a 49 year old bisexual Caucasian male who is a long-distance walker who in the past 4 years has traversed the United States twice from Los Angeles to New York and recently completed a trek from Mexico to Alaska. During his journeys, he would sleep under bridges, in bat caves, redwood trees, and along desert roads.

He initially presented complaining of headache, transient loss of vision, left arm numbness and oral pain after a dental procedure for dental carries. The patient complained of 40lbs weight loss over the past 7 months, but stated that this was usual for him during the course of his treks.

Initial stroke workup revealed complete opacification of the right maxillary sinus with cortical breakthrough along the inferior maxillary floor with concern for a neoplastic or fungal etiology. Incidentally, multiple cystic left upper lobe cavitary lesions were detected, suggestive of a fungal etiology. The patient was admitted and underwent lung biopsy and lumbar puncture.

Physical Exam: Ophthalmologic exam revealed bilateral suprachoroidal hemorrhages and decreased peripheral vision bilaterally. There was significant oral thrush with erythema on the right hard palate and tenderness over the right maxillary sinus. Considerable cervical lymphadenopathy was present. Lungs were clear to auscultation. Neurologic exam was non-focal.

Differential Diagnosis: A broad differential was initially considered including a neoplastic process as well as an infectious etiology given his imaging results. Given his wide geographic exposure, Coccidioidomycosis, Histoplasmosis, and Blastomycosis were considered. Given his thrush, HIV and opportunistic infections with CNS manifestations, such as Cryptococcus (including Cryptococcus gattii), Aspergillus, Nocardia, Rhodococcus, and Actinomyces were also considered. Mycobacteria was considered less likely given no history of incarceration, military service, or known TB exposures.

Lab Results: Chemistry panel was unremarkable. CBC was notable for hemoglobin of 10.8 g/dL. Serum cryptococcus antigen was positive. Lung biopsy culture was positive for Cryptococcus. HIV was positive by Western Blot. Absolute CD4 count was 69. Lumbar puncture revealed WBC of 4, protein of 30, and glucose of 58.

Discussion: The patient was diagnosed with AIDS with disseminated cryptococcal infection including pneumonia, choroiditis, and probable meningitis (the patient was on therapy at time of lumbar puncture). He was started on Amphotericin and subsequently HAART therapy.

Conclusion: HIV/AIDS should be strongly considered in patients presenting with evidence of disseminated infections suggestive of immunocompromisation.
An Infectious Case of Tricuspid Stenosis

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Endocarditis is a rare cause of tricuspid stenosis, particularly in prosthetic valves. There are only isolated case reports of bioprosthetic tricuspid stenosis due to infectious endocarditis, which makes prognostic and therapeutic decisions difficult.

A 22 year old man with a history of intravenous drug use (IVDU) and endocarditis seven months prior complicated by tricuspid regurgitation requiring bioprosthetic tricuspid valve replacement presented with fevers, chills, headaches, and abdominal pain. He denied recent IV drug use. He was noted to have stable vital signs, jugular venous distension, a wide splitting S1 with a tricuspid opening snap, and a diastolic murmur best heard over the left sternal border increasing in intensity with inspiration. There were no peripheral stigmata of endocarditis or IVDU and no other signs of volume overload. Blood cultures were drawn and he was started on IV antibiotics. Transthoracic echocardiogram showed massive vegetations on the anterior and septal leaflets of the bioprosthetic tricuspid valve and a large vegetation on the right ventricular outflow tract. Doppler findings confirmed severe tricuspid stenosis. Blood cultures grew *Pseudomonas* and *Haemophilus influenzae*. He was initially managed on parenteral antibiotics with symptomatic improvement and negative repeat blood cultures. Later in his stay, however, he was found to have polymicrobial septicemia (*Candida albicans* and *Coagulase-negative staphylococcus*). The patient was discovered to be diverting narcotic tablets and was believed to be crushing and injecting drugs through his central line. His anti-infective coverage was broadened, but a second transthoracic echocardiogram two weeks into his hospital admission showed persistent enlarging massive vegetations (up to 4 cm). Replacement of the prosthetic tricuspid valve was not attempted due to the high operative risk in the setting of ongoing IVDU. The patient was continued on IV anti-infective therapy, however he opted to leave against medical advice prior to finishing his full course of anti-infectives. The patient returned six months later with recurrent prosthetic tricuspid endocarditis, but with moderate tricuspid regurgitation and resolution of his tricuspid stenosis.

This case illustrates a rare and potentially serious example of tricuspid stenosis due to prosthetic valve endocarditis. The findings on physical exam were classic for tricuspid stenosis illustrating the utility of a careful exam. AHA/ACC guidelines recommend early surgical intervention in prosthetic valve endocarditis cases causing either symptomatic valvular failure (Class I) or large persistent vegetations (Class IIa), or severe symptomatic prosthetic valve stenosis (Class IC). Despite qualifying for surgical intervention, the patient improved with medical management despite ongoing IVDU. Due to the rarity of tricuspid stenosis secondary to prosthetic valve endocarditis, the incidence, prognosis, and optimal therapy of this condition remain unclear and warrant further study.
VERMONT POSTER FINALIST - CLINICAL VIGNETTE Sherrie Khadanga, MD

Oozing all over: An interesting case of Acquired Hemophilia A

First Author: Sherrie Khadanga MD J. Monterroso MD, Andrew Goodwin, MD, P.Unger MD

INTRODUCTION: Acquired hemophilia is a potentially life threatening bleeding disorder which can occur in malignancy. The workup can be challenging and present a diagnostic dilemma as detailed in this case

CASE: 79 y/o woman with newly diagnosed CLL presented after a fall. She was noted to have a hemoglobin of 5.1, PTT 90, and a large retroperitoneal hematoma seen on CT abdomen. Coagulation studies on admission revealed a prolonged PTT that did not correct with a 50/50 mix, PT partially corrected with mixing study. FVIII activity was low (3%) with a Bethesda assay for FVIII that showed the presence of a very strong inhibitor (182.4 Bethesda units). Testing of FVIII activity using a lupus insensitive reagent increased activity to 100. Initially there was a high suspicion for a lupus non-specific inhibitor, due to low levels of factor XI (59%) and XIII (28.5%). Further testing was negative for Dilute Venom Viper Time, B2gp1 IgM and IgG and silica Clot time; ruling out LA. Repeat testing after the patient was stabilized revealed continued low FVIII activity (1%), with an increase in FXIII antigen to around 50%. FVIII chromogenic activity was <1 %. Bethesda assays were repeated and consistently >400 Units. She received RCV-P to treat the underlying CLL as steroids had been ineffective. She was readmitted to the hospital due to bleeding. Her Bethesda levels have remained >400 on follow up

DISCUSSION: Acquired hemophilia A is rare and the diagnosis is challenging as the patient typically doesn't have a family history or prior history of bleeding.

In this case, there was a diagnostic dilemma. Factor VIII inhibitors are time and temperature dependent and mixing studies with normal plasma may demonstrate inhibition on incubation. We needed to perform chromogenic FVIII assay because LA does not interfere with this assay. On repeat Bethesda assay and Chromogenic FVIII we confirmed the diagnosis because there was a high suspicion for a lupus inhibitor causing decreased levels of FVIII, FXI and FXIII. Phospholipid specific assays were done and confirmed negative for LA.

We are following her Bethesda Assay levels as an innovative surveillance method to determine if the treatment of her underlying CLL is affecting her antibody production.

In summary, patients with elevated PTT should always have a thorough workup to determine the etiology. The workup can present a challenge when other coagulation factors are also decreased. It is important to keep acquired hemophilia in the differential diagnosis. Initial therapy may involve bypassing agents and treating the underlying cause (if one is found).
Delayed HHV-6 encephalitis in an allogeneic stem cell transplant patient.

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Human herpes virus 6 (HHV-6) can become reactivated in immunosuppressed individuals typically within the first 50-100 days following an allogeneic hematopoietic stem cell transplant (HSCT). HHV-6 encephalitis during HSCT is associated with poor prognosis. Routinely, patients in the post-engraftment period are put on Cytomegalovirus (CMV) chemoprophylaxis and monitoring, but it is not currently recommended to screen or provide prophylaxis for HHV6. We present a case of HHV-6 encephalitis more than 200 days after a 7/8 unrelated allogeneic stem cell transplant. In our review of the literature, this is the first reported case of HHV 6 encephalitis occurring more than six months after a stem cell transplant.

The patient was a 58 year-old male with acute myelogenous leukemia who received a non-myeloablative 7/8 unrelated donor stem cell transplant. The patient relapsed five and a half months after transplant and was admitted for chemotherapy in the setting of neutropenic fever and pneumonia. At 223 days post-transplant, he developed progressively worsening disorientation and hallucinations. He was afebrile with no other significant exam findings. CSF examination revealed elevated glucose and cell count with a normal protein. Cytological evaluation showed lymphocytic pleocytosis with a small component of atypical lymphocytes. Cerebrospinal and blood cultures for bacterial, fungal or viral organisms were negative, including for enterovirus RNA, HSV Type 1 or Type 2, VZV DNA, JC virus by PCR, and cryptococcal antigen. A CT of the head was negative for acute intracranial pathology. He could not tolerate an MRI because of his mental status and an electroencephalogram was not done. Ganciclovir was initiated empirically without improvement after 24 hours. The family decided to transition the patient to comfort care, and the patient died 6 days later. HHV-6 by RT PCR resulted positive in qualitative assays on both the CSF and serum a week later. Autopsy findings showed rare foci of perivascular lymphocytes present in the cortical ribbon in the inferior frontal cortex and in the left temporal cortex, consistent with HHV-6 encephalitis as seen in prior case reports.

Most studies looking at HHV-6 reactivation and its role in encephalitis look at the acute post-engraftment phase. Although our patient was 200+ days from transplant, perhaps the discontinuation of his immunosuppression to allow for a graft-versus-leukemia response returned him to a de facto newly transplanted immune status. This case is an example of why HHV-6 encephalitis should continue to be in the differential diagnosis of altered mental status in a HSCT recipient who is > 200 days out from their transplant, including patients with relapsed malignancies. Serologic monitoring for HHV-6 reactivation may also be beneficial and could be considered in the future.
Zebra Spotting: A Case of Adult onset Urea Cycle Disorder

Tara Scribner-Metcalf, MD, Jacqueline O’Toole, DO, Samreen Raza, MD, Jennifer Borofsky, MD, Department of Internal Medicine, University of Vermont Medical Center

The urea cycle is the metabolic pathway that transforms nitrogen to urea for excretion from the body. Ornithine Transcarbamylase (OTC) Deficiency is one of five inborn urea cycle disorders (UCD) which can result in hyperammonemia and life-threatening illness. Most cases of OTC deficiency present in infancy, however women can be carriers of this X-linked disorder and present much later in life. This occurs rarely and with great clinical variance, making diagnosis challenging.

A 69 year old woman with a history of hypertension, diabetes mellitus, CKD IV, HFpEF, morbid obesity, and anticardiolipin antibody syndrome presented from a nursing home. She was noted to have one day of progressive confusion, lethargy and vomiting. On exam, she was non-communicative, her vital signs were within normal limits; and she had crackles in her left lung base. CXR was concerning for left lower lobe pneumonia. The patient was treated with antibiotics. Her altered mental status continued to wax and wane and asterixis was noted on exam, prompting an ammonia level, found to be elevated at 122 in the absence of liver enzyme abnormalities.

The patient’s mental status returned to baseline and she was discharged on lactulose for hyperammonemia of unclear etiology. She continued to have daily bowel movements, however returned less than a month later again with lethargy and vomiting. Asterixis was noted on exam and ammonia level was noted to be 236 with an acute on chronic kidney injury. Abdominal ultrasound revealed normal kidneys, slightly enlarged liver with no parenchymal abnormalities and liver enzymes were again normal. Given the limited differential for this level of hyperammonemia in the absence of liver dysfunction, workup for UCD was initiated and revealed a borderline low citrulline level. Eventual follow up testing revealed a markedly elevated urine orotic acid level at 129.5 mmol/mol Cr (reference 0.4-1.2), consistent with an OTC deficiency.

Definitive diagnosis of this patient’s OTC deficiency was delayed for seven months after it was first suspected, as clinical suspicion for this “zebra” was low. She was admitted four times for altered mental status and hyperammonemia during that time period, each prompted by an infection, injury or other derangement causing penetrance of her OTC deficiency. After diagnosis, treatment was initiated with a low-protein diet and the nitrogen scavenging agent sodium phenylbutyrate, however this medication is foul-tasting and the patient remained slightly confused and refused to take it on a regular basis. Over the next several months, she continued to present to the hospital with lethargy and hyperammonemia, although her hospital courses were shorter and cognitive depression less severe. She eventually died of respiratory failure which was likely unrelated to her OTC deficiency. Her case is a reminder that we must be willing to pursue diagnosis of rare conditions when appropriate and illustrates that treatment can be difficult secondary to patient compliance, even after successful diagnosis.
CASE PRESENTATION: A 73-year-old man with a history of hypothyroidism and alcohol abuse presented to the Emergency Department with four weeks of progressively worsening mental status and hallucinations. Staff from his nursing home reported that he had been receiving levothyroxine as prescribed without any new medications and he had no access to alcohol. Vitals were remarkable for a pulse of 115 and a respiratory rate of 23. He was confused and agitated, but had a normal cardiopulmonary exam, on neurologic exam he had no nystagmus or asterixis. Labs were significant for an ammonia level of 61 with AST of 42 and an ALT of 43. TSH was 4.19. CBC, electrolytes, Vit. B12, urine toxicology, urinalysis, CXR and head CT were all unrevealing. He was treated as hepatic encephalopathy with lactulose and rifaximin. He was also treated for possible Wernicke’s encephalopathy with IV thiamine with no improvement. On hospital day five, he developed myoclonic jerks in his legs bilaterally. EEG showed background and bifrontal slowing consistent with a moderate encephalopathy. In addition, periodic lateralized epileptiform discharges (PLEDS) were noted on the left. PLEDS are commonly associated with partial seizures in the context of acute insults such as vascular lesions or infections. MRI of the brain showed mild volume loss, mild nonspecific white matter changes, presumed microangiopathy and old lacunar infarct within the right thalamus. Examination of the CSF fluid revealed a leukocyte count of 2 (lymphocytes), RBC 0, glucose 74, protein 40, and negative gram stain. Encephalopathy and myoclonic jerks persisted and on hospital day ten, his respiratory status began to decline. A subsequent chest film showed an infiltrate, and he was started on treatment for aspiration pneumonia. He was transferred to the ICU and intubated for airway protection. A full course of antibiotics for aspiration pneumonia was completed without improvement. Mental status worsened in the ICU, he became unresponsive to voice or physical stimuli. Serum TSH was increased to 10.19 and his dose of thyroid replacement was increased without improvement in clinical status. Patient was trialed on multiple anti-epileptic medications without response. Repeat LP was performed and was unrevealing; CSF studies for paraneoplastic antibodies, RPR/VDRL, and HIV were all negative. Repeat EEG showed repeated generalized sharp slow wave complexes at 1-2Hz, a finding associated with non-convulsive status epilepticus, severe hepatic or renal encephalopathy or Creutzfeldt-Jakob disease. At this point, the differential diagnosis included Hashimoto’s encephalitis—withelevated TSH values, elevated thyroglobulin antibody level, and elevated thyroperoxidase—versus Creutzfeldt-Jakob disease (CJD). A five-day trial of high-dose IV steroids was initiated for empiric treatment of Hashimoto’s Encephalitis. His condition did not improve and his family decided to withdraw care. He expired two days later, one month after being transferred to the ICU. Post-mortem, CSF levels of 14-3-3 and tau proteins were found to be highly elevated. Thus, his post-mortem diagnosis was CJD. The patient’s family declined autopsy.

DISCUSSION: Altered mental status (AMS) is a common presentation in Emergency Departments as well as inpatient Medicine and Neurology services. This case is an example of a rare cause of AMS with no known treatment. The diagnosis was established only after more common metabolic, toxicologic, cardio-pulmonary, vascular, neurologic, and infectious causes had been ruled out. CSF tau level carries a positive predictive value of 86% for CJD, which—curiously, like Hashimoto’s encephalitis—can also present with elevated thyroid autoantibodies.
A 49-year-old man—on immunosuppressants since receiving a cadaveric renal transplant eighteen months prior—presented with acute pain and weakness in the proximal right lower extremity, fever, tachycardia, and leukocytosis. Concern for pyelonephritis emerged after an early CT scan revealed haziness at the superior pole of the transplanted kidney. Broad-spectrum antibiotics were initiated, but he continued to deteriorate. Within three days of admission, the weakness had progressed to flaccid paralysis of the bilateral lower extremities. This raised suspicion for an atypical variant of Guillain-Barre Syndrome. He was promptly transferred to the Intensive Care Unit for closer monitoring.

MRI of the lumbar spine showed a diffuse, hyperintense signal within the paraspinal soft tissues and interspinous spaces. The CSF showed a lymphocytic pleocytosis with mildly elevated protein, so empiric antiviral coverage was added. An EMG was suggestive of axonal sensorimotor peripheral neuropathy, a nonspecific finding that can be seen in the early stages of Guillain-Barre Syndrome.

Two days later he became encephalopathic and required intubation for airway protection. An EEG showed background diffuse slowing and attenuation consistent with a moderate encephalopathy without focal or epileptiform abnormalities. Plasmapheresis was initiated, but after five sessions there was no evidence of improvement.

His neurologic status regressed to complete flaccid paralysis and loss of brainstem reflexes. A subsequent MRI showed diffuse signal abnormalities throughout the brain and spinal cord consistent with meningoencephalitis. After a repeat lumbar puncture showed a neutrophilic pleocytosis and an even higher protein, antifungal therapy was added. A subsequent lumbar puncture showed lymphocytic pleocytosis with increasing glucose and decreasing protein. Diagnosis remained elusive. On the twenty-second day of hospitalization, the patient’s family withdrew care. A post-mortem brain biopsy was positive for rabies. Serum specimens drawn five days prior to withdrawal of care—the results from which were not available until after death—revealed rabies virus specific binding IgG > 1:128 and IgM 1:8 dilution along with rabies virus neutralizing antibody 0.14 IU/ml. Notably, three pre-mortem tests for rabies were negative: CSF, saliva, and nuchal skin biopsy. Cultures and viral PCR studies from all lumbar punctures were negative.

**DISCUSSION:** There are approximately two cases of rabies in the United States each year. There had been no documented cases of rabies transmitted from transplanted organs until 2005, when one organ donor infected four recipients in Texas. This case raises several questions regarding the screening of donated organs, pre-mortem testing for rabies, and the natural history of rabies acquired through transplanted tissue. From the clinician’s perspective, the diagnosis of rabies without a history of an animal bite requires an exceptionally high index of suspicion, as there is only one documented case of a patient who survived after developing prodromal symptoms.
Loin Pain Hematuria Syndrome (LPHS)

Case Description: We present a 35 years old male with no known past medical history, who was referred to nephrology by his primary care physician given history of recurrent episodes of severe bilateral flank pain radiating to his groin accompanied by gross hematuria, dysuria and nausea/vomiting for one year. His symptoms prompted multiple visits to the emergency departments and the workup for infection or nephrolithiasis was always negative; he would require narcotics for pain control during these exacerbations. Dysuria and hematuria would resolve in a few days but the bilateral flank pain would persist, although at much less intensity between the exacerbations and was still requiring narcotics for comfort. He had been seen by urology for hematuria workup – ultrasound kidneys, CT urogram, urine cytology and cystoscopy were all negative. His urinalysis, in the setting of exacerbations, revealed gross hematuria and mild proteinuria on dipstick, but negative for leukocytes, nitrite or leukocyte esterase; some dysmorphic RBCs but no casts were seen on microscopy. When out of the exacerbation, his urinalysis would be completely unremarkable or would have microscopic hematuria +/- mild proteinuria on dipstick. He had no evidence of renal insufficiency and his Cr was around 0.9. CBC, BMP, LFT, coagulation profile were unremarkable. ANA, ANCA, anti-GBM, HIV and viral hepatitis panel were negative. Doppler imaging of renal vessels was also unremarkable. Patient underwent renal biopsy, which revealed IgA nephropathy. He was diagnosed with LPHS secondary to IgA nephropathy and was started on angiotensin converting enzyme inhibitor (ACEI) and referred to pain management.

Discussion: LPHS is a rare syndrome characterized by recurrent attacks of severe unilateral/bilateral flank pain associated with hematuria. It is diagnosed after ruling out obstructive nephrolithiasis and other causes of loin pain + hematuria. It is broadly classified into primary (no underlying glomerular disease; no proteinuria) or secondary (with underlying glomerular disease and proteinuria – usually IgA nephropathy); distinction between the two is made on renal biopsy. Dysmorphic RBCs +/- casts are seen on urine microscopy; however, absence of these does not rule out the diagnosis of LPHS. Pathogenesis includes episodes of glomerular hypertension (in the setting of abnormal GBM) and intra-ductal microcrystal deposition. Treatment remains controversial - goal is to control symptoms with analgesics and possible consideration of ACEI to reduce intraglomerular hypertension.
“EVANS” TO BETSY! HOW TO HANDLE THE DELICATE BALANCE BETWEEN THROMBOSIS AND HEMORRHAGE IN A PATIENT WITH EVANS SYNDROME

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A 45-year-old Caucasian female with idiopathic thrombocytopenic purpura [ITP] was transferred from an outside hospital with a diagnosis of right transverse and sigmoid sinus thrombosis complicated by a 3.5 cm right parieto-occipital lobe parenchymal hemorrhage and a 5-mm left midline shift. She was transferred to our hospital for further care and neurosurgical evaluation. She was being anticoagulated with heparin bridge to warfarin at that time. Upon arrival, her only complaints were headache, blurry vision, and tinnitus. Examination was remarkable for bilateral papilledema and left homonymous hemianopsia. Neurological exam was otherwise normal. Serial CT head scans revealed stable thrombosis and right parenchymal bleed. Laboratory evaluation was remarkable for anemia, thrombocytopenia, positive IgM/IgG cardiolipin antibody, and positive lupus anticoagulant (though negative hexagonal phase). She was also heterozygous for prothrombin gene mutation, and her Coombs test was positive with positive DAT IgG and complement consistent with autoimmune hemolytic anemia. Factor V Leiden, anti-nuclear antibody, double-stranded DNA, HIV, hepatitis panel, flow cytometry, and MTHFR DNA analysis were negative. She was diagnosed with Evans syndrome [autoimmune hemolytic anemia plus autoimmune thrombocytopenia], and treated with corticosteroids. Her symptoms initially remained stable over several days, however she subsequently developed a gradual worsening of her headache. A repeat CT head revealed several new foci in the lateral right frontal subarachnoid space suggesting subarachnoid hemorrhage. With these new findings, management decisions became difficult regarding whether to continue anticoagulation which would prevent progression of her sinus thrombosis, while risk worsening of the subarachnoid hemorrhage. It was decided to continue heparin and hold warfarin [without any reversal] as well as her corticosteroids. An MRV performed at that time showed worsening thrombosis in the superior sagittal sinus, and it was ultimately decided to resume warfarin with very close monitoring. She continued to improve throughout her hospitalization, with no further progression of her subarachnoid hemorrhage.

Hemorrhage and sepsis are the most frequent causes of death in patients with Evans syndrome. While venous thromboembolic disease is a known complication of autoimmune hemolytic anemia, cerebral venous thrombosis in the setting of Evans syndrome is quite uncommon. The rarity of this association and lack of randomized controlled trials make it difficult to make evidence-based recommendations regarding the optimal care of these patients. This case illustrates the complex decision-making involved in treating Evans syndrome patients with cerebral venous thrombosis.
Rickettsia Parkeri – A headache of a diagnosis

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Introduction: Rickettsia parkeri was first isolated in 2002 from a patient residing in Virginia and has since been increasingly recognized as an emerging etiology of Rickettsial tick-borne febrile illnesses. The clinical presentation is nonspecific and underdiagnosed. We present an afebrile patient with a headache, diffuse myalgia, an eschar, and negative serology in which diagnosis was not confirmed until DNA extracted from the eschar tested positive for Rickettsia parkeri.

Case presentation: A 47 year old Caucasian male without a significant past medical history presented with an 8-day history of frontal headaches, low grade fevers, diffuse myalgia, and nausea. A thorough history revealed some outdoor activities but no hiking history or any recent infectious symptoms. Physical exam was pertinent for a healing eschar on the right shoulder and a normal neurological exam. Imaging, including CT/MRA/MRV, revealed normal CNS vasculature without evidence of intracranial hemorrhage. Cerebral spinal fluid (CSF) analysis showed erythrocytes in tubes 1 and 4 without xanthochromia, a normal opening pressure, protein elevation at 111 mg/dL, and a normal glucose concentration. Laboratory studies were significant for peripheral monocytosis (1.08x10^9/L) and transaminitis (ALT 400 U/L, AST 228 U/L, alkaline phosphatase 163 U/L) with a normal total white blood cell count and a platelet count at 181x10^9/L. Serum and CSF serologies were negative for viral hepatitis, syphilis, West Nile, Lyme disease, anaplasma, Rocky Mountain Spotted Fever (RMSF), cryptococcal antigen, and Herpes Simplex Virus (HSV). Given the high clinical suspicion for rickettsial disease, the patient was placed on doxycycline empirically for a suspected tick-borne illness. Subsequent analysis of DNA extracted from the eschar 6 days after antibiotics were initiated tested positive for Rickettsia parkeri. Ultimately, the patient completed a 21 day course of doxycycline with resolution of his symptoms and normalization of his liver enzymes.

Case discussion: Though increasing in prevalence among local tick populations, Rickettsia parkeri remains an underdiagnosed etiology of Spotted Fever Group Rickettsia (SFGR). The current case presents the challenge with arriving at a specific diagnosis based on non-specific findings. It illustrates the necessity of a high index of suspicion for tick-borne illnesses in patients presenting with constitutional symptoms that may or may not have relevant environmental exposure. It also highlights immunological testing of skin lesions as a useful diagnostic modality for tick-borne illnesses in which serologies may not agree with clinical suspicion.
Shearing the Pentad: An atypical case of TTP

This is a 49 year old African American female with a history significant for TTP and recurrent ischemic strokes. From 2006-2014, she presented with various combinations of dysarthria, hemiplegia and altered mental status all consistent with newly developed cortical ischemic infarcts, twelve in total. However, TTP was linked to only 2 of these strokes when hematologic abnormalities coincided with neurologic deficits. Extensive testing for alternative etiologies was unremarkable and risk factors for ischemia were all well controlled. Stroke prevention with both Coumadin and then Aggrenox were unsuccessful due to hemorrhagic conversion. The only antiplatelet agent safely continued was 325mg of Aspirin. The patient is now blind with left hemiparesis.

Three months after her last stroke, she presented to our facility after her family witnessed her collapse. She was unresponsive upon arrival to the ED with a physical exam significant for disconjugate gaze and extensor posturing. She was intubated immediately. Blood pressure was normotensive. Initial labs revealed: hemoglobin 11.9 g/dL, hematocrit 36.5 % and platelets 316 K/ul. CT head was negative for an acute infarct. On day 2, MRI head showed acute infarcts in bilateral thalami and left median posterior midbrain. CTA head and neck showed diminished flow in the distal sylvian branches of the left MCA and right PCA. On day 8, her platelet count plummeted to 27 K/µl coinciding with a hemoglobin of 4.8 g/dL, hematocrit 14.2 %, LDH 612 U/L and ADAMTS13 assay <10%. PBS revealed schistocytes. TTP was diagnosed and plasma exchange initiated immediately with subsequent correction of thrombocytopenia. Consequently, her mentation improved though she is now nonverbal and nonambulatory.

TTP is an episodic microangiopathic coagulopathy classically resulting in the pentad of microangiopathic hemolytic anemia (MAHA), thrombocytopenia, neurologic manifestations, renal failure and fever. Since the advent of plasma exchange for treatment of TTP, fewer than 5% of patients present with all five entities of the pentad. Without sufficient clinical clues, diagnosis of TTP is challenging. This patient is of particular interest as her presentation with multiple cryptogenic strokes are evidence that neurovascular complications of TTP may develop prior to the onset of hematologic manifestations. Thrombocytopenia and MAHA are attributable to microthrombi formation in small blood vessels with resultant platelet consumption, RBC shearing and consequential widespread non-focal end organ ischemia. Rarely, large and medium vessel thrombi can occur though MAHA and thrombocytopenia tend to be insignificant. To date, only 8 documented cases link CVA causality to TTP with hematologic abnormalities delayed days to months after the initial presentation. This case highlights the need to keep TTP at the forefront of suspicion in young individuals presenting with cryptogenic stroke and even more importantly, those with prior TTP to hasten treatment and prevent permanent neurologic deficits.
A lesson in hypocalcemia

A 24-year-old female presented to our Emergency Department with a tonic-clonic seizure. Three months prior she was diagnosed with stage IA malignant mixed germ cell tumor of the right ovary. She had undergone salpingo-oophorectomy and was three weeks following her fourth round of bleomycin, etoposide, and cisplatin. She experienced nausea, persistent emesis, peri-oral numbness, paresthesias, cramping of the hands and feet and daily headaches with blurred vision following her latest chemotherapy.

On arrival her blood pressure was 194/98, pulse 137, temperature 37.3 °C, respiratory rate 21 and oxygen saturation 94% on room air. She exhibited post ictal confusion. Cardiovascular, respiratory and abdominal exam was normal. Chvostek and Trousseau sign were positive. Neurological exam was non focal but limited by poor patient cooperation. A further tonic clonic seizure was witnessed in the emergency department. Initial laboratory investigation revealed serum calcium 4.8 mg/dL, ionized calcium 0.58 mmol/L, albumin 4.0 g/dL, magnesium <0.8 mg/dL, and creatinine 1.73 mg/dL. Electrocardiogram demonstrated QTc of 510 ms. Non contrast computed tomography of the brain was normal. Parathyroid hormone (PTH) level was 22.7 pg/mL (9.2 – 79.5 pg/mL). 25-hydroxy vitamin D level was normal.

Her calcium and magnesium were aggressively corrected. No further seizures occurred during hospitalization. As the patient became more lucid, she described tinnitus, unremitting headache, and demonstrated bilateral 6th cranial nerve palsies. Fundoscopic exam revealed papilledema. MRI of the brain was negative except for restricted diffusion and edema of the splenium of the corpus callosum, a recognized complication of seizures.

Lumbar puncture revealed an opening pressure of 58 cmH2O, with unremarkable cerebrospinal fluid (CSF) analysis. Her symptoms rapidly improved following large volume CSF tap and acetazolamide. She remains well to date and is being weaned off acetazolamide.

Cisplatin has the propensity to cause hypomagnesaemia by inhibiting magnesium reabsorption in the ascending limb of the Loop of Henle. In turn, hypomagnesaemia leads to hypocalcemia by causing impaired synthesis, secretion and peripheral resistance to PTH. Therefore, PTH levels can be decreased, normal, or increased in hypomagnesaemia.

Our patient exhibited many of the classic features of hypocalcemia to include tetany, seizures, and QT prolongation. A lesser known feature of hypocalcemia is papilledema. The papilledema of hypocalcemia can occur in the presence or absence of raised intracranial pressure. Mechanistic hypothesis include increased intracranial pressure secondary to CSF hyper-secretion caused by increased choroid plexus adenylate cyclase activity or decreased CSF absorption. In the absence of raised intracranial pressure the mechanism is felt to be related to decreased axonal transport within the optic nerve.

Hypocalcemia is therefore, as in our case, a secondary reversible cause of pseudotumour cerebri.
MONTELUKAST TO THE RESCUE?

Vinay Gidwani (First Author) James Dixon (faculty Preceptor)

Background: Montelukast, a leukotriene receptor antagonist (LTRA) is typically used as a "controller" medication for asthma however acute effects after even a single dose have been demonstrated (1) therefore suggesting Montelukast may have a role in treating acute asthma exacerbations. A case of an acute asthma exacerbation in which Montelukast was added to standard therapy with marked sequential improvement in spirometry is presented.

Case Presentation: A 34 year old African American female with asthma and no known history of aspirin allergy presented with dyspnea. CXR demonstrated hyperinflation and she was actively wheezing and hypoxic. Standard treatment with inhaled albuterol, ipratropium, and intravenous steroids were administered. Initial spirometry after initiation of treatment revealed a FEV1 was 28% (0.66 liters) FVC 33% (0.92 liters) and PEF of 84 Liters/Minute. Oral Montelukast was added to her therapy in an effort to improve her acute condition. By the next day her chest exam was clear and FEV1 had improved to 70% predicted (1.68L) and FVC to 78% predicted (2.23L) and FEV1/FVC of 75%. She was much improved and discharged with Montelukast in addition to a Prednisone taper, Albuterol, and Fluticasone-Salmeterol.

Discussion: While the documented improvement FEV1 could have been a result of her steroid and bronchodilator therapy, a literature review reveals there may have been a contribution from Montelukast to her recovery. A double blind randomized trial with 583 patients comparing standard therapy plus placebo vs standard therapy plus IV Montelukast that demonstrated improvement with an onset of action as early as 10 minutes (2). Another trial of 73 patients with acute asthma requiring hospitalization randomized to placebo or oral Montelukast similarly demonstrated a better PEF in the Montelukast group (3). However, in a meta-analysis looking at eight trials of IV or Oral LTRAs and standard acute asthma care versus placebo and standard care with 1470 adults and 470 children concluded that at present the evidence does not support routine use of LTRAs in acute asthma.

One can speculate that Montelukast in this case may have contributed to her improvement and have a role in the acute phase. Particularly benefit can be hypothesized to be of exceptional utility in subgroups leukotriene modulation responsive forms of Asthma from the controller paradigm such as exercise induced asthma, asthma associated with allergic rhinitis, or aspirin induced asthma (5). Finally, perhaps higher doses and routes (i.e. IV) may play a role in the future.

References

A Rare Case of Acute-Onset Chorea Related to End-Stage Renal Disease

INTRODUCTION: A patient presenting with choreiform movements is a rare and concerning clinical finding. Although at first one may consider hereditary diseases such as Huntington’s disease and Wilson’s disease, a negative family history and advanced age is suggestive of an acquired chorea. There is a broad range of differentials including acute intracranial vascular events, paraneoplastic syndromes, medication-induced or infectious etiologies. Other culprits may include carbon monoxide poisoning or heavy metal toxicity, especially with manganese, aluminum or lead. We present a case of a patient with end-stage renal disease on peritoneal dialysis with new-onset choreoathetosis without any clear etiology. Her symptoms ultimately improved with daily hemodialysis, indicating that her clinical presentation was likely related to her renal disease.

CASE DESCRIPTION: A 67-year-old female presented to the emergency room with involuntary writhing movements in her entire body that had been worsening over the past 2 weeks. She had a history of end-stage renal disease on peritoneal dialysis, type II diabetes mellitus and hypertension. She denied having missed any dialysis at home prior to admission or any recent medication changes. On exam patient was alert, awake and oriented, however she had constant choreiform movements in her limbs and spastic speech. These movements ceased when she was asleep, but there was minimal response to IV diphenhydramine, IV lorazepam or IV haldol when she was awake. Initial labs revealed BUN 61 mg/dL and creatinine 11.6 mg/dL. CT head was negative for any acute intracranial abnormality. The remainder of her work up to exclude autoimmune, rheumatologic, inflammatory and infectious conditions was negative.

MRI brain was done which showed symmetric abnormal T2 hyperintense basal ganglia abnormalities. She was initiated on daily hemodialysis and after one week her choreiform movements had improved greatly.

DISCUSSION: Acute-onset chorea and bilateral basal ganglia abnormalities in patients who have end-stage renal disease secondary to diabetic nephropathy is a rare clinical finding. The pathophysiology of this phenomenon has not yet been confirmed, there are speculations that there may be some form of demyelination disorder associated with patients who have diabetes mellitus and end-stage renal disease. Alternate theories suggest that the cells in the basal ganglia are particularly susceptible to chronic metabolic and toxic insult of uremia resulting in tissue edema. In some cases the MRI findings are reversed after a prolonged course of aggressive hemodialysis. It is important to recognize choreoathetosis as a potential complication of uremic toxicity in patients with inadequate dialysis. Further studies are needed to determine whether inadequate renal replacement therapy puts patients at a greater risk of developing basal ganglia injury, as the development of chorea does not necessarily run a benign and reversible course.
Relapsing neuroleptic malignant syndrome in a middle aged female previously taking trifluoperazine and venlafaxine.

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Neuroleptic malignant syndrome (NMS) is a syndrome categorized by hyperthermia, extrapyramidal symptoms, altered mental status and autonomic dysfunctions often associated with neuroleptic medications. It is commonly seen after three to nine days of changing or initiating a neuroleptic drug. Patients commonly present with mental status changes, muscle rigidity, hyperthermia, tachycardia, diaphoresis, blood pressure instability and arrhythmias. Muscle rigidity which is present up to 90% of the cases can often be mistaken for extrapyramidal side effects of the drugs. Associated lab findings include elevated creatine kinase, myoglobinuria, leukocytosis, and acute kidney injury. Treatment focuses on reducing fever, repleting dopamine, and general supportive measures. Dopamine agonist including bromocriptine, amantadine, or levodopa/carbidopa have been used to replete dopamine levels. Dantrolene has been used to decrease muscle rigidity and reduce fever. Other supportive measures include benzodiazepines to help reduce agitation and management of fluids and electrolytes. Prior to the diagnosis, it is important to rule out other causes such as meningitis, sepsis, or status epilepticus via cultures, lumbar puncture, or ECG.

We present a case of 51 years old female that was treated for relapsing NMS. This patient had a history of schizophrenia and suicidal ideations who was initially admitted to psychiatry ward. At that time she was on Prozac and Haldol for depression and psychosis. Due to worsening symptoms, those 2 medications were stopped and switched to amitriptyline and trifluoperazine. Pt experienced dizziness so amitriptyline was switched to venlafaxine 37.5mg daily. This dose was increased to 225mg daily within a span of 7 days. Patient developed fever on the 8th day and was sent to ED for evaluation where she was found to have temperature of 105F, tremor, muscle rigidity, rhabdomyolysis with CK peak of 11327 and altered mental status. NMS was considered to have been caused by the recent initiation and eventual dose increase of venlafaxine on top of trifluoperazine. NMS Hotline was also contacted to provide assistance. Patient initially responded to dantrolene and fluids but had remitting high fevers. Bromocriptine was added on top of dantrolene for treatment. This patient had an extremely prolonged and relapsing course of NMS with rigidity, fever, and acute encephalopathy despite stopping the offending drug and supportive treatment along with multiple rounds of dantrolene and bromocriptine. Extensive work up was done with negative work up for meningitis or other possible sources of acute encephalopathy. After 45 days of treatment that was complicated by renal failure and respiratory failure, patient eventually returned to baseline and was discharged to rehab given prolonged immobility.

With NMS, despite early aggressive therapy, cessation of medications, and supportive measures, symptoms may persist for prolonged periods of time with multiple relapses requiring continued close management.
Nacho Average Rash: Sweet’s Syndrome Presenting with Oral and Cutaneous Pathergy

First Author: David A Klimpl, MD

Pathergy is the phenomenon of exuberant inflammatory response to local trauma which can be seen in a select few disorders including Sweet’s Syndrome. We present a patient with a systemic illness characterized by fever and rash where the presence of pathergy was key to the diagnosis. A 68 year old Asian female with PMH of transfusion dependent myelodysplastic syndrome (MDS) presented with acute oropharyngeal swelling requiring nasal intubation. Prior to admission, she experienced 5 days of fever, oral pain, and facial edema which she insisted started after oral injury from a tortilla chip. Exam was notable for fever of 102.3, and a diffusely edematous oropharynx and tongue with scant hemorrhagic bullae. CT revealed a 2.7 x 1.4 x 3.8 cm mass along the R palate and neck. Vancomycin, clindamycin, and meropenem were started empirically, along with high dose IV dexamethasone. Biopsy of the oral process showed inflammation with necrosis and hemorrhage, but no neoplasia. Blood and tissue cultures were negative. Swelling & fever improved, the patient was extubated, and steroids were tapered off. Two days later, the patient developed recurrent fevers and. Repeat blood cultures were negative, and repeat buccal biopsy staining and culture showed no signs of infection or neoplasm. Microscopy of the buccal mass was again consistent only with chronic and acute hemorrhage with scattered mast cells and neutrophils. The next day, the patient developed painful erythematous plaques on her trunk and induration of the right forearm concerning for necrotizing fasciitis. Surgical exploration of the arm was negative, however postop day 1 the incision was a sheet of coalescent pustules consistent with a pathergy response. Punch biopsy of a trunk lesion showed a superficial, thin band of neutrophils with sparing of the epidermis and intact endothelium of the blood vessels consistent with neutrophilic dermatosis. Sweet’s Syndrome was diagnosed based on the constellation of biopsy findings, pathergy phenomenon and negative pathology and microbiology in a patient with underlying MDS. Prednisone 60 mg/d was started and within several days her fever and cutaneous lesions resolved, and she experienced dramatic global improvement.

Pathergy is the development of erythematous papular or pustular lesions due to local trauma. It can be seen in a number of disorders, most notably Bechet’s Disease, where a pathergy response to pinprick injury may be used as a diagnostic tool. In our patient, oral pathergy due to tortilla chips and later cutaneous pathergy clued us to the diagnosis of Sweet’s Syndrome, which has a known association with MDS. Pathergy is a unique and in the case of our patient, dramatic clinical finding which may be a diagnostic clue in patients with inflammatory disorders including Sweet’s Syndrome.
A 72 year old gentleman presented to the hospital with acute on chronic low back pain. He had a history significant for coronary artery disease status post coronary artery bypass graft, aortic valve replacement, and pacemaker placement after AV node ablation for atrial fibrillation. Two weeks prior to admission, he experienced a myocardial infarction and underwent multiple rounds of CPR at an outside hospital. Left heart catheterization at that time showed occlusion of the proximal circumflex artery, and a subsequent balloon angioplasty was successful. The patient had a history of chronic back pain, but he reported that since his discharge from the outside hospital the pain became more frequent and severe. He described the pain as gnawing and in the center of his lower back. He denied bowel or bladder incontinence, fevers, or lower extremity weakness. He did report a weight loss of 30 pounds and increasing fatigue over the preceding three months.

Upon admission, his vital signs were all within normal limits. Physical exam was significant for pallor, a grade III/VI systolic ejection murmur, and a grade III/VI rumbling mid-diastolic murmur. He had elevated JVP and + lower extremity edema. Dentition was grossly normal. There were no rashes, skin changes, or nail lesions. His back exam revealed point tenderness in the L1-L3 region. Range of motion was limited secondary to pain. His sensory and motor exams were normal. His preliminary labs showed an WBC 8.3 with left shift, ESR 48, CRP 11.2, normocytic anemia, and microscopic hematuria. A CT of his spine with contrast showed loss of disc space height, cortical erosion, and end-plate irregularity in L1-L2 concerning for osteomyelitis. This finding was not seen on prior imaging two months earlier.

Within 48 hours, blood cultures grew alpha-hemolytic streptococcus. The patient was started on Ceftriaxone 2 grams daily. A transesophageal echocardiogram was performed and showed a 1 x 1 cm aortic valvular lesion. The blood cultures speciated to Streptococcus mitis. He underwent an aortic root revision and replacement of his pacemaker due to infected leads. The patient’s blood cultures cleared within a week of antibiotic therapy and his back pain improved as well. Repeat lumbar CT with contrast two months later demonstrated no evidence of osteomyelitis.

This case highlights the importance of having a low threshold to suspect endocarditis and its seeding phenomenon in patients with valvular replacement. Streptococcus mitis is an alpha-hemolytic bacterium that inhabits the oral flora. Although streptococcal subacute bacterial endocarditis is rarely associated with osteomyelitis, it is important to recognize these unusual seeding phenomena. This is the first described case of this bacteria leading to osteomyelitis as a seeding phenomenon of endocarditis.
Recurrent benign lymphocytic meningitis - A case report

Mayssam A Nehme, MD Karolyn Teufel, MD

A 33-year-old woman presented to the emergency department with headache, meningismus, subjective fever and vomiting of 3 days duration. She was overall healthy except for two previous hospitalizations for viral meningitis in 2006 and 2011, and possible bacterial meningitis in 2002. At the time of presentation, she denied any recent infections or sick contacts. She also denied any new neurologic symptoms including hallucinations, diplopia, photophobia, seizure activity or focal deficits. The patient recently traveled to Europe for business, but was not exposed to unpasteurized products, ticks or mosquito bites. She was in a monogamous relationship and did not have any history of genital or oral herpetic lesions. The physical exam revealed positive meningeal signs and was otherwise unremarkable. The patient was admitted to the hospital and a lumbar puncture revealed lymphocytic pleocytosis with CSF WBC 164, lymphocytes 99%, glucose 55, total protein 90, RBC 23. We treated her with intravenous Acyclovir and her symptoms improved markedly within 24 hours. The following day, HSV2 PCR result was positive and the patient was diagnosed with recurrent benign lymphocytic meningitis. She was discharged on oral Valacyclovir with a plan to consider suppressive therapy at outpatient follow up with an infectious disease specialist.

Recurrent benign lymphocytic meningitis was first described by Pierre Mollaret in 1944. It is a rare disease that manifests with recurrent episodes of aseptic meningitis followed by spontaneous recovery. The disease is most commonly seen in young adults, especially women. Patients generally present with acute headache, meningismus, fever and photophobia. They can also exhibit focal neurologic deficits, including cranial nerve palsies, seizures, hallucinations, diplopia and altered mental status. Most cases are associated with HSV2 infection and careful assessment including sexual history should be obtained. Patients do not always have a history of genital or oral herpes infection and analysis of CSF for HSV DNA is the gold standard for diagnosis. Once confirmed, patients can be treated with Acyclovir which may also be used as suppressive therapy.

Recurrent benign lymphocytic meningitis should be considered in healthy patients with repeated episodes of meningitis. Early diagnosis may prevent prolonged hospitalizations along with the iatrogenic risks of inappropriate treatment, unnecessary testing and the associated costs.
Haemophilus Influenzae Biotype VI Cellulitis Resulting in Septic Shock with Multiple Organ Dysfunction Syndrome

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Haemophilus influenzae is a common pathogen in pneumonia and meningitis. Since the implementation of the vaccine toward serotype b, non-b-type Haemophilus influenzae infections have increased in prevalence. Such infections can be atypical and result in severe disease.

A 71-year-old gentleman presented to the emergency department with complaints of acute-onset severe right arm pain over the elbow which awoke him from sleep. Two days prior he had suffered a scratch to that area from his dog which broke the skin, though it had not bothered him prior to retiring to bed that night. His past medical history was notable for COPD (chronically on prednisone), coronary artery disease, and atrial fibrillation (on warfarin). Upon presentation to the emergency department vital signs were within normal limits. Physical exam demonstrated marked tenderness to palpation, erythema, and edema of the skin of the right arm surrounding the elbow. Labs showed a normal white blood cell count, creatinine of 1.7 mg/dL, and a lactic acid of 6.6 mmol/L. He was treated with IV vancomycin, piperacillin/tazobactam, clindamycin and aggressive volume resuscitation. A CT of the right arm showed prominent subcutaneous edema with extension to the superficial fascial layer with no drainable fluid collection, subcutaneous gas, or joint effusion. His course quickly spiraled in the first 4 hours of admission developing refractory shock requiring three vasopressors with stress steroids, acute respiratory failure requiring mechanical ventilation, acute cardiomyopathy with EF 15-20%, anuric renal failure requiring CRRT, DIC, acute hepatic injury, and encephalopathy. The surgical consultant performed a bedside fasciotomy of the right arm demonstrating viable tissue with no evidence of necrotizing fasciitis. Blood cultures drawn on presentation grew Haemophilus influenzae biotype VI, beta-lactamase negative and pansensitive. Antibiotics were narrowed to ceftriaxone. With critical care support his shock and acute renal failure resolved, he liberated from the ventilator, and repeat echocardiography demonstrated recovery of his EF to 55-60%. He finished 14 days of antibiotics and was discharged 16 days after admission.

This case is a rare presentation of an emerging pathogen. Infections with this pathogen may present with sudden onset of symptoms and rapid progression to severe illness. Additional work is necessary to clarify the changing epidemiology of Haemophilus influenzae and the mechanisms of pathogenesis in severe septic states.
WASHINGTON POSTER FINALIST - CLINICAL VIGNETTE Lindsay A Collins, MD

DRESS: A Deadly Rash

First Author: Lindsay A Collins, MD April Schachtel MD, Caroline Davis MD, Matthew Triplette, MD, Chris Knight MD.

Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) is a rare condition that can lead to a severe cutaneous and multisystem idiosyncratic inflammatory reaction. This disease is important to understand because early recognition and discontinuation of the offending drug can be life-saving.

A 36-year old man developed a fever and painful erythematous truncal rash 21 days after initiation of vancomycin and ceftriaxone for treatment of suspected spine osteomyelitis. Ceftriaxone was discontinued and he was treated with one additional week of vancomycin, which was ultimately discontinued due to persistence of rash. The day after vancomycin was discontinued he developed recurrent fevers, chills, and rash progression. Over the next two days his rash spread to his face, chest, abdomen, back, and thighs, without mucosal involvement. He appeared ill with fever, tachycardia, hepatitis, and a white blood cell count of 64,000 of which 13,000 were eosinophils. Skin biopsy revealed perivascular and interstitial dermal inflammation with prominent eosinophils. He was diagnosed with DRESS based on characteristic clinical presentation: confluent erythematous rash, fever, facial edema, and lymphadenopathy in addition to hepatitis, peripheral eosinophilia and compatible skin biopsy.

Methylprednisolone 60mg IV twice daily was started and his rash quickly improved; this was followed by a three week steroid taper. He had a long hospital course complicated by multiple infections including a perioral herpes simplex virus outbreak and respiratory failure. Four weeks after discontinuation of steroids he developed a recurrence of DRESS with eosinophilia to 4,000 with mild liver function abnormalities. High dose methylprednisolone was re-started and followed by an extended taper.

This case represents a severe life-threatening reaction to a commonly used antibiotic, vancomycin. The exact pathophysiology of DRESS is not well understood, though a correlation with herpes virus reactivation has been well documented. There is no evidence to suggest that treating these viruses affects overall clinical trajectory. Identification of the causal drug is critical, as initial therapy is to stop the offending agent. The most common culprits are anti-epileptics and antibiotics. DRESS typically appears 2-10 weeks after drug initiation. For our patient, the only drugs in this window were vancomycin and ceftriaxone. A paradoxical worsening of symptoms is common upon stopping the offending drug. Our patient exhibited this phenomenon with vancomycin but not with ceftriaxone, making vancomycin the more likely culprit.

Steroids are the pharmacologic mainstay of treatment. In severe disease a minimum of six weeks of steroid therapy is recommended but three to six months is often necessary to achieve complete disease remission. Clinical appearance, LFTs, and peripheral eosinophils are the best markers for disease activity.
WASHINGTON POSTER FINALIST - CLINICAL VIGNETTE Rachel P Safran, MD

TESTOSTERONE SUPPLEMENTS: HARDLY A STROKE OF GENIUS

Rachel Safran, MD R3 Mary Noble, MD FACP

A 43-year-old male with well-controlled hypertension and ulcerative colitis presented with 3 days of nausea, vomiting, headache and dizziness. Initial workup revealed a hemoglobin concentration of 19.4g/dL (Hct 58.7%) and WBC 20k, but otherwise normal labs and a negative non-contrast head CT. He was given instructions to increase fluid intake for presumed viral gastroenteritis. His symptoms persisted with increasing severity that culminated in a syncopal event and he presented back to the ER where follow-up studies showed persistent polycythemia (Hgb 17.7g/dL; Hct 52.7%) and MRI of the brain revealed a large subacute left cerebellar cortical infarction with edema and mass effect causing 6mm midline shift, displacement of the cerebellar tonsils and early obstructive hydrocephalus. Work-up for etiology of his stroke included echocardiogram with a small PFO, normal lipid panel, A1c and no evidence of arrhythmia on cardiac monitoring. Further investigation revealed he had been receiving bi-weekly testosterone injections for low libido and review of outpatient labs indicated longstanding polycythemia with hemoglobin >17g/dL for at least one year. His hospitalization was complicated by hemorrhagic transformation of the stroke requiring craniotomy, but he ultimately recovered after a prolonged course of inpatient rehabilitation and his polycythemia resolved rapidly after discontinuation of testosterone supplementation.

Secondary polycythemia is a well-known result of chronic exogenous testosterone therapy. Although the mechanism is unclear, evidence points towards stimulating production of erythropoietin and decreasing circulating levels of hepcidin. On average, chronic testosterone supplementation causes a 7-10% increase in hematocrit, and this is even higher when injectable replacement is used. Increased blood viscosity in polycythemia has clearly been shown to increase the risk of stroke, myocardial infarction and overall mortality. Recent data also indicates that testosterone supplementation alone may increase cardiovascular risk independent of any polycythemia. Testosterone replacement therapy should be used only in the appropriate setting, and mandates thorough cardiovascular risk assessment and frequent monitoring of Hgb levels to evaluate for polycythemia.
Removal of vancomycin in a patient with acute kidney injury using high flux hemodialysis membranes

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Introduction: With the emergence of methicillin-resistant Staphylococcal strains, vancomycin has become a key antimicrobial. Increased use has however resulted in an increased incidence of adverse effects, including nephrotoxicity. Vancomycin associated nephrotoxicity is being increasingly reported, associated with high trough levels. We report a patient with acute kidney injury with persistently high vancomycin levels, who underwent hemodialysis to facilitate its removal in an effort to prevent further renal damage and ototoxicity.

Case: 36 year old female with chronic myeloid leukemia (CML), presented as a transfer from an outside facility where she presented with fever. Work up done showed leukocytosis, following which empiric vancomycin and cefepime were started and continued for 2 days. She later received high dose cytarabine for CML. Patient developed labial and vulva cellulitis, Staphylococcus Aureus/Staphylococcus Epidermidis bacteremia, and was started on vancomycin and cefepime. Vancomycin was switched after 3 days to daptomycin due to a non-oliguric acute kidney injury (AKI). Vancomycin levels however were not checked. Ultrasound kidney was unremarkable. Patient was transferred to our facility with worsening non-oliguric acute kidney injury, with serum creatinine on admission being 7.84. Random vancomycin level was 82.8 (two days after her last dose), and decreased to 79.2 eighteen hours later. Patient was started on hemodialysis due to persistently elevated vancomycin levels, with concerns it could cause permanent kidney damage and ototoxicity. Random vancomycin level decreased to 48.4 after the first session of dialysis. Patient underwent additional sessions of hemodialysis, and subsequent vancomycin levels post-dialysis were 35.1 and 13.3 respectively. Patient's creatinine remained high at 4.0 and she had to continue on hemodialysis. Due to the poor prognosis of her CML, patient was discharged home with hospice.

Discussion: Vancomycin can accumulate in patients with deteriorating renal function. Historically vancomycin removal was considered difficult, and charcoal hemoperfusion had been used with limited success. The availability of high flux hemodialysis membranes has however resulted in improved vancomycin removal.

Our patient’s AKI was likely multifactorial. However the extremely high vancomycin levels and its known tubular toxicity make it likely to have played a role in causing her AKI. Vancomycin levels tend to decrease upon discontinuation of the medication. Persistently high serum levels were noted in our patient however, and increased the risk of permanent kidney injury and ototoxicity, warranting augmented clearance using high-flux hemodialysis. While complete renal recovery was not achieved, she remains non-oliguric which carries a better prognosis. Furthermore she did not developed any ototoxicity. We would like to highlight the importance of monitoring vancomycin levels in AKI even after discontinuation, and the use of high flux hemodialysis to facilitate removal if needed.
WEST VIRGINIA POSTER FINALIST - CLINICAL VIGNETTE Mehran Moradi, DO

Should I give Lactulose in Depakote overdose?

First Author: Mehran Moradi, DO

A 39-year-old white female admitted with intentional overdose of 80 of 0.5 mg Klonopin, 20 of 500 mg Depakote, and a bottle of Robitussin. She was lethargic for approximately 24 hours after arriving to the intensive care unit. She was given supportive care. Her liver enzymes, EKG, Ammonia and Depakote level were trended.

The highest Depakote level peaked at 212. On the day of discharge, the Depakote level was down to a value of 104. She also never had a spike in her liver enzymes. Her QT interval on her EKG remained within normal limits throughout her stay. CT scan was negative for cerebral edema.

Literature review demonstrated that the Depakote toxicity could cause drowsiness, confusion, and QTc prolongation. Pancreatitis, thrombocytopenia, rhabdomyolysis, renal failure, and severe cerebral edema are other manifestations of toxicity. This pt. did not demonstrated any of the above symptoms except lethargy. Naloxone is recommended if the patient has CNS depression.

The unique aspect of this case was that she received multiple doses of Naloxone without any effect on CNS depression, but flumazenil helped to reduce the sedation likely secondary to reversal of Klonopin effect. Also ammonia level had gone down to less than 9 before discharge to the psych unit but it raised back up to 36 at the psych unit even-though Depakote was not restarted.

Depakote toxicity could cause an increase in the serum ammonia level which is from a non-GI source, and not always accompanied by abnormal liver function tests; thus lactulose is not helpful. This is secondary to propionic acid, a metabolite of Depakote, which inhibits activation of mitochondrial carbamoyl phosphate synthetase I, an enzyme necessary for ammonia elimination via the urea cycle.

Moreover it could cause delayed carnitine deficiency, a cofactor necessary for mitochondrial long-chain fatty acid metabolism of the urea cycle. As a result, mitochondrial deficiency of fatty acid transport during beta-oxidation with eventual urea cycle inhibition.

Ammonia level should be monitored even after it lowers to a normal level. This pt. did not receive carnitine since Ammonia level was back to normal before her discharge to the psych unit. carnitine should be administered for hyperammonia with or without encephalopathy. hemodialysis should be considered only for refractory hypotension to fluid and vasopressors.
A “CRYSTAL” Clear Case of Pulmonary Foreign Body Granulomatosis

Grant Boschult MD, Maria Herrera MD, Nevin Uysal-Biggs MD

Introduction: Pulmonary foreign body granulomatosis is a reactive process caused by embolization of foreign material within pulmonary arterioles resulting in inflammation, granuloma formation and fibrosis. Patients with this disease typically have a history of IV drug abuse and present with dyspnea and a dry cough. If not recognized early, the disease can progress to massive pulmonary fibrosis and end-stage lung disease.

Case: A 61 year-old male with a history of end-stage renal disease, hepatitis C and drug abuse presented with three days of dyspnea and hemoptysis. In the emergency department he was found to be afebrile, tachycardic and hypoxemic. Initial laboratory data was notable for a normal white blood cell count and baseline hemoglobin, renal function and coagulation studies. A urine drug screen was positive for cocaine, benzodiazepines, and amphetamines. CT angiogram of the chest showed no evidence of PE, but was notable for ground glass opacities in the right-middle and left-lower lobes. Blood cultures were collected and broad spectrum antibiotics were started. The patient was admitted to the inpatient medicine ward where he continued to have intermittent episodes of dyspnea and hemoptysis. An extensive infectious and autoimmune work-up yielded no significant findings. Bronchoscopy with lavage was significant for bloody return from the right-middle and left-lower lobes. Lavage fluid studies were notable for alveolar macrophages with rare hemosiderin, but an infectious or malignant etiology was not identified. Video-assisted thorascopic surgical biopsy was pursued. Biopsy results were significant for scattered crystalline, polarizable foreign material with an associated perivascular and alveolar giant cell reaction, consistent with the diagnosis of pulmonary foreign body granulomatosis.

Discussion: Foreign body granulomatosis typically results from embolization of pulmonary arterioles by insoluble material, which migrates through the vessel wall into the perivascular and interstitial tissue where it is phagocytized by macrophages and giant cells. Over time a granuloma is formed. Common substances include tablet fillers like talc or microcrystalline cellulose. Patient presentation ranges from dyspnea and dry cough to hemoptysis, night sweats and weight loss. Tissue biopsy is considered the diagnostic gold standard. Histologic findings include perivascular fibrosis, multinucleated giant cells, granulomas and polarizable material. No established therapy exists for this disease. Cessation from smoking and IV drug abuse is essential to avoid progression. This case illustrates the importance of considering pulmonary foreign body granulomatosis in patients presenting with hemoptysis, dyspnea and a diffuse ground glass pattern on chest CT without a discernable infectious, malignant or autoimmune etiology.
Hemolytic Uremic Syndrome (HUS) Presenting in an Adult Chemotherapy Patient

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HUS/TTP is often overlooked as a diagnosis in adults. Additionally, because many chemotherapy regimens are associated with diarrhea, infectious etiologies of diarrhea can be easily missed in cancer patients. The time sensitive nature of starting plasmapheresis and IVIG to avoid the potentially irreversible renal damage of microangiopathic hemolytic anemia (MAHA) makes this an important diagnosis to consider, even in less classic circumstances.

A 62 year old female on dasatinib for CML developed watery, non-bloody diarrhea, and non-bilious emesis without fevers during a trip to Missouri. No other family members had gastrointestinal symptoms. Her symptoms persisted for the following 2-3 weeks, despite a trial of loperamide and ondansetron. Upon return to Wisconsin, she was instructed to stop dasatinib and required IVF for dehydration. Her labs were notable for BUN 38 and Cr2.3 thought pre-renal from volume loss. Over the following 48 hours, however, she developed worsening confusion and peri-orbital edema. She was admitted to the hospital with physical exam notable for BP 159/87, pale sclera, asterixis and petechial rash on her lower back and sacrum. Lab recheck was notable for HgB 7.8, Plt 85, BUN 49, CR 4.82, UA with 3+ protein and FeNA 1.34 suggestive of intra-renal pathology. Peripheral smear with 4-5 schistocytes/hpf and renal biopsy showing thrombotic microangiopathy confirmed MAHA. Stool was sent for shigella, O157:H7, shiga toxin, which came back negative, however, further inquiry of outside hospital workup revealed positive stool shigella and shiga toxin. Missouri department of public health was notified. Upon urgent initiation of plasmapheresis, IVIG, and dialysis she improved dramatically over the following six days with normalization of cell lines and renal function.

This case illustrates the importance of re-evaluating the cause of worsening renal function when not improving after fluid resuscitation, and remembering MAHA and HUS when presented with a history of gastrointestinal symptoms that evolve into renal, hematologic, and neurologic features- even in adults, as early recognition and treatment are critical to maximizing renal recovery.
ACQUIRED ANGIOEDEMA IN A PATIENT WITH A HISTORY OF CLL

First Author: Sarang Patel, MD  Second Authors: Amara Hussain, MD Ehab Atallah, MD Rahul Nanchal, MD

Introduction: Acquired angioedema is a rare disorder distinct from hereditary angioedema. It is most commonly associated with lymphoproliferative disorders. The presentation includes recurrent episodes of self-limited swelling of the skin, upper respiratory tract, and GI tracts without urticarial lesions. It is an often under recognized disorder that can result in frequent hospitalizations, and is potentially fatal.

Case: The patient is an otherwise healthy 55 year old who was diagnosed with chronic lymphocytic leukemia in 2012, when routine mammography revealed axillary lymphadenopathy. She denied any constitutional symptoms and had normal red blood cell and platelet counts. She followed with an oncologist regularly with routine blood counts and had never received chemotherapy. Between June 2013 and December 2013 she presented to the hospital four times with the same symptoms of abdominal pain and dizziness. Each time she was found to be hypotensive and received large volumes of intravenous fluids. Her dizziness and hypotension would resolve after volume resuscitation and abdominal pain would self-resolve after a few days. During each hospitalization the patient received a variety of diagnostic studies. Broad infectious laboratory work up was negative. ANA was negative. Complement levels including C3, C4, and CH 50 were low. Abdominal CT revealed non-specific duodenal and jejunal wall thickening with stable lymphadenopathy. EGD with biopsy of the duodenum and jejunum were unremarkable. Eventually a C1 esterase inhibitor level was ordered, which was low, revealing a diagnosis of acquired angioedema associated with a history of CLL. The patient was subsequently started on chemotherapy and has had no recurrence of symptoms since that time.

Discussion: Acquired angioedema is characterized by an acquired deficiency in C1 esterase inhibitor, an inhibitor of the first component of the complement pathway. It is less well known than hereditary angioedema. Acquired angioedema presents in middle age in patients with lymphoproliferative disorders while hereditary disease presents in otherwise healthy youth. It typically involves edema of GI tract or upper respiratory tract and self resolves after a few days. No urticarial lesions are present. Patients with acquired angioedema have low complement levels and identifiable antibodies to C1 esterase on lab analysis. The relationship between the production of these antibodies and concurrent lymphoproliferative disease is incompletely understood. The diagnosis often evades recognition for years. Some reasons for this include a lack of knowledge of the acquired form of the illness, uncertainly regarding lab analysis, and fluctuant complement levels during the early development of this illness.
WISCONSIN POSTER FINALIST - CLINICAL VIGNETTE Sridevi Ramalingam, MD

Preventing iatrogenic harm by utilizing a collaborative multi-disciplinary multimodal approach to managing cancer-related bone pain

First Author: Sridevi Ramalingam, MD

**Background:** Incident pain is a common cause of breakthrough pain in patients with cancer-related bone pain. It is a rapid onset, severe pain that is secondary to movement of a tumor bearing bone. Incident pain is important to recognize and treat as it can adversely affect quality of life and functional status, thus precluding patients from potentially undergoing further life prolonging therapies.

**Case Description:** Here we present the case of a 67 year old female with history of metastatic Urothelial cancer who presented with right sided hip pain, associated with a dramatic decrease in functional status (ECOG: 3), secondary to metastatic disease involving the right pubic bone and Ischial Ramus. Radiation therapy targeting these areas provided minimal pain relief. Furthermore, pain management with opioids was limited by opioid induced neurotoxicity with the development of myoclonic jerks and delirium. At this time, a multimodal approach with a tunnel epidural, steroid injections, and interventional procedures such as thermal coagulation ablation, cementoplasty and minimally invasive fixation of fractures of the right pubic bone was implemented. Subsequently, patient achieved pain resolution objectively measured by the improvement in pain scores, oral morphine equivalent daily dose, delirium assessment, and number of myoclonic jerks.

**Conclusion:** Despite established guidelines for cancer pain management outlined in the World Health Organization analgesic ladder, incident pain remains difficult to treat with oral analgesics, particularly opioids. Its repetitive and unpredictable nature with variable frequency of daily attacks makes basal and as needed opioid dose titration challenging. Furthermore, opioid dose escalation is often limited by opioid-related toxicities. In our patient, we highlight alternative methods to traditional pain management with a multi-modal approach including tunneled epidural, epidural steroid injection, cementoplasty and various other interventional procedures, with an observed reduction in opioid usage and the associated reduction in opioid related adverse side effects as well as an increase in functional status.
A SELF-LIMITED VIRUS TURNED DEADLY: ADENOVIRUS PNEUMONIA IN A HEALTHY YOUNG ADULT

First Author: Ruthanna Seidel, MD Second Author: Barry C. Fox, MD

PRESENTATION: A previously healthy 22 year old male college student presented to the emergency room (ER) with one week of progressive respiratory symptoms including shortness of breath, productive cough, and fever. A chest x-ray revealed a right upper lobe infiltrate. Levofloxacin was prescribed and he was discharged. Within 24 hours, he re-presented to the ER for worsening dyspnea. He was febrile, tachycardic and hypoxic. Chest x-ray showed a progressive right upper lobe infiltrate. He was admitted and continued on levofloxacin.

HOSPITAL COURSE: Hypoxia progressively worsened, fever continued, and on hospital day 3, he was transferred to the ICU and started on BiPAP. Microbiology was nondiagnostic and legionella testing negative. Antibiotics were changed to ceftriaxone and azithromycin due to a possible reaction to levofloxacin. Chest CT revealed right sided patchy nodular airspace disease. Due to progressive illness and lack of response to antibiotics, non-bacterial sources were suspected. Voriconazol was added for empiric treatment of blastomycosis on day 4. He became more hypoxic and required intubation on hospital day 5. A bronchoscopy with bronchialveolar lavage (BAL) was performed with lymphocytic predominance but no yeast forms. On hospital day 6 he underwent an open lung biopsy; pathology was consistent with acute respiratory distress syndrome. The adenovirus PCR from his BAL returned positive and all other viral studies were negative. Fungal studies were negative and voriconazol was stopped. With literature supporting in vivo antiviral activity of cidofovir to adenovirus, he was treated with cidofovir on hospital day 7. Antibiotics were stopped on hospital day 8 when bacterial cultures remained negative. His oxygenation improved, and he was extubated on hospital day 10. He was discharged home on hospital day 19.

DISCUSSION: Adenovirus is a DNA virus that causes various infections, most commonly conjunctivitis, mild respiratory infections and gastroenteritis. Infections are typically self-limited in the immunocompetent host, but can be life-threatening in immunosuppressed hosts. Cidofovir is an antiviral agent approved to treat CMV infections, and has also been shown to have in vivo activity against adenovirus. It has been used to treat adenovirus infections in immunocompromised patients in varying dosages. There are case reports of severe adenoviral disease in healthy adults treated with cidofovir, but results are mixed and large studies are lacking. This case illustrates potential successful use of cidofovir in an immunocompetent adult with life-threatening adenovirus pneumonia.
PODIUM PRESENTATIONS
COLORADO PODIUM PRESENTATION - RESEARCH Ryan Daniel Murphy, MD

IMPLEMENTATION OF A “FOUR C’S” REAL-TIME FEEDBACK TOOL TO ASSESS PATIENT SATISFACTION AND PROVIDER COMMUNICATION

First Authors: Michelle Templeton Barron MD, Tyler M Miller MD, Ryan Daniel Murphy MD. Additional authors: Patrick P Kneeland MD.

Introduction: Under Medicare Value Based Purchasing incentives, patient satisfaction scores comprise about one-third of a hospital’s total performance score.[1] Current metrics used to assess patient satisfaction include the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) and Press Ganey surveys. These tools are impractical for providing actionable feedback regarding patient satisfaction to individual physicians for several reasons. First, the time lag between an episode of care and physician receipt of survey data is often several months. Second, current methods fail to attribute satisfaction to specific physicians or physician teams. Lastly, these methods do not inquire about specific elements that contribute to high or low ratings, precluding a more precise analysis of current practice patterns.

Methods: To address these shortcomings in current tools, we developed a four-question bedside survey instrument that could provide immediate, actionable feedback to providers. Each survey item corresponds to one of the “Four C’s” of patient satisfaction – caring, confidence, communication, and coordination – and requests qualitative feedback for each item. The “Four C” items correspond to Society of Hospital Medicine guidelines for assessing patient satisfaction[2] and have been validated in the inpatient setting.[3] Sixty patients on three different inpatient hospitalist services were surveyed utilizing a ten-point quantitative net promoter methodology followed by qualitative evaluation. The de-identified composite results were immediately shared with teams, and providers were surveyed on the utility of the data on informing practice.

Results: Twenty-one patients refused to participate or were unable due to barriers in cognition (e.g. delirium or dementia). The remaining respondents rated physicians in the “Four C” aspects of patient satisfaction, with average scores ranging from 8.8 to 9.3. Most patients offered commentary on how to improve or maintain their reported scores. Sixteen providers were surveyed before and after presentation of service-specific patient survey results. While thirteen stated that patient feedback on communication is important to them, only two reported receiving any in the preceding six months. Half believe that the feedback they received through our initial survey changed their current practice, and the majority (75%) believes it will influence future practice.

Conclusions: These results confirm a lack of feedback to physicians regarding patient communication and satisfaction despite the increasing incorporation of such metrics into reimbursement nationwide. Our results suggest that a system to provide feedback anonymously and in a timely manner is feasible and would be welcomed by physicians. We identified numerous obstacles to routine implementation of such a system including barriers related to patient cognitive status and language. Future innovation cycles will focus on streamlining real-time provision of feedback to providers in combination with specific information on strategies for improvement.


Vascular Closure Device Malfunction: What are we missing?

Abdalla Hassan, MD Lloyd W. Klein, MD

Background: Vascular closure devices (VCD) are routinely used for vascular closure and hemostasis after cardiac catheterization and interventions. They effectively reduce hemostasis time and hospital stay, while increasing patient satisfaction. The purpose of this study was to identify angiographic findings on the femoral angiogram in patients with presumed VCD malfunction and vascular occlusion.

Methods: We queried the NCDR database at our institution to identify patients undergoing femoral angiography who had VCD malfunction requiring subsequent surgical or interventional procedures. All diagnostic and interventional procedures in 2011-2014 were evaluated. Four patients met these criteria. All were females aged 60-65; 3 had peripheral vascular disease, and 2 were obese (BMI>30). Two patients developed leg pain several hours post-VCD, one developed leg pain one day later, and one lost pulse after manual compression for mild superficial bleeding. Three patients required emergency surgical repair and one needed an interventional procedure for loss of pulse in the affected limb. Angiograms were reviewed blinded to the catheterization reports and findings of other modalities i.e. CT scan, or surgical findings.

Results: All cases had insertion of the sheath in the “safe” zone. There were material findings on the femoral angiogram in all cases prior to VCD deployment suggesting possible hazard. These included: apparent femoral and iliac artery dissection, plaque disruption at the insertion site, diminished flow distally, and/or significant arterial vascular atherosclerosis of ~ 50% occlusion. None of these findings were recognized at the time of the decision to deploy VCD.

Conclusion: Many cases with lost pulses after VCD are ascribed to device malfunction, but are consequent to undiagnosed access problems. In addition to evaluating femoral sheath insertion location, operators making decisions about the advisability of VCD should evaluate all information available from the angiogram, especially in female patients with history of peripheral vascular disease.
Methyl Jasmonate: A plant stress hormone that enhances radio-sensitivity of hormone refractory prostate cancer cells.

First Author: Daniel E Ezekwudo, MD, Ph.D; Periasamy Selvaraj Ph.D; Ravi Palaniappan Ph.D.

Introduction: Prostate cancer is the second leading cause of cancer death among men in USA. Radiotherapy remains the treatment for unresectable hormone-refractory prostate cancers (PC-3s'). PC-3s' have been shown to be radioresistant owing to induction of anti-apoptotic proteins (Bcl-2 family). Jasmonates are phytochemicals that have been shown to exhibit anti-apoptotic properties. We hypothesized that inhibition of these anti-apoptotic proteins with jasmonates will enhance PC-3s' radiosensitivity.

Methods: We studied the effect of nano-encapsulated-Methyl Jasmonate (MJon) on irradiated PC-3s'. Briefly, PC-3s' were exposed to varying doses of gamma radiation alone and with differing concentrations of MJon. The efficacy of the combined treatment was analyzed using Western blotting and flow cytometry. Annexin V-FITC/PI dual staining was used to determine the mechanism of cell death.

Results: A significant (p<0.05) increase in cytotoxicity in the combined treatment group occurred, compared to single treatment with MJon, gamma-radiation or control. Western blotting showed that treatment of irradiated PC-3 cells with MJon caused suppression of Bcl-2 protein. Flow cytometric analysis showed no significant difference in % apoptosis between irradiated PC-3 cells (14.36%) and the control group (10.07%). However, apoptosis was significantly increased by 2.0mM MJon treatment of irradiated PC-3 cells with (38.64%) compared to the controls (14.36%, p<0.05). Using Annexin V-FITC/PI dual staining we confirmed that the mechanism of cell death was via apoptosis.

Conclusion: MJon suppressed Bcl-2 expression and enhanced the radiosensitivity of human PC-3 cells. This approach may conceptually be applied to all radioresistant cancers that employ anti-apoptotic protein induction as their mechanism of resistance ultimately resulting in the use of radiotherapy at lower doses to achieve higher efficacies. Nevertheless, issues of vascular mimicry in human cancers will have to be addressed before this system can be adopted clinically.
Positive airway pressure affects cardiac remodeling in hypertrophic cardiomyopathy patients with obstructive sleep apnea

First Author: Suwen Kumar Second Author: Benjamin Ebner Third Author: Jennifer Bragg-Gresham Fourth Author: Peter M. Farrehi Fifth Author: Sharlene M. Day

Introduction: Obstructive sleep apnea (OSA) is highly prevalent in patients with Hypertrophic Cardiomyopathy (HCM) and may lead to adverse cardiovascular outcomes. Treatment of OSA with positive airway pressure (PAP) has been shown to have favorable results in non-HCM patients and may have similar benefits in HCM but the evidence is lacking. We propose that PAP therapy in HCM patients with OSA may affect cardiac remodeling.

Methods: Existing HCM registry at our institution was used to identify adult patients (>18 years) with HCM. Information on PAP use was collected directly from the patients. HCM patients with diagnosed OSA based on standard polysomnography (PSG) were selected and divided into two groups: PAP compliant and PAP noncompliant. Patients consistently using PAP >4 hours nightly were considered PAP compliant. Demographics and clinical characteristics were extracted from the registry. Prevalence and means were compared between the two groups using Chi-square and t-tests. Differences between the groups were adjusted for age, sex, and BMI using linear mixed models for continuous measures and logistic regression for dichotomous measures.

Results: 51 patients were identified with known OSA. Of those, 32 (62.7%) were PAP compliant and were relatively older (mean: 60.7 years vs. 53.6 years, p<0.047). PAP compliant group had significantly lower left ventricular (LV) mass index (mean: 62 g/m² vs. 98.7 g/m², p<0.01) based on cardiac magnetic resonance imaging. The difference in LV mass index remained significant even after adjusted comparisons for age, gender and body mass index (mean: 63.8 g/m² [PAP compliant] vs. 96.3 g/m² [PAP noncompliant], p<0.01).

Conclusion: OSA is a highly prevalent and potentially harmful, but a treatable comorbidity in HCM. Adherent PAP therapy in HCM patients with OSA may affect cardiac remodeling by attenuating LV mass. Data is still preliminary and randomized controlled trials are warranted to further investigate this association.
IMPROVED EFFICIENCY AND COST SAVINGS FROM TRIAGING SELECTED TRANSIENT ISCHEMIC ATTACK PATIENTS TO OUTPATIENT URGENT CARE

First Author: Martin Miguel I Amor, MD Michael Edward Chan MD, Nagakrishnal Nachimuthu MD, Florence Armour MS, Shirley Hwang MS, Neil Holland MBBS

BACKGROUND: Although most patients presenting with suspected transient ischemic attack (TIA) in the United States are currently hospitalized for urgent evaluation, many are later found to have alternate diagnoses, and it is not clear that hospital admission is either necessary or cost effective in all cases.

OBJECTIVE: To report the outcomes, diagnostic efficiency and cost savings from triaging selected transient ischemic attack (TIA) patients with lower expected stroke risks into an outpatient TIA rapid evaluation center (TREC) to avoid hospitalization.

METHODS: We started an open-access ABCD2 score-based outpatient TIA Rapid Evaluation Center (TREC). Patients referred to the TREC are seen on the next weekday and undergo a diagnostic evaluation then consultation with a stroke neurologist. We collected prospective data from all TREC patients seen during its first year, and compared them to the patients who were still admitted to the hospital with a primary diagnosis of TIA during the same period.

RESULTS: We saw 74 TREC patients within an average of 1.25 days of referral during its first year of operation (56 from the emergency room and 18 from physician offices). Only 2 TREC patients needed admission to the hospital, the remainder completed their evaluation as out-patients. Only 1 TREC patient had a follow-up cerebrovascular event. Patients referred to the TREC had lower ABCD2 scores (1.8 vs. 3.8, p <0.001) and were less likely to have a final diagnosis of TIA (19% vs. 77%, p<0.001). Nearly all patients underwent CT scan, lipid panel and EKG. However, TREC patients were more likely to undergo carotid ultrasound (99% vs. 84%, p=0.001) and MRI of the brain (89% vs. 68%, p=0.001). Based from our financial analysis, TREC patients were evaluated at significant cost savings. Both average hospital charges ($2,270 vs. $6,232, p=0.03) and average hospital costs ($666 vs. $6,523, p<0.00001) were significantly lower in TREC patients compared to hospitalized patients. In its first year, institution of the TREC resulted in average cost savings of $340,000 at our community medical center.

CONCLUSION: Our TREC program allowed us to avoid hospitalization for selected TIA patients, and still offer timely and efficient diagnostic evaluations at significant cost savings.
“NOTE BLOAT SYNDROME”: AN EPIDEMIC AFFECTING ELECTRONIC HEALTH RECORDS, HIGH TIME TO CHANGE SOAP NOTE TO APSO NOTE.

First Author: Mahesh Bavineni, MD Second Author: Sreelakshmi Ravula Third Author: Vijay Mahajan

INTRODUCTION: Electronic health records (EHRs) have become integral to improving the quality and efficiency of the health care system. A key patient safety factor supporting (EHRs) has been to make physician notes legible. Unfortunately, they've also allowed doctors to produce a staggering amount of auto-generated data that can render physician notes close to useless. “Note Bloat” and other electronic documentation hazards like copy and paste, and copy forward, threaten both patient safety and physician liability.

METHODS: We undertook a resident driven quality improvement project where we surveyed about 200 physicians about the traditional SOAP note (Subjective, Objective, Assessment, Plan), and also introduced them to our modified version called APSO note (Assessment, Plan, Subjective, Objective). Typically, providers first look for the assessment and plan portion of the note. APSO places them at the beginning of the note, making provider search faster. The new template also deliberately eliminates the auto-population of the problem list, which usually occupies the assessment portion. This prompts physicians to think about the problems actually being addressed in that particular clinical encounter.

RESULTS: We surveyed all participating physicians 3 months after using the new modified template. Outcomes were measured using survey data and the mean time spent scrolling through the note as recorded in the EHR that included time spent reading through the physician notes and the usefulness of other consultant’s notes for opinion. The mean time spent reading the notes was significantly reduced to 60 seconds in the APSO format compared to 100 seconds in SOAP format. Approximately 85% respondents opined that modifying the template also reduced the unnecessary auto generated data which made the note shorter and enabled the physicians to spend more time communicating with the patients as compared to time spent for documentation.

CONCLUSIONS: “Note Bloat”, expansion of a note’s length and complexity due to a marked increase in copied content, introduces the risk of misinterpreting key clinical data with potentially negative consequences for patient safety and provider workflow. APSO presents the information generally most relevant to ongoing care at the beginning of the note, where it can be most quickly found, shortening the time required for the clinician to find each colleague’s Assessment and Plan. Having the Assessment and Plan at the beginning of the document stresses its importance, and may induce a greater effort to provide a complete, clear, and concise representation of diagnostic and therapeutic thoughts.
Electrocardiographic Changes Consistent with Atrial Infarction are an Independent Predictor of 30 Day and 1 Year Mortality in Patients with Acute ST-Elevation Myocardial Infarction

First Author: Marvin Louis Roy Lu, MD, Chinualumogu Nwakile, MD, Anastasios Dimou, MD, Toni De Venecia, MD, Mahek Shah, MD, Vincent M. Figueredo, MD

Introduction: Atrial Infarction is an uncommonly diagnosed disease and data on its significance are limited. Its incidence in STEMI patients reportedly ranges from 0.7-52%. Certain Atrial ECG changes such as abnormal p wave morphology have been associated with 90-day mortality after STEMI. However, whether these changes are associated with short-term (30 day) or long-term (1 year) mortality have not been studied.

Methods: We examined index electrocardiograms of 250 STEMI patients at Einstein Medical Center Philadelphia. Demographics, clinical variables, peak troponin, ejection fraction, and angiographic data were collected. Atrial ECG patterns were examined and correlated with mortality.

Results: Age, sex, cardiovascular risk factors, infarct size and ejection fraction were similar in STEMI patients with and without abnormal P wave morphology or PR displacement. P wave notching in any lead was associated with higher 30 day (OR 3.09 (1.35-7.05) and 1 year mortality (OR 5.33 (2.74-10.36). PR displacement in any lead was also associated with increased 30 day (OR 2.33 (1.03-5.28) and 1 year mortality (OR 6.56 (3.34-12.86). Notched P wave, PR depression in II III and AVF and elevation in AVR/AVL was associated with increased 1 year mortality (OR 12.49 (5.2-30.0) as well as if PR depression was found in precordial leads (OR 21.65 (6.82-68.66). After adjusting for age; ejection fraction; peak troponin level; and left main disease, PR displacement in any lead was associated with increased 1 year mortality (adjusted OR 6.22 (2.33-18.64). Length of stay was longer in patients with notched P waves ($p$ 0.008) or PR displacement in any lead ($p$ 0.003). Left main coronary disease was more prevalent in patients with a notched P wave ($p$ 0.045).

Conclusion: Notched P wave morphology is associated with increased 30 day and 1 year mortality after STEMI. PR displacement consistent with atrial infarction is associated and independently predicts 1 year mortality in STEMI patients.
Proton Pump Inhibitors and Hypomagnesemia in Patients with Arrhythmias

Loheetha Ragupathi MD, Natasha Fonseka MD, Jocelyn A. Sendecki MSPH MS, Melissa M. McCarey MPH, Steven W. Breecker MD, David J. Whellan MD MHS.

Introduction: Proton pump inhibitors (PPIs) are among the most widely used prescription drugs in the United States. In 2011, the FDA released a Drug Safety Communication informing the public that long term PPI use may be associated with hypomagnesemia. Hypomagnesemia is known to be associated with the development of cardiac arrhythmias, particularly atrial fibrillation. The purpose of this study is to describe a potential class effect of PPI use on magnesium levels of patients admitted to the hospital with an arrhythmia.

Methods: We conducted a retrospective review of the electronic health record in which we identified 999 consecutive patients above the age of 18 years admitted to a single tertiary care hospital between January 1, 2011 and December 31, 2012 with admission diagnoses of cardiac arrhythmias, identified by International Classification of Diseases (ICD 9) codes. Only patients with duration of hospitalization less than 20 days were included. Of these patients, 372 were excluded from the analysis due to lack of availability of serum magnesium level on admission, leaving a study population of 672 patients. Within the study population, we identified 177 (27.2%) patients who were taking a proton pump inhibitors prior to admission. Hypomagnesemia was defined as serum magnesium <1.3mEq/L (0.65mmol/L).

Results: Overall, hypomagnesemia occurred in 26 (4.1%) patients. There was no significant difference in magnesium level between patients taking PPI (1.63±0.23mEq/L) and not taking PPI (1.64±0.21mEq/L), p= 0.73. In patients taking PPI on admission, the odds ratio for hypomagnesaemia was 1.10 (95% confidence interval 0.47 to 2.58, p=0.83). In the subgroup of patients admitted for atrial fibrillation, the odds ratio for hypomagnesemia was 1.16 (95% confidence interval 0.45-2.98, p=0.81).

Conclusions: In a cohort of patients admitted for cardiac arrhythmias, the incidence of hypomagnesemia at the time of admission was low. Our data did not find a significant association between PPI use and hypomagnesaemia among patients admitted for arrhythmias, including atrial fibrillation. Given the current FDA drug safety communication with regards to PPI induced hypomagnesemia, further studies should be considered given the effectiveness of PPIs in treating peptic ulcer disease.
QUEBEC PODIUM PRESENTATION - RESEARCH Catherine Matte, MD

Improving Prescribing Practices on Clinical Teaching Units: Glucocorticoid Use in Chronic Obstructive Pulmonary Disease Exacerbations

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death in the United States. COPD exacerbations (COPDE) are an important risk factor for progression of this disease. Systemic glucocorticoids (GCs) use in COPDE has been shown to reduce hospital stay, treatment failure, and relapses. Nevertheless, poor adherence to best practice guidelines, both in terms of over- and under-prescribing are documented. A recent study demonstrated that a 5 day course of GCs in COPDE was as effective as 14 days, (Reduce trial, JAMA June 2013) this provided an opportunity to evaluate its effect on prescribing practices of physicians on medical Clinical Teaching Units. (CTUs) We aimed to determine if prescribing practices of GCs in COPDE improved following implementation of a targeted, multidisciplinary educational intervention.

Methods: We used a before-after study design with concurrent control. An educational power-point presentation was developed for the treatment of COPDE and presented at the beginning of every 4-week internal medicine CTU rotation at one of two large teaching institutions (CTU-I) for a period of 12 months, beginning March 2014. The other institution served as the control institution (CTU-C). Retrospective chart review was conducted pre-implementation (June 2013 – February 2014) and post-implementation (March 2014-Nov 2014) on all patients (over age 40) admitted for a COPDE to the CTUs at the intervention and control hospital. Exclusion criteria were patients with asthma or pregnancy. Our primary outcome was the difference in optimal GC use (5 days) in the post-implementation as compared to the pre-implementation population in both hospitals. Secondary outcomes include: dose and route of administration of GC, readmission rates and concomitant antibiotic use. Comparisons were analyzed with student T-tests.

Results: In the 9 months prior to implementation, we identified 101 consecutive patients (50.5% female, mean age 74 SD 10.5, 57% pneumonia) and 68 patients, 9 months post-implementation (54% female, mean age 73 SD 11.3, 50% pneumonia) 39.4% of patients received the optimum duration of therapy (5 days) in the post-implementation as compared to the pre-implementation population in both hospitals. Secondary outcomes include: dose and route of administration of GC, readmission rates and concomitant antibiotic use. Comparisons were analyzed with student T-tests.

Conclusion: There is an important gap between adoption of guidelines and current practice on medical CTUs. Our educational intervention has led to a significant improvement in prescribing practices on the CTUs concerning COPDE and continued promotion of evidence-based practice through short directed educational presentations. Such educational interventions that target a specific care gap can help translate knowledge into better patient care.
**Introduction:** Transurethral resection of the prostate (TURP) has long been the gold standard intervention for patients with benign prostatic hyperplasia (BPH). Recently, prostatic arterial embolization (PAE) has emerged as a minimally invasive alternative to TURP with fewer complications and shorter recovery time. The purpose of this study was to compare in-hospital direct costs of elective PAE and TURP in a community hospital setting.

**Materials and Methods:** This was an Institutional Review Board approved retrospective financial data review of patients undergoing PAE and TURP from January to July 2014. Only patients undergoing elective ambulatory procedures were included. Direct costs were categorized in to the following 6 categories: nursing and/or staffing, operating room or interventional supply costs, anesthesia supplies, room/boarding, radiology and laboratory costs. In-direct hospital costs (i.e. electrical, housekeeping, security, medical records, pathology) and professional physician costs (i.e. anesthesiology, radiology, urology) were excluded. Data was analyzed with the use of student t test and a probability value of <0.05 was considered statistically significant.

**Results:** Average age of TURP (n=36) patients was 73.9 years and PAE was 64.5 (n=30, p<0.0001). Intra-procedural supplies for PAE ($1554.19, SD $437.79) were significantly more costly than TURP ($1124.61, SD $606.44, p=0.0019). However, total intra-procedural costs including anesthesia supplies and nursing/staffing were significantly more expensive with TURP than with PAE (TURP: $2246.38, PAE: $1765.69, p=0.01). The average length of stay for the TURP group was longer at 40.6 hours (range 1-5 days) versus 3 hours for the PAE group, with room costs incurred only by the TURP group ($2334.27, SD $1523.84). Total in-hospital costs for the TURP group ($5191.90, SD $3232.56) were significantly higher than for PAE ($1791.46, SD $458.19, p<0.0001).

**Conclusion:** Compared with PAE, TURP is associated with significantly more in-hospital direct costs. The difference in cost is largely related to length of hospital stay, as well as associated costs of labs and imaging. PAE offers a safe and efficacious therapy for BPH, however, overall less cost for the average patient. Future studies aimed at comparative cost effectiveness as it relates to clinical outcome, complications, and recurrences are warranted.
POSTER FINALISTS
Innovations in Patient Safety Education of Internal Medicine Residents

Bisi Alli, DO, MS, Jordan Coulston, MD, Hamed Abbaszadegan, MD, MBA, LeAnn Cox, MD,

Event reporting of adverse events and near misses is critical to patient safety and is the recent focus of the ACGME-CLER objectives. However, the ACGME is not prescriptive about how to satisfy these milestones. While informal curricula are more common in residencies, continued barriers exist in engaging residents in system-level reporting and interventions.

To start, we conducted a needs assessment survey of internal medicine residents, which reflected the ACGME-CLER objectives and asked residents about their personal experiences over the past twelve months (Figures 1 & 2). Less than half (44%) of the residents reported observing unsafe conditions, adverse events and/or near misses on a monthly basis. Similarly, there was poor resident involvement in event reporting (36%) and participation (18%) in processes to promote and enhance safe care (Figure 1). Limitations in time and familiarity with the hospital event reporting system were common barriers identified by the residents (Figure 2).

In response, we created a formal, resident-led patient safety education curriculum to educate internal medicine residents. Directed by the Chief Resident in Quality and Safety (CRQS), curricular elements include formalized training in core concepts of patient safety, demonstration of event reporting, interprofessional patient safety conferences (PSC), and the launch of the patient safety consultative service (PSCS). Furthermore, monthly patient safety conferences serve as a hospital-wide forum to reinforce core concepts such as: identification of healthcare errors; promotion of just culture, high yield communication, and quality improvement science. After curriculum initiation, early data demonstrates an increase in resident-submitted error reports (Figure 3) with several subsequent system-level interventions (data shown).

Ultimately, our patient safety education curriculum has proven to be an effective approach to resident education by increasing error reporting, real-time evaluation of errors, and useful system-level interventions. Ongoing focus is to sustain these interventions, to assess resident educational outcomes, and to further translate this culture change to our other residency hospital site.
Simplified Pulmonary Embolism Severity Index Accurately Reflects Length of Stay, Readmission and Death in a California Cohort.

First Author: Alan Beneze Second Author: Jill Waalen Third Author: Dan Dworsky Fourth Author: Darlene Elias

Introduction: The Simplified Pulmonary Embolism Severity Index (sPESI) is a validated, bedside clinical prediction model used to predict all cause mortality following pulmonary embolism. The sPESI utilizes a binary scoring system in which a score of 0 is considered low risk and a score of 1 is high risk. Six prognostic variables include age, presence of congestive heart failure, chronic respiratory disease or malignancy, tachycardia, hypoxia and hypotension are included in the sPESI. The sPESI has been used to risk stratify patients for outpatient treatment in recent studies.

Methods: A retrospective chart review was performed of all patients discharged with a diagnosis of PE in 2012-2013 at Scripps Green Hospital. Various quality outcomes at three months, including recurrent VTE, major bleed, death and readmission as well as length of stay for low and high risk patients using sPESI were analyzed.

Results: A total of 237 patients were hospitalized with a diagnosis of PE at Scripps Green Hospital. The mean age was 65.5 yrs ±17.0 with 52% male sex. The mean length of stay (LOS) was 3.56 ± 4.32 days with a range of 1-33 days. Etiology of PE was idiopathic in 40%, and provoked in 60%. PE was diagnosed with CT angiogram in 89% of patients and anatomic extent of pulmonary embolism was: limited 70 (29.5%), intermediate 77 (32.5%) and extensive 60 (22.5%). Ninety-one (38.4%) patients had a low risk sPESI score. Death, LOS and readmission were all inversely related to low risk sPESI scores. Recurrent VTE and major bleed was not associated with low risk sPESI scores. Those patients with a low risk sPESI score had an average length of stay of 2.0 ±2.5 (p<0.001). Readmissions occurred in 9.9% of patients with a low risk sPESI compared to 32% of high-risk patients (p<0.001). Twenty patients of the 237 studied had died at three months, of which only 1 had a low risk sPESI (p<0.001).

Conclusion: In this cohort of patients hospitalized with PE over a two year time period, a low risk sPESI score was inversely related to readmission, risk of death and prolonged LOS. The recognition of truly low risk acute PE patients suggests clinicians have the option for partial or complete outpatient treatment. Outpatient treatment for pulmonary embolism can be considered feasible and is expected to improve care of many patients while also having an important impact on healthcare management and costs.
Evaluating the risk of re-emergence of measles in the United States

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Second Author: Wayne Enanoria PhD, MPH
Third Author: Sarah Ackley, BSc
Fourth Author: Travis Porco, PhD, MPH
1 St. Mary's Medical Center, San Francisco CA
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Introduction: The use of vaccination to eliminate endemic transmission of measles in the United States is a remarkable public health accomplishment. However, past success does not guarantee sustained elimination and a recent surge in the incidence of measles suggests measles may be re-emerging. We use stochastic modeling techniques to quantitatively evaluate the transmission of measles in the United States and to assess the risk of re-emergence.

Methods: We model transmission as a branching process with a negative binomial offspring distribution. This permits us to use maximum likelihood estimation to infer the effective reproduction number and dispersion parameter of measles. These parameters characterize the strength and heterogeneity of measles transmission respectively. Variations of this technique provide insight into how measles transmission has changed with time, how vaccine coverage relates to disease transmission and how characteristics such as age may affect transmission. Data used in our study are acquired from the Centers for Disease Control and the California Department of Public Health.

Results: National data for 2001 to 2011 produce on estimate of 0.52 (95% confidence interval: 0.44 - 0.60) for the effective reproduction number of measles in the United States. Since this value is well below the critical value of one, measles remains eliminated – implying that endemic transmission is not possible. However, we identify an increase trend of measles incidence with time. This trend appears attributable to an increase in the number of disease introductions rather than a change in the transmissibility of measles. We also find that there is a high degree of transmission heterogeneity in measles transmission, which may be caused by age-dependent transmission or clustering of immunity. The control of transmission is extremely sensitive to the level of vaccine coverage as a decrease in coverage by as little as 1% could result in a 70% increase in measles incidence.

Conclusions: Maintaining a low incidence of measles in the United States requires control of geographic importation of cases and maintenance of high vaccine coverage. Vaccination of children in areas where there is a high degree of vaccine refusal appears particularly important. Our general approach of characterizing the case burden of measles is applicable to the epidemiologic assessment of other weakly transmitting or vaccine-controlled pathogens that are either at risk of emerging or on the brink of elimination.
Frequent Premature Atrial Complexes and their Association with Risk of Incident Heart Failure, Stroke, and All-Cause Mortality.

First Author: Brittany A Doremus, DO Tushar Acharya, MD, Michael Cheng, DO, Manminder Bhullar, MD, Steve Tringali, DO, Marta Nalbandyan, DO, Vishnu Ilineni, MD, Manmeet Singh, MD, Enrique Carbajal, MD, Prakash Deedwania, MD, FACC

Background: Frequent Premature Atrial Complexes (PACs) have been shown to be associated with higher risk of Atrial Fibrillation (AF).

Objective: To examine the association between frequent PACs and a composite end point of known AF complications, namely heart failure (CHF), stroke and all-cause mortality.

Methods: For this retrospective cohort study, Holter ECGs obtained between 2000 and 2010 of 1357 patients free of AF at baseline were analyzed for PAC activity. All pertinent data in electronic medical records was reviewed to ascertain baseline characteristics. Holter groups with frequent PACs (>100/day) and infrequent PACs (<100/day) were compared to evaluate for differences in reaching the composite end point on a median follow up of 7.5 years. Multivariate Cox regression analyses was performed to assess the strength of association and to adjust for confounders.

Results: Mean age was 64 years with 93% men. Mean BMI, A1c, LDL, left atrial size, and average HR were 31.24 kg/m2, 6.42%, 107.92 mg/dL, 42.56 mm, and 73 bpm, respectively. A predetermined composite end point was reached in 47.3% of those with frequent PACs compared to 26.4% of those with infrequent PACs (HR, 2.11 [95% CI, 1.75-2.53]; P < 0.001). After adjusting for demographics and co-morbidities via Multivariate Cox Regression Analysis, frequent PACs remained independently associated with a higher incidence of the combined end point (HR, 1.31 [95% CI, 1.07-1.60]; P = 0.008). In the subgroup analysis, frequent PACs were independently associated with all-cause mortality (37.4% vs 18.8%, HR, 1.40 [95% CI, 1.12-1.76]; P = 0.004). There was a trend towards more CHF (12.6% vs 8.2%) and stroke (6.8% vs 5%) in patients with frequent PACs.

Conclusion: Frequent PACs (>100/day) are associated with higher risk of composite end point of CHF, stroke, and all-cause mortality. This data is predominantly driven by higher mortality in patients with frequent PAC activity.
Cox multivariate curves showing event free survival when plotted against time in cohorts with frequent and infrequent PAC activity

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Graphic representation of incident CHF, stroke and all-cause death in comparison groups.
Teaching on Rounds: Observations, Perceptions, and an Intervention to Increase Bedside Teaching

Everardo Arias, BS, Francisco Espitia, BS, Michael Phelan, PhD, John Boker, PhD, Lloyd Rucker, MD

Introduction: The current inpatient teaching environment, with its emphasis on throughput, technology, electronic records, and limited resident duty hours, has affected the location of rounds, as well as the balance of education versus service for learners. The authors characterized inpatient medicine ward teaching and compared learners’ preferences for rounding sites with their assessment of the quality of their learning. The authors also evaluated an intervention to increase time teaching and time at bedside.

Methods: The authors developed and validated an instrument to assess site and teaching time of medicine ward rounds. Study participants were selected through convenience sampling over a six-month study period and included all internal medicine attendings, residents and medical students on service at the University of California, Irvine Medical Center. Researchers observed attending rounds and recorded the location and activity in time intervals. Attendings were identified as leading predominantly workroom (WR) or bedside (BS) rounds based upon whether they spent the majority of attending rounds in the workroom or at the bedside, respectively. Learners completed a survey about their experiences. Observations and surveys were obtained over the study period, with the intervention introduced after three months: faculty development and whiteboards installed in patient rooms. Authors performed descriptive and inferential analysis on de-identified data.

Results: Ten core teaching behaviors were identified through literature search and expert consensus, Cronbach’s alpha 0.80, and validated during 6.5 hours of joint observations, Kappa = 0.69 (p<0.001, 95% CI [0.524, 0.850]). Workroom-based attendings taught during 41% of time in rounds, bedside-based attendings during 39%. The intervention showed an increase in teaching for bedside-based attendings (39% to 43%), and an increase in time at bedside for workroom-based attendings (23% to 27%). Ninety-six learners completed the evaluation survey pre-intervention (P) and 28 after the intervention (I). Weighted means for key items from the learners survey (1=Strongly Disagree, 5 = Strongly Agree) were 1) Amount of teaching, WRP 3.7, WRI 3.8, BSP 4.3, BSI 4.2; 2) Preference for bedside rounding, WRP 3.1, WRI 3.6, BSP 4.0, BSI 3.5; 3) Would like to work with attending again, WRP 3.8, WRI 3.7, BSP 4.9, BSI 5.0.

Conclusions: Hospitalists spent about 40% of rounding time teaching regardless of site. The intervention increased teaching for bedside attendings and time at bedside for workroom attendings. Learners with attendings who rounded at the bedside felt they received more teaching and preferred bedside teaching and working with bedside-based attendings.
SOLUBLE GUANYLATE CYCLASE AS A NOVEL TREATMENT TARGET FOR OSTEOPOROSIS

Jisha Joshua MD, Gerburg K. Schwaerzer, Hema Kalyanaraman, Esther Cory, Florin Vaida, Gerry Boss MD, Renate Pilz MD.

Introduction: Osteoporosis is a major health problem leading to fractures that cause substantial morbidity and mortality. Current osteoporosis therapies have significant drawbacks, creating a need for novel bone-anabolic agents. We previously showed that the nitric oxide (NO)/cGMP/protein kinase G (PKG) pathway mediates some of the anabolic effects of estrogens and mechanical stimulation in osteoblasts and osteocytes. We tested cinaciguat—a prototype of a novel class of soluble guanylate cyclase activators—in a mouse model of estrogen deficiency-induced osteoporosis and in primary osteoblast cultures.

Materials and methods: 12 week old female C57/Bl6 mice were divided into 5 groups: Ovariectomized (OVX) + vehicle (0.1% DMSO), OVX + Cinaciguat (10ug/kg/day), OVX + Estrogen (5ug/kg/day), sham operated + vehicle and sham operated + Cinaciguat (n=8-10). Daily i.p injections were started one week post-surgery for 5 weeks. MicroCT, histomorphometry, biochemical marker assays and gene expression analysis were performed at the time of sacrifice. Survival, proliferation and differentiation assays were performed in primary osteoblasts in the presence or absence of Cinaciguat. Statistical analysis was done using two-tailed Student t-test or one-way ANOVA with Bonferroni post-test analysis; p

Results: Compared to sham-operated mice, ovariectomized mice had lower serum cGMP concentrations, which were largely restored to normal by treatment with cinaciguat or low-dose 17ß-estradiol. Treatment with cinaciguat attenuated the ovariectomy-induced trabecular bone loss, improving the BV/TV, trabecular number, and BMC, with effect sizes of d = +1.47, +1.35, and +1.20, respectively, compared to vehicle-treated OVX mice as measured by micro-CT. These effect sizes were comparable to those of estradiol in all parameters (d = +1.45, +0.9, and +1.66 for BV/TV, trabecular number, and BMC, respectively). Cinaciguat reversed ovariectomy-induced osteocyte apoptosis (d = -2.79 and -4.25 for trabecular and cortical bone, respectively) as efficiently as estradiol (d = -3.68 and -4.27 for trabecular and cortical bone, respectively) and significantly enhanced histomorphometric bone formation parameters. Compared to 17ß-estradiol, which completely reversed the ovariectomy-induced increase in osteoclast number, cinaciguat had little effect on osteoclasts. In vitro, Cinaciguat significantly increased cGMP concentrations in osteoblast cultures and enhanced their survival, proliferation and differentiation potential.

Conclusions: Direct guanylate cyclase stimulators have been extremely well tolerated in clinical trials of cardiovascular diseases, and our findings provide proof-of-concept for this new class of drugs as a novel, anabolic treatment strategy for post-menopausal osteoporosis, confirming an important role of NO/cGMP/PKG signaling in bone.
Racial Ethnic Differences in Hip Fracture Incidence and Mortality in Older Men

Lucy Liu MD, Malini Chandra MS, Joel Gonzalez BS, Joan Lo MD

**INTRODUCTION**: Hip fracture is a major public health concern in older men and women. While men have a lower incidence, they suffer higher rates of mortality, postoperative complication and functional decline. Fracture rates and outcome also differ by race/ethnicity. This study reports the contemporary incidence of hip fracture and subsequent mortality in older men by age and race/ethnicity within a large integrated healthcare delivery system.

**METHODS**: This retrospective cohort study identified men age 50 years and older in Kaiser Permanente Northern California (KPNC) who experienced a proximal femur fracture during 2000-2010 in the absence of major trauma. Age and self-reported race/ethnicity were obtained from administrative databases. The annual incidence of hip fracture was determined based on the number of eligible KPNC male members per calendar year, with rates adjusted for age according to the 2010 U.S. Census. All-cause mortality was determined at 1, 3, 6, and 12 months following fracture. Chi-square tests and logistic regression analyses (with odds ratio, OR and 95% confidence interval, CI) were used to examine differences by age and race/ethnicity.

**RESULTS**: There were 6247 men (mean age 79.3 +/- 9.8 years) experiencing hip fracture during 2000-2010; 81.4% were white, 7.5% Hispanic, 3.8% black and 3.9% Asian. The annual age-adjusted incidence of hip fracture ranged from 124 to 145 (mean 132) per 100,000 men. Contemporary (2010) hip fracture incidence was highest for white (146), followed by Hispanic (105) and black (88), and lowest for Asian (44) men per 100,000. Overall mortality rates at 1, 3, 6 and 12 months were 11.1%, 19.8%, 25.4% and 32.9%, respectively. Mortality increased significantly with age, with one-year mortality at 13.4% for men 50-64 years old and 46.6% for men 85 years and older. Post-fracture mortality also differed by race/ethnicity; one-year mortality was similar among white (33.7%), black (32.4%) and Hispanic (31.1%) men, but significantly lower among Asian men (23.1%, p<0.05). Adjusting for age, black (OR 1.05, CI 0.79-1.41) and Hispanic men (OR 0.93, CI 0.76-1.15) had similar odds of mortality at one year when compared to white men, but Asian men had significantly lower odds (OR 0.65, CI 0.47-0.88).

**CONCLUSION**: The age-adjusted incidence of hip fracture in older men averaged 132 per 100,000 men during 2000-2010 and was highest for white and lowest for Asian men in 2010. Post-fracture mortality increased significantly with age, with one year mortality approaching 50% in men 85 years and older. One-year mortality was similar in whites, blacks and Hispanics but significantly lower in Asians. Future studies should examine factors contributing to racial/ethnic differences in hip fracture incidence and outcome.
CALIFORNIA POSTER FINALIST - RESEARCH Mala C Mandyam, MD

Discharge checklists may reduce medical errors.

First Author: Mala C Mandyam MD Gomathi Krishnan PhD, Kambria H. Evans MEd, Lisa Shieh MD PhD

Background: Discharge checklists may reduce medical errors. Traditional paper checklists do not fit into the current workflow in centers that utilize electronic medical records (EMRs). In an era where team-based care is becoming widespread, defining each person’s role in discharge practices is increasingly important.

Objective: Our aim was to develop and implement a standardized discharge checklist into our university hospital’s EMR that was tailored towards internal medicine housestaff. We sought to analyze utilization of the checklist and compare the effects of its usage on discharge best practice items. As this was a pilot study we also sought out qualitative feedback on the project from participating medicine housestaff.

Methods: Using focus groups and published best practices, we selected 5 tasks necessary for safe discharges to include in our checklist: follow-up appointments, medication education, POLST form completion, discharge equipment orders, and timely catheter discontinuation. We created a “dotphrase” in our EMR that could pull the checklist into daily MD progress notes. We randomized each of 5 general medicine ward teams to receive either weekly reminders to use the checklist dotphrase in their daily notes (intervention team) or less frequent reminders to use any existing methods they already had to remember discharge tasks (control team). Over a 5-week period, we collected data on checklist usage, as well as outcomes relating to the checklist tasks across all general medicine teams.

Results: The intervention group had 269 (60%) patient encounters and the control group had 179 (40%) encounters during the pilot period. Checklist usage in the intervention group was at 23% (ie, 61 encounters contained the checklist in at least one note entered during the encounter). Patients in both groups were of similar case mix index (p=0.85). Housestaff in the intervention group were more likely to consult discharge pharmacists for medication education than those in the control group (30% vs 14% of encounters; p<0.001). This association was driven by encounters containing the checklist. There were no significant differences in length of stay, follow-up appointment scheduling, or POLST completion in either group.

Overall, housestaff in the intervention group liked seeing and updating the discharge checklist in their daily notes. They wanted more instruction on how to actually complete the discharge tasks. They also wanted to see discharge task reminders earlier in the work day.

Conclusion: An EMR based discharge checklist can improve completion of some best practice items such as consulting a discharge pharmacist. Medicine housestaff are willing to use an EMR-based checklist to aid in discharge tasks. There are opportunities to improve actual usage of the checklist and to better tailor it to medicine housestaff workflow.
Appropriate Utilization of Telemetry

Sajan Patel, MD Myung Sim, DrPH Erin Dowling, MD Department of Internal Medicine, UCLA Medical Center

Intro: Telemetry is overused in hospitals, likely due to physician uncertainty regarding patient trajectory, unawareness of established indications, and a misconception that telemetry imparts a higher level of care. Inappropriate use leads to increased costs, emergency department backups, unnecessary work up of insignificant arrhythmias, and patient discomfort. We conducted a study to evaluate the use of telemetry at UCLA-Santa Monica Medical Center and the effect of an educational intervention on telemetry utilization.

Methods: We studied the admissions of UCLA Internal Medicine residents rotating through the hospitalist rotation at UCLA-Santa Monica Medical Center from 11/21/14 – 5/7/14 (6 blocks). Data on admissions were collected discretely by post-call nurse practitioners who recorded admission diagnosis, telemetry status, and telemetry indication. For 3 of the 6 blocks, half the residents on the rotations received an educational intervention on telemetry indications and received a pocket card with guidelines. We reviewed all telemetry admissions that had unclear indications and deemed them appropriate or not based on published guidelines. We also conducted a program-wide survey on Internal Medicine resident opinions of telemetry use and comfort with indications.

Results: Data on 642 admissions was collected, and of these admissions, 52% (333/642) were put on telemetry. Of all telemetry admissions, 34% were deemed inappropriate (112/333). With no intervention, 56% of admissions were put on telemetry whereas with intervention, 40% were put on telemetry (p=0.0004). In addition, without intervention, 63% of telemetry admissions were appropriate, whereas with intervention, 79% of admissions were appropriate (p=0.0135). The intervention group was 2.24 times more likely to admit appropriately to telemetry than those that did not receive the intervention (p=0.0151). Of the residents who responded to the survey (74/113), 92% felt that telemetry is overused, and 72% felt they personally overused telemetry.

Conclusions: Our study showed that telemetry was overused by the Internal Medicine residents at UCLA-Santa Monica Medical Center, however a relatively simple and inexpensive educational intervention significantly reduced inappropriate use. These results translate to a significant reduction in cost and waste of resources. In addition these interventions appear to be favorably received by residents based on their survey responses. Future directions include a program-wide telemetry intervention, guideline integration into the electronic health record program, and a telemetry discontinuation study.
CALIFORNIA POSTER FINALIST - RESEARCH Ray Pillai, MD

Change in Pulse Oximetry Waveform Before and After Hemodialysis and Ultrafiltration in Critically Ill Patients May Reflect Hemodynamics

R. Pillai, S. Chowdhury, E. Kaptein, A. Baydur

Objectives: To assess how pulse O2 saturation waveform changes correlate with volume removal during hemodialysis with UF. Rationale: Pulse oximetry is a non-invasive method for monitoring blood oxygen saturation. Patients undergoing intermittent hemodialysis (HD) with ultrafiltration (UF) frequently experience hypotension which potentially can result in end-organ injury. Prior research has shown that pulse O2 saturation waveform may correlate with intravascular volume status and fluid responsiveness. This study assessed the relationship of the pulse oximetry waveform changes to volume removal in patients before and after UF.

Methods: Pulse O2 saturation waveform were retrieved by telemetry in 46 critically ill patients before and after undergoing UF. Variation in the amplitude of the pulse O2 saturation wave was measured as the difference between end-inspiration and end-expiration as defined by \( \Delta P = \frac{(\text{max} - \text{min})}{(\text{max} + \text{min})/2} \) during one minute segments before onset and at completion of UF. We also measured the variation in the peak values of the pulse oxygen saturation (SpO2) waveform at end-inspiration and end-expiration defined as \( \Delta S = \frac{\text{(peak max) - (peak min)}}{(\text{max} + \text{min})/2} \). The net ultrafiltrate volume removed was plotted against \( \Delta S \) and \( \Delta P \). \( \Delta S \) and \( \Delta P \) values before and after UF were compared with the Wilcoxon rank sum test. The effect of positive pressure ventilation (V) and spontaneous breathing (SB) on \( \Delta S \) and \( \Delta P \) were separately assessed. Results: Pulse O2 saturation waveform data were obtained from 46 patients (spontaneously breathing = 14, ventilated = 32). Patients with 0–20 mL/kg and >20 mL/kg ultrafiltration exhibited increased variability in pulse O2 saturation peaks with respiratory variation (\( \Delta S \)) [35% (p=0.02) and 19% (p=0.001), respectively] as seen in Figure 1. \( \Delta S \) did not significantly change in patients without net ultrafiltration (p=0.34). \( \Delta S \) increased significantly after UF in patients on mechanical ventilation and breathing spontaneously (p=0.01 and p=0.002 respectively). No significant change in \( \Delta P \) was found. In spontaneously breathing patients the volume per body weight removed significantly correlated with the difference between median post-HD and pre-HD \( \Delta S \) values (\( r= -0.60, p=0.02 \)). There was no significant correlation in ventilated patients.

Conclusions: Pulse oximetry waveform variability reflects the quantity of volume removed by ultrafiltration in critically ill patients. More patients are currently undergoing \( \Delta S \) and \( \Delta P \) assessment before and after UF in our institution to assess in greater detail the influence of PPV on these variables. Monitoring these variables has the potential to predict intradialytic hypotension, shock, and end-organ injury.
Health in one touch: Assessing the use of mobile health information by patients of LAC+USC Medical Center Primary Care Clinics

First Author: Veronica Ramirez, MD

Introduction: There is significant potential for mobile health technology, such as smartphone applications and text messaging, to improve health outcomes for patients with chronic diseases. However, there is a need for further development of such mobile health technology, as well as further investigation into the clinical efficacy of such technology in improving the health of patients in lower-income communities. The purpose of this study is to investigate what type of mobile health information our patients at the LAC+USC Resident Primary Care Clinics utilize to educate themselves about managing chronic diseases, such as diabetes mellitus and hypertension.

Methods: 150 subjects, all patients of the resident primary care clinics of LAC+USC Medical Center, completed a 25-question survey June 2014 to August 2014. Surveys were delivered in the patient’s primary language. Demographic information such as age, primary language, ethnicity, annual income, and highest education level were collected. Use of mobile technology and social media, as well as patient interest in using mobile health technology were stratified by annual income and education level. Results: In terms of demographic information, 73.2% of subjects earned an annual household income of less than $20,000 per year and 67.1% of patients had obtained at least a high school diploma. Ninety percent of subjects owned a cellular phone, with 74.8% of these subjects owning a cellular phone with internet capability. 59.8% of subjects used mobile applications on their cellular phones, but only 27.5% of these individuals used mobile applications related to their health. 87.1% of subjects stated they would be interested in using a cellular phone application to improve their health, with 89.1% of respondents stating they would use this type of application either every day or every week. Patients stated they would find the mobile health application most useful for obtaining general information on medical conditions as well information to improve their nutrition.

Conclusions: Despite the majority of our primary care patients are of lower socioeconomic status, our patients utilize cellular phones with internet and mobile application capabilities to great extent. There was a wide range of education levels despite the majority of our patients meeting the federal poverty guidelines. There is substantial interest amongst our patients in using mobile health technology to both manage and prevent chronic diseases. Given that cultural, educational, and socioeconomic disparities strongly correlate with higher rates of chronic diseases such as diabetes and hypertension, access to culturally-relevant mobile health tools may help to improve health outcomes in these populations.
The MyCare pilot: Improving non-urgent ED utilization and inpatient admission through ambulatory multidisciplinary care

Schuttner, L., Henry, K., Soares, A., and Kuo, A.

**Background:** Improving hospital readmissions and non-urgent ED utilization are major current quality efforts for many national hospitals. However, few models exist that use an ambulatory-based comprehensive approach to care for chronically ill patients, despite promising potential. We developed a multidisciplinary program with nutrition, pharmacy, behavioral health, and case management to decrease ED utilization and hospital admissions for chronically ill, complex patients.

**Methods:** Patients were identified from lists of ED utilization and inpatient readmissions from two hospitals, as well as physician referral. Eligible patients were screened and enrolled in the pilot. Patients met with nutrition, behavioral health, pharmacy, and case management at an initial intake appointment, and received ongoing care as needed with each provider or were referred to longer-term resources, as appropriate. The patient’s primary care provider was notified of all recommendations and enrollment status, and continued to provide routine primary medical care. Multidisciplinary intakes and follow-ups occurred at a single ambulatory clinic setting with capacity for enhanced medical services (infusion, IV services, extended hours), with urgent care providers on site if needed during any appointment. For data analysis, the 12-month period prior to enrollment was compared to the 6-month pilot period for 30 of 42 patients (based on enrollment follow-up >30 days), with rates compared in patient-years (PY).

**Results:** A total of 42 patients were enrolled from 12/5/13 until data analysis on 8/14/14. Data from the first 30 patients was considered based on follow-up period. An additional 59 patients were screened and excluded (primary care provider ineligibility or refusal, n = 16; health condition ineligible, n= 10; patient refusal, n = 10; other, n = 23). Included patients were on average 59 years old, majority female (n = 19), Caucasian (n = 13), lived alone (n = 17), and with an average per patient of 15 types of prescription or supplemental medications. Pre-enrollment, the cohort had an event rate of 4.3 ED visits/PY, 2.0 urgent or emergency admissions/PY, 5.3 primary care visits/PY, 8.3 specialty care visits/PY, and <1 visit/PY with any social work, behavioral health, nutrition, or pharmacy provider in the ambulatory setting. During the pilot post-enrollment, the cohort had 2.4 ED visits/PY, 1.9 admissions/PY, 5.9 primary care visits/PY, 11.3 specialty care visits/PY, and between 4-8 visits/PY with outpatient behavioral health, nutrition, and pharmacy. ED disposition of an admission after an ED visit decreased from 42% pre- to 21% post-enrollment, and bed days per admission decreased from 9.1 days/PY to 8.2 days/PY.

**Conclusions:** A multidisciplinary care program for medically complex chronically ill patients targeting comprehensive health needs and care coordination reduced ED utilization by 43% and urgent or emergency admissions by 9%, while increasing use of outpatient ambulatory services during a pilot period, without prolonging or delaying necessary admissions.
Utilization of G Charts to Analyze Rare Occurrence Events in Health Care Quality Improvement

First Author: Sarthi R Shah, MD Authors: Faraz Khan Luni, Abdur Rahman Khan, William Barnett, Ragheb Assaly

Introduction: Quality improvement professionals in many industries can use statistical control charts to differentiate normal variation from real change. Most traditional process charts, such as count charts (c charts) and proportion charts (p charts) lack the power to detect low occurring events. A g chart is used to identify the interval between rarely-occurring events and is sensitive enough to detect rare events, but is seldom used by infection control practitioners. The incidence of nosocomial infections is an important quality measure across all institutions, thus we have chosen to study the incidence of both central-line-associated bloodstream infections (CLABSI) as well as catheter induced urinary tract infections (CAUTI).

Methods: We used g charts to monitor nosocomial infections. We collected the data for both CLABSI as well CAUTI. Real-time occurrences were recorded on a daily basis from October 2013 to October 2014. The date of each adverse event was recorded over time and then plotted using a geometric control chart.

Results: We recorded 8 incidences of CLABSI and 21 CAUTI. From the g chart we were able to calculate there was a 4.8% chance of recording a CLABSI and 5.3% chance to record a CAUTI per day. We found that the dates between incidences stayed close to the center line and always below the upper control limit suggesting only normal variation. We believe the g chart is an effective tool to track real time changes in nosocomial infections and should be used more frequently in the healthcare setting.

Discussion: SPC allows effective implementation of quality improvement measures. The ease of data collection and ability to interpret low occurrence rates makes g chart a powerful tool when applied correctly.

G charts detect significant changes between rare events without requiring a high sample size and large amounts of data. Each point in a g chart represents the number of day, or any unit of time, between occurrences of a rare event. Like other control charts, the g chart has a center line and upper and lower control limits. However, the lower limit is often close to zero, thus you cannot determine when the adverse rate is unusually high. Points above the upper control limit signify a period of lower than normal probability of an adverse event. These points can suggest the success of a quality improvement measure in place; they can also be designed to further study the events leading up to an adverse occurrence.
Percentage of Patients with Gram Positive Bacteremia, Meningitis, Hospital-Acquired Pneumonia, Severe Sepsis, or Septic Shock who Achieve a Therapeutic First Vancomycin Trough

First Author: Viet Tran, DO Patrick Mulroy, DO Andrew Lowe, PharmD

**Background:** The 2009 Vancomycin Therapeutic Guidelines issued by the Infectious Diseases Society of America recommend higher serum Vancomycin trough concentrations of 15-20 mg/L for seriously ill patients and patients with complicated infections such as bacteremia, meningitis and hospital acquired pneumonia caused by Staph Aureus. A loading dose of 25-30 mg/kg (actual body weight) can be considered followed by 15-20mg/ kg every 8-12 hours for subsequent doses. The first serum trough is recommended to be drawn just before the fourth dose when steady state achievement is most likely to have been obtained.

**Objective:** The aim of the study is to determine the percentage of patients with serious infections who achieve a therapeutic first Vancomycin trough with and without a loading dose.

**Methods:** A retrospective review of the medical records of Arrowhead Regional Medical Center was conducted for patients admitted between January 1st, 2009 through April 30th, 2014. Patients were included in our study if they were treated with Vancomycin for the conditions listed in the background section. Patients were required to be age = 18, creatinine = 1.5, and not pregnant. The Vancomycin trough was required to be drawn within 1 hour of the scheduled 3rd or 4th dose of Vancomycin. Data was analyzed for patients who received the standard 15-20mg/kg dosing and those with an initial loading dose of 25-30mg/kg followed by standard dosing for subsequent doses.

**Results:** Patients in the group receiving a loading dose were more likely to have achieved a therapeutic first trough than standard dosing (p<0.01). Mean trough in the standard dosing group was 11.7 with a standard deviation of 5.35. Mean trough in the loading group was 17.8 with standard deviation of 6.65. Supra-therapeutic troughs were 45% in the loading group versus 8% in the standard group.

**Discussion:** Initial selection of vancomycin dose is of critical importance when treating patients with serious and life threatening infections. Improper dosing of vancomycin may lead to potential under treatment of these infections for 36 hours before the clinician becomes aware of the mistake. This not only may have grave consequences for the patient, but also contributes to selection of bacteria resistant to Vancomycin, limiting future effectiveness of Vancomycin. Newer nomograms such as those proposed by Wesner et al utilize a loading dose and aim for troughs of 15-20 mcg/ml.
Clinical characteristics of patients diagnosed with community-associated Clostridium difficile infection

First Author: Claudia Ihm, MD Bryan Knepper MPH MSc Heather Young, MD

Objectives: Community-associated Clostridium difficile infection (CA-CDI) is increasing, and many patients with CA-CDI lack traditional risk factors. In fact, a large number of CA-CDI patients have no previous antibiotic exposure, and they tend to be younger and healthier compared to patients with hospital-associated CDI. However, risk factors for CA-CDI are not well understood. We conducted a retrospective study to determine the clinical characteristics of CA-CDI.

Methods: Patients with potential CA-CDI were identified from a database maintained for infection control surveillance at an urban hospital in Denver, Colorado, between 10/1/2012 and 9/30/2014. Patients were included if they were tested positive for C. difficile. The National Healthcare Safety Network definition was used to define CA-CDI. A chart review was conducted to determine previous antibiotic exposure. Health care contact in the 6 months prior to CDI, including hospital stay, clinic visits, acute care or ED visits, outpatient surgery <24 hr, and observation <24 hr were documented. Clinical details of the acute infection such as severity, laboratory data and other stool pathogens as well as pertinent medications and co-morbidities were recorded.

Results: 152 patients were identified with possible CA-CDI, and 124 patients were included in the study. 28 patients were excluded because of age <18 (1), negative testing (12), deficient medical records (1), previous CDI <8 weeks (5), and recent hospital stay or hospital observation >24hr (9). 54% (67/124) of included patients with CA-CDI were male, and the median age was 53 (IQR 42-61). Of 124 patients with CA-CDI, 60 patients (48%) had no antibiotic exposure within the previous 90 days. Cephalosporins (3+4 generation) were the most frequently prescribed antibiotics (25/64; 39%), followed by fluoquinolones (24/64; 37.5%). 13% of patients with CA-CDI (16/124) had no health care contact documented in the chart in the 6 months prior CDI. The median number of outpatient visits was 5 (IQR 1-9). 38/124 (31%) of patients were hospitalized within the 6 months prior to the diagnosis (median: 8 days, IQR 4-21). The majority of patients (56%) were treated as inpatient for the acute CA-CDI episode with a median hospital stay of 7 days (IQR 4-11). Only 16/124 required ICU stay.

Conclusion: Almost half of CA-CDI cases had no prior antibiotic exposure although 87% had prior health care contact. Our data suggest that relying on antibiotic exposure to detect CDI may not be sufficient. Further work, including the selection of control patients, may help determine novel risk factors for CA-CDI.
COLORADO POSTER FINALIST - RESEARCH Kara R Mizokami-Stout, MD

Evaluation of the Appropriate Use and Safety of Intravenous Levothyroxine at an Academic Medical Center

First Author: Kara R Mizokami-Stout, MD Second Author: Paul M Reynolds, PharmD Third Author: Gerard Barber, PharmD Fourth Author: Larry K Golightly, PharmD Fifth Author: Michael T McDermott, MD

Purpose of Study: Intravenous levothyroxine (IV T4) provides a rapid repletion of thyroid stores and is often used in endocrinologic emergencies such as myxedema coma. The efficacy and safety of IV T4 for other clinical conditions is uncertain. Given the cost differential, hormone repletion rates, bioavailability and half-life, a retrospective study was conducted to evaluate the usage of IV T4.

Methods: A survey was sent to the Division of Endocrinology and University Health Consortium to establish compelling indications for IV T4 in addition to the FDA indication (myxedema coma). These included: NPO greater than 3 days, cardiogenic shock, and suspected thyroid malabsorption. Hospital in-patients receiving IV T4 were retrospectively evaluated over 6 months. Patients were assessed for presence of compelling indications for IV T4, appropriate dose reduction from oral T4, and duration of IV T4. A safety analysis was conducted to describe adverse events to IV T4 at higher risk from rapid supplementation (geriatrics, history of congestive heart failure, atrial fibrillation, or coronary artery disease). A cost analysis was performed to evaluate patients without compelling indications to IV T4.

Results: 76 patients were evaluated in the study period (Table 1). Among these, there were diagnoses of 5 (6%) cases of myxedema, 3 (4%) suspected T4 malabsorption, and 2 (2.5%) cardiogenic shock. Of patients without compelling indications, 49 (79%) patients had PO access while receiving IV T4. Of patients receiving IV T4, 22% were not converted correctly from their oral form. In addition, 13.5% developed atrial fibrillation and 14% developed troponin elevations while on IV T4.

Conclusions: Evaluation of necessity for IV T4 administration revealed that use of IV T4 was often unwarranted. Further analyses projected that implementation of an order set including standardized laboratory requests and conversions of T4 dosage forms coupled with clinical decision support aimed at limiting use of IV T4 to compelling indications could result in drug acquisition cost avoidance totaling $50,820 per year in our hospital. A post intervention analysis is to follow.
CONNECTICUT POSTER FINALIST - RESEARCH Theo Borgovan, MD

The Role of Cancer Stem Cells in Gauging Follicular Lymphoma Prognosis

Theodor Borgovan, MS, MD, Xin Zhang, MD, PhD, Li Huang, John Cole, MD, Li Li, MD, PhD

**Background and Objective:** Follicular lymphoma (FL) is an indolent disease of aberrant B cells marked by a relapsing and remitting pattern, partly due to the intrinsic resistance of a cell subset termed cancer stem cells (CSC). Although patients are often responsive to initial treatment, relapse rates into a more resistant form of the cancer are significant. Median survival is approximately 10 years with or without aggressive or palliative treatment. Due to the variable course of FL, our objective is to identify FL biomarkers that are reliable indicators of disease relapse, and overall survival via a high-throughput screening using tissue microarray (TMA).

**Methods:** Pathology reports and electronic records were all queried to tabulate information on diagnosis, biopsies, and current health. This data was tabulated to create a FL patient database sorted according to survival time following diagnosis. Using this database, patient biopsies were collected to create a TMA for high-throughput immunohistochemistry (IHC) screening of putative CSC markers. Preliminary results were obtained via analyzing the CSC population of FL in a set of grouped patients (n=2, <5-year survival, >15-years survival). IHC for putative CSC markers ABCG2, Ki67, and OCT3/4 was performed via digital batch processing method using Image-Pro software and microscopy.

**Results:** 75 patients were initially partitioned into 2 cohorts: survival =15 and =5 years (n=24 and n=51, respectively). The finalized database serves as an adaptable blueprint for scrutinizing survival and for high-throughput screening of prognostic biomarkers in the form of TMA. Preliminary IHC results showed an increased expression pattern for all 3 CSC markers (ABCG2, Ki67, and OCT3/4) within a grouping of short-vs. long-survival FL patients.

**Conclusion:** Qualified prognostic markers for FL will direct clinical decision paradigms on which patients are favorable candidates for early therapy, and will offer additional insight in the development of targeted regiments and treatment protocols to ameliorate outcomes.
CONNECTICUT POSTER FINALIST - RESEARCH Kofi M Osei, MD

The impact of an awareness campaign on hospital cost reduction and redundant laboratory testing in a community teaching hospital

First Author: KOFI M OSEI, MD Virginia Cody, MD, MHS, Heather M. Gainer Huribal, MD, APRN BC, Catherine Apaloo, MD, and Forugh Homayounrooz, MD

Introduction: Health care waste, estimated at $690 billion dollars annually (2012) contributes to the rising cost of healthcare in the U.S. Unnecessary testing or diagnostic procedures accounts for between $158 billion and $226 billion (2012), with physicians being one of the drivers of this rising cost in healthcare. The ACP and AAIM have found ways to incorporate high value care (HVC) curricula in residency training programs to raise awareness of this issue. As part of a quality improvement (QI) project we assessed the impact of a computer monitor post-it to heighten awareness of HVC on cost savings and the number of laboratory tests ordered per hospital day.

Objectives: (1) To determine the absolute cost reduction (ACR) in the average cost per admission days due to CBC and BMP ordering before and after intervention. (2) To determine and compare the total number of laboratory tests (CBC and BMP) ordered per admission days, before and after the intervention. (3) To compare (1) and (2) amongst three physician groups, residents, hospitalists and private physicians

Results: There were 19,380 orders for CBC and BMP during the pre-intervention period compared to 17,848 during the post-interventional period. The ACR was 8.32 (2.95-13.70), p 0.002 with an estimated cost savings of $139,000 over the 3-month period. ACR was largest amongst the residents [ACR 17.14(4.12-30.16), p 0.01], hospitalists [ACR 13.17 (3.76-22.57), p 0.01], private physicians [ACR 4.85(-2.15-11.84), p 0.174]. The incidence rate ratio (IRR) for total number of labs per admission days was 0.98 (0.92-1.05), p 0.64 after adjusting for physician groups. Subgroup analysis showed favorable trend for residents though not significant; [IRR 0.99 (0.89-1.10), p 0.870.], hospitalist [1.04 (0.93-1.17), p 0.490] and private physicians [1.00 (0.93-1.08), p 1.00]. After adjusting for physician group CBC ordering pattern was not different pre or post interventional [IRR 1.01 (0.944-1.08), p 0.78], there was a non-significant favorable trend toward reduction in BMP orders after adjusting for physician group [RR 0.96(0.90-1.02), p 0.27]

Discussion: Our study demonstrates that a simple intervention such as post-it on HVC coupled with HVC awareness education can help reduce the cost of care. The greatest effect was seen in the resident group attesting that introducing HVC during training is likely to alter future ordering habits and help reduce the cost of care. Though there was a non-significant trend toward reduction in lab ordering, it was financially significant ($139,000). Thus minor reductions in wasteful tests are likely to produce huge healthcare cost savings. Future research should include radiologic testing. Such research in the future should adjust for disease burden in the pre-interventional and post-interventional period.

Conclusion: Low cost interventions such as post-its on HVC along with heightened HVC awareness is effective in reducing health care costs.
**Supersize This - Improving Resident Communication about Obesity in the Outpatient Clinic**

First Author: Nirmol Philip, MD Tara Edwards-Booker DO, Matthew Lunser DO, Jung Kim RN, Evalyne Mwangi RN, and Dennis Shaw, PA-C, Edward Ewen MD

**Introduction:** Obesity is growing faster than any public health issue, and obese patients incur up to a 46% increase in inpatient costs. While physician discussion of healthy weight during office visits is critical, research demonstrates that the most effective behavioral weight loss treatments involve in-person, high-intensity, comprehensive programs provided by trained interventionists. This study aimed to 1) understand how often obesity is addressed by internal medicine residents in the outpatient setting; and 2) increase resident discussion of weight loss with obese patients by 50% over a two week period, through resident education and provision of a weight loss referral guide.

**Methods:** We conducted the study at the Adult Medicine Office (AMO), which is staffed by approximately 65 internal medicine residents and additional faculty and cares for >3,500 patients. Nearly half (48%) of AMO patients are obese (defined as body mass index (BMI) ≥30, compared to the national average of 33%. We surveyed residents initially to measure their self-reported frequency of weight loss discussions with obese patients.

During a two-week pre-intervention period, using our electronic medical record we measured whether residents documented obesity as a problem addressed during the office visit, which served as a proxy for discussion of obesity. We re-measured this documentation during a two-week post-intervention period, and compared the two periods using the Mantel-Haenszel chi square test. Our intervention involved creating a brochure with local weight loss resources that included descriptions, costs and contact information. We also launched a “BMI >30? Refer!” campaign, featuring a 10-minute presentation to residents about the intervention, the costs and morbidities associated with obesity, and the important role physicians can play in helping patients achieve effective weight loss.

**Results:** Of the 57 residents surveyed, over two-thirds admitted to addressing weight loss in obese patients less than 20% of the time during an office visit. Time limitations were cited as the major reason (37%). Of 276 obese patients seen during our pre-intervention period, residents listed obesity as a problem 7.9% of the time. During the post-intervention period, 257 obese patients were seen with documentation of obesity increasing to 14.8% (p=0.01).

**Conclusion:** Providing residents with education and information about community weight loss resources increased the frequency of obesity discussions with patients. Not only did our intervention directly address the time limitation cited by residents as a frequent barrier, but the information provided to patients can help connect them with multi-faceted programs that research has shown to be effective for weight loss.
Reflex to Urine Culture: Truncating the Time Taken to Transport the Tinkle to the Testing

First Author: Xian Qiao, MD Joseph Santora, DO Gealina Dun BS MS3 Kavita Patel, PharmD Alicia Edelblute, PA-C Nora Protokowicz, MSN, RN Allison Steuber, MSN, RN, CEN Loretta Consiglio-Ward, MSN John Powell, MD

Introduction: Complicated urinary tract infections (UTIs) are a common reason for Emergency Department (ED) visits, often leading to the initiation of empiric broad-spectrum antimicrobials and admission to the hospital. In our institution, if urine cultures are not ordered within two hours of the urinalysis (UA), the samples are discarded and must be recollected. This delay in urine culture plated times can often lead to prolonged use of empiric antimicrobials, along with patient and staff dissatisfaction. We sought to improve the delay in culture results by optimizing the time between UA and urine culture plating times.

Methods: Prior to our intervention, we determined the mean and median times between UA and culture plating time for 50 males presenting with symptoms of UTI over a 2-week period. We defined a positive UA per modified Centers for Disease Control and Prevention (CDC) surveillance criteria (positive nitrites, positive leukocyte esterase or presence of organisms). Working with our ED physicians and laboratory technicians, we implemented a method to automatically send (reflex) positive UAs for culture. Providing daily education to our laboratory staff, we tested this reflex method for a two-week period. We compared the mean and median times between urinalysis and urine culture to our baseline data.

Results: Among the pre-intervention group (n=50), the time between UA and culture plating ranged between 31–1020 minutes, with a median time of 128 minutes, and an mean time of 234 minutes. During the intervention, 35 UAs were successfully reflexed. The UA to culture plating time ranged between 28-388 minutes; the median time was 65 minutes and the mean time was 85 minutes. This represented a reduction of 49.2% and 63.7% in median and mean times, respectively. Overall, 83% of the reflex urine cultures were under the 2-hour criteria, compared with just 46% at baseline.

Conclusions: Reflexing reduced the time between urinalysis and urine culture at our institution. The impact of our intervention on the overall cost, initiation and duration of antimicrobials, and patient and staff satisfaction remains uncertain. Multiple studies have shown that correctly tailored antibiotic use can decrease mortality, length of hospital stay, and overall healthcare cost. Determining the impact of the intervention on our patient population will be the next step in our study.
Positive predictive value of elevated troponin for diagnosis of acute coronary syndrome

Lucas A. Burke MD, Nayan Agarwal MD, Carsten Schmalfuss MD, David E. Winchester MD

**Background:** Cardiac troponins are highly sensitive for detection of myocardial necrosis and considered the reference standard for diagnosing acute coronary syndromes (ACS). Due to high sensitivity and widespread use in patients with low likelihood of ACS, the positive predictive value (PPV) of elevated troponin for determining ACS may be limited. There is little evidence in the medical literature pertaining to the positive predictive value of troponins after evaluation by a Cardiologist.

**Methods:** From 2006-2007, all patients with elevated troponin ( > 0.01 ng/dL) at our facility were evaluated by an attending cardiologist within 24 hours of a positive troponin in order to determine the presence or absence of ACS. Patients were then tracked during their hospitalization and relevant data were gathered prospectively in a database maintained for quality purposes. We conducted a cross sectional investigation of patients in this database to ascertain the PPV of elevated troponin for diagnosing ACS. Baseline characteristics and symptoms for patients with and without ACS were compared. Multivariate logistic regression was performed to determine correlations between the diagnosis of ACS and patient characteristics, symptoms and other objective findings.

**Results:** 1018 patients were included. Mean initial troponin value was higher for patients with ACS (0.42 versus 0.13, p < 0.0001). Overall, the PPV of elevated troponin for diagnosing ACS was only 29.8%. The PPV varied widely depending on the initial symptom reported (highest, chest pain 48.8%; lowest, low energy 2.3%). Few patient characteristics were correlated with ACS, including smoking (odds ratio [OR] 5.71, 95% confidence interval [CI] 3.50-9.31, p < 0.0001), and hyperlipidemia (OR 1.64, 95% CI 1.24-2.17, p=0.001). New electrocardiogram changes (OR 6.44, 95% CI 4.37-9.50, p<0.0001) and troponin value greater than 10 fold above upper limit of normal (OR 7.10, 95% CI 3.40-14.81, p<0.0001) were correlated with ACS. The only symptom correlated with ACS was chest pain (OR 5.00, 95% CI 3.51-7.14).

**Conclusion:** Elevated troponin alone has weak PPV for diagnosing ACS when adjudicated by an attending cardiologist. Troponin elevations were observed with various presenting symptoms, and the PPV was dependent on chief complaint. New electrocardiogram changes, level of troponin elevation, chest pain, and smoking were strongly correlated with the diagnosis of ACS. This is a unique report evaluating the positive predictive value of troponins in all comers who were followed prospectively by a Cardiologist.
Clinical Laboratory Practices in Speciating Organisms and Reporting Results of Voided Urine Cultures

First Author: Maroun Sfeir, MD Thomas Hooton, MD

Background: Studies comparing midstream voided and catheter urine specimens in symptomatic women have shown that colony counts of *E. coli* as low as $10^2$ CFU/mL in midstream voided urine (MSU), even when in mixed growth, are predictive of bladder infection. Given that clinical laboratories generally do not quantify organisms in MSU cultures to this level, the use of MSU cultures in the diagnosis of cystitis may lead to inappropriate interpretation of culture results. We queried laboratories to ask about their MSU culture and reporting practices.

Methods: A convenience sample of clinical microbiology laboratories in Miami, Florida, and nationally were queried. We called the laboratories to ask the microbiology laboratory manager and/or the clinical microbiologist about their practices in speciating and reporting results of MSU cultures and to send us any written algorithms relevant to such practices.

Results: We queried 11 local and 3 national clinical microbiology laboratories for our study. We were able to talk by telephone with laboratory personnel in all 14 laboratories to obtain study information, but only 8 laboratories sent us their MSU culture algorithms. No laboratory refused to provide us with information. Results are shown in the Table.

Table: Species identification and reporting of organisms growing in MSU.

<table>
<thead>
<tr>
<th>No. organisms grown and colony counts</th>
<th>No. (%) of labs speciating and reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 or more organisms at any colony count</td>
<td>0 (0)*</td>
</tr>
<tr>
<td>2 or less organisms, CFU/mL for either or both</td>
<td>14 (100)</td>
</tr>
<tr>
<td>• More or equal to $10^4$ CFU/mL</td>
<td>1 (7.1)†</td>
</tr>
<tr>
<td>• $10^3$ - $&lt;10^4$ CFU/mL</td>
<td>0 (0)‡</td>
</tr>
<tr>
<td>• $&lt;10^3$ CFU/mL</td>
<td></td>
</tr>
</tbody>
</table>

*9 laboratories report such cultures as “mixed flora”, 3 “contaminated urine” and 2 “multiple organisms present”; 5 of 14 also suggest to repeat the specimen

†4 other laboratories report growth at $10^3$ - $<10^4$ CFU/mL but don’t speciate; 9 report as “no growth”

‡9 report “no growth”; 5 report “$<10^3$ CFU/mL of unidentified organism”

Conclusion: Only one of 14 clinical microbiology laboratories speciate and report organisms in MSU if 2 or less organisms grow at $10^3$-$<10^4$ CFU/mL, and none do if 3 or more organisms grow at any colony count. Lack
of awareness by clinicians as to how their clinical microbiology laboratory reports MSU results may result in misinterpretation of such results, including underdiagnosis of low colony count or mixed growth \emph{E. coli} UTIs.
College Education is an Independent Predictor of Survival in Patients with Heart Disease or Cardiovascular Risk Factors Who Undergo Left Heart Catheterization

First Author: Mosaab Awad, Salim S. Hayek, Yi-An Ko, Badr Harfouch, Andrea D. Soto, Adithya Yadalam, Aneese Chaudhry, Kareem Hosny, Natasha Anoka, Ganiat O. Adeogun, Kirandeep Dua, Sean T. Healy, Arshed A. Quyyumi

Introduction: Population level studies have shown a strong association between socioeconomic status and survival in patients with coronary artery disease (CAD). In industrialized nations, individuals with lower education, lower income, and blue collar occupations have higher mortality rates. Whether the level of education is an independent predictor of survival in patients with CAD is however unclear. We hypothesized that patients with CAD and a history of college education will have improved long-term survival compared those who did not receive any college-level education level independent of traditional cardiovascular risk factors.

Methods: 5552 patients who underwent left heart catheterization (LHC) between 2004 and 2013 at 3 different sites of the Emory Healthcare system were recruited after informed consent as part of the Emory Biobank prospective cohort. Demographics, education level and clinical characteristics were collected using questionnaires as well as medical record review. Enrolled patients were followed-up at 1 and 5 years post-LHC, for collection of outcomes. Information on death was obtain through family contact, medical record review and social security death index search. For the purpose of analysis, patients were stratified by education level as a binary variable (with or without college education). Demographics and clinical characteristics were compared. Multivariable survival analysis was performed using Cox regression, adjusting for age, race, employment status, history of smoking, diabetes mellitus, history of myocardial infarction, and presence of >50% stenosis of any major vessel of LHC.

Results: The cohort consisted of predominantly older (63±12 years), male (64%), white (76%) patients with CAD on LHC (65%). Over half (57%) of patients had at least some level of college education. Those with college-level education were more likely to be male (69% vs 59%), white (82% vs 76%), with less smoking (53% versus 63%) and had lower prevalence of CAD (63% vs 67%) as well as diabetes (32% vs 38%) and hypertension (68% vs 62%), p<0.001 for all comparisons. By the time of writing there were 737 deaths in the cohort, 337 in the college education group with a mean survival of 8.5 years post-LHC (95%CI 8.2-8.7) and 400 in the no-college group with a mean survival if 7.8 years (95%CI 7.6-7.9), Log-rank p<0.0001. On multivariable analysis, college education status imparted a HR of 0.69 (95%CI 0.59-0.81), p<0.0001 after adjusting for the aforementioned confounders.

Conclusions: Older patients with CAD and a history of college education had a lower burden of cardiovascular disease compared to those without a college education. Most importantly, college education as a discrete indicator of socioeconomic status was an independent predictor of survival in this cohort. While the reasons underlying this is unclear, one may speculate that college education imparts better awareness of their clinical condition, leading to better compliance with medication regimen and lifestyle changes.
Performance of Oxygen Saturation Index in Adults with Type 1 Respiratory Failure

Anthony Otekeiwebia MD, Oluwatosin Ajao, MD., Iwayemi Olayeye MD., Marilyn Foreman FCCP.

Introduction: Given recent advances in technology, pulse oximetry is increasingly taking the place of arterial blood gas monitoring as a noninvasive marker of lung disease severity in patients with hypoxemic respiratory failure. Our objective was to examine the performance of oxygen saturation index (OSI): (FiO₂×mean airway pressure)/SPO₂ to oxygenation index (OI): (FiO₂×mean airway pressure)/PaO₂ in a cohort of adults with type 1 respiratory failure.

Method: We performed a retrospective analysis of 127 mechanically ventilated patients admitted to our ICU with hypoxemic respiratory failure between 2010 and 2013. Simultaneous blood gas, pulse oximetry and ventilation settings were retracted from the database. PaO₂/FiO₂ ratio (PF), OSI and OI were calculated. A linear mixed modeling was used to derive predictive equation for OSI between OI and OSI. Model performance was evaluated using the areas under receiver operating characteristic curves for diagnosis of PF ratio = 100, 200, and 300.

Result: Four hundred and forty one blood gas and Spo2 values from 127 patients were included. OSI had a strong linear association with OI, given by the equation OSI = 0.6075 X OI + 3.4489 (R² = 0.882, P<0.001, 95% CI 0.587-0.628). Oxygen saturation index as measured by (FiO₂×mean airway pressure)/SPO₂ values for OI of 5.3 and 8.1 were 6.7 (95% confidence interval [CI], 6.56-6.77) and 8.4 (95% CI, 8.20-8.52). OI cut off for severe hypoxemia; defined as PF=100 was 12.8 (sensitivity 94.2% and specificity of 90.1%). A corresponding OSI for OI of 12.8 was 11.2 (95% CI, 10.96-11.49). Areas under receiver operating characteristic curves for diagnosis of PF ratio less than 100, 200, and 300 with the OSI were 0.922, 0.869, and 0.787 respectively.

Conclusion: Oxygen saturation index is an adequate noninvasive surrogate marker of oxygenation dysfunction among adults with Type 1 Respiratory Failure and would be a good substitute for oxygenation index in adults with acute hypoxemic respiratory failure.

Study Implication: Oxygen saturation index has demonstrated to be an equally reliable marker of oxygenation dysfunction in adults. This would perhaps decrease the need for invasive oxygen monitoring in critically ill patient with hypoxemic respiratory failure.
Circulating progenitor cells are an independent predictor of coronary artery disease progression

First Author: Ayman Samman Tahhan 2nd Author: Salim Hayek 3rd Author: Muhammad Hammadah 4th Author: Danny J Eapen 5th Author: Riyaz Patel 6th Author: Arshed Quyyumi

Background: The pathophysiology of coronary artery disease (CAD) progression in patients on optimal medical therapy is not fully understood. CXCR4/CD34 is expressed on progenitor cells (PCs) and plays an integral role in their homing and mobilization. We hypothesized that progression of CAD will be greater in patients with lower levels of PCs.

Methods: We studied 103 patients, recruited from the Emory Cardiovascular Biobank, with significant CAD (at least one vessel = 50% stenosis on angiography) documented by two or more angiograms at least 6 months apart. Mononuclear cell levels (CD45 medium) with CXCR4/CD34 ligand were enumerated using flow-cytometry microbead approach on the day of the angiography. Gensini coronary severity scores (GS) were calculated for each angiogram and progression was assessed using net change of GS per year. Patients were categorized as “progressors” if they had an absolute net increase of 5 units per year in the GS. Regression models were adjusted for established CAD risk factors, prior myocardial infarction (MI), baseline GS, and number of stents. Patients with acute MI were excluded. C-Statistic was calculated for a model of established risk factors with and without PCs levels.

Results: The mean age of the cohort was 69 ± 11 years (74% were males, and 56% had history of prior MI) with a mean duration between angiograms of 6.7 ± 4 years. Patients with CAD progression 37/102 (36%) displayed lower levels of PCs with a median of 731 cells/milliliter (482-1456) as compared to non-progressors with a median of (960 cells/milliliter (751-1587), p = 0.03). For each 10% reduction in PCs, the risk of having progression increased by 9.1% (p=0.013). The C-statistic improved over a model of established risk factors from 0.715 to 0.776 (p= <0.01) with the addition of PCs counts.

Conclusions: In individuals with significant CAD on medical therapy, low levels of circulating CXCR4+/CD34+ expressed on mononuclear cells are associated with progression of CAD.
Provider Orders for Life-Sustaining Treatment (POLST) Implementation and Training in Nursing Facilities in Hawaii

Pamela Sebastian, MBBS, MD; Elizabeth Freitas, APRN, OCN, ACHPN; Daniel Fischberg, MD, PhD

BACKGROUND A POLST document transforms medical wishes for end-of-life care into actionable medical orders. POLST programs have grown across the United States since 1991. This study was conducted to assess the extent of POLST implementation amongst nursing facilities in Hawaii. The Hawaii statute governing POLST was revised as of July 1st 2014 allowing APRNs, in addition to physicians, to sign the POLST document. Hence we also wished to assess POLST training across nursing facilities.

METHOD We performed a telephone survey using a modified instrument1. The survey instrument included questions about facility size, advance care planning processes, POLST training procedures, and the percentage of the units of the facility that had implemented a POLST program. A list of registered nursing facilities in Hawaii was obtained from the Department of Health website. Data were collected in July 2014 and results were tabulated for analysis. The study was approved by the Queen’s Medical Center and University of Hawaii Institutional Review Boards.

RESULTS Thirty-nine nursing facilities in Hawaii were called to participate in the study, of which 23 responded (59% response rate). The majority of the facilities (74%) were of moderate size (50-150 residents). All but one facility had a POLST program in place. Social workers and/or nursing staff usually held the POLST discussions. Thirteen of the 23 (57%) facilities had at least one APRN provider, of which 8 had APRNs involved in POLST discussions. In all but one instance, APRNs were also signing the document. The percentage of the units of the facility using POLST was reported to be over 50% for 20 out of 23 (87%) of nursing facilities surveyed with 10 (43%) of them reporting achieving 100% implementation rates. All facilities surveyed stated that their target implementation rate was 100%. Individualized counseling and facility-developed educational materials were the main methods of communicating and educating residents about POLST. Most facilities held training seminars on the POLST program with social workers and nurses being the focus for staff trained.

CONCLUSIONS The results of this study demonstrate significant penetration of the Hawaii POLST program into the nursing home community. All except one of the nursing facilities surveyed had a POLST program in place and of these most of them achieved over 50% implementation rates throughout the facility. Most nursing facilities required staff to undergo POLST training which largely targeted social workers and nursing staff. Some facilities reported APRNs are already involved in signing the POLST form, only weeks after their signatory capacity was enacted.

Correlation between Blood Glucose levels and duration of Mechanical Ventilation

First Author: Pakhadi H Buddhadev, MD, Mihir Shah, MD, Kushal Naha, MD, Jeffery Brower, MD, Harvey Friedman, MD.

Introduction: Uncontrolled hyperglycemia has been associated with poor outcomes in patients admitted to the Intensive Care Unit (ICU), but its impact on ventilator dependency in patients with exacerbation of chronic obstructive pulmonary disease (COPD) and/or congestive heart failure (CHF) is unknown. We conducted a retrospective study to determine whether an association exists between blood glucose levels and duration of mechanical ventilation in this population of patients.

Methods: Patient charts were reviewed using Electronic Health Record (EHR) system. Subjects admitted at St Francis Hospital between January 2011 and December 2012 with a diagnosis of COPD and/or CHF exacerbation and were intubated within 48 hours of presentation were included in the study. Patients requiring vasopressors and/or tracheostomy, pregnant patients, patients younger than 18 years of age and patients who did not survive were excluded. Subjects were divided into three groups based on mean fasting glucose levels: 70-110 mg/dl (group 1), 111-150 mg/dl (group 2) and >150 mg/dl (group 3). Clinical data and laboratory parameters including steroid usage, history of smoking, BNP level at admission and therapy with bronchodilator and diuretic was recorded for all the patients. Hypoglycemic episodes were also noted if any. The primary end point was defined as successful extubation. Data analysis was performed using SPSS software with one-way ANOVA test, chi-square test, Spearman correlation and multinomial regression analysis.

Results: Forty eligible patients were included in the study with six, fifteen and nineteen patients in groups 1, 2 and 3 respectively. ANOVA test showed statistically significant difference in mean duration of ventilation between the three groups (1.67±0.8 vs 2.87±1.8 vs 4.05±2.5; p=0.047), as well as significant difference in BNP level at admission (p=0.027). Multinomial regression analysis confirmed independent association between blood glucose level and duration of ventilation. Spearman test also showed positive correlation between duration of ventilation and mean fasting blood glucose (R=0.52, p=0.001).

Conclusion: Blood glucose level is independently associated with duration of mechanical ventilation in patients with COPD and/or CHF exacerbation, with a positive correlation between rising blood glucose levels and prolonged need for ventilation. Hyperglycemia increases the chances of developing sepsis and critical illness neuropathy, which is related with increased duration of mechanical ventilation. Our study showed that blood glucose above 150 mg/dl was associated with an increased duration of mechanical ventilation.
ILLINOIS POSTER FINALIST - RESEARCH Briana T Costello, MD

IF YOUR PATIENT HAS-BLED, DID YOU CALCULATE THE CHA2DS2-VASc SCORE?

Briana T. Costello MD, Jordan Harris MD, Jason Rodriguez MD, Ann Goh MD, Sarah Alexander MD, Kousik Krishnan MD, FACC, FHRS

Introduction: An estimated 2.66 million people had atrial fibrillation (afib) in 2010 and this number is projected to grow to nearly 12 million by 2050. Physicians deal with afib often in their clinic and the hospital setting. While stroke risk from afib gets more attention, one cannot ignore the major bleeding risk associated with anticoagulation. Stroke risk is widely assessed through the use of CHADS2 or CHA2DS2-VASc scoring. The HAS-BLED scoring system is validated tool used to assess one-year major bleeding risk. These two scores together can aid in the decision to start anticoagulation. It is hypothesized that incomplete assessment of stroke and bleeding risk results in inappropriate clinical decisions.

Methods: Retrospective chart review was conducted on 250 consecutive patients with afib admitted to a tertiary medical center. CHA2DS2-VASc and HAS-BLED risk factors, medication regimens on admission and discharge, and warfarin teaching occurrence were collected. Risk scores were calculated.

Results: Stroke and bleeding risk were documented for 53% and 4.8% of patients, respectively. Averages for CHADS2, CHA2DS2-VASc, and HAS-BLED score were 2.52, 3.7, and 2.57 respectively. On admission, 60% of patients with CHADS2 score greater than HAS-BLED score were on anticoagulants; 46% of patients with HAS-BLED score greater than CHADS2 were on anticoagulants. On discharge, 73% of patients with CHADS2 greater than or equal to HAS-BLED were on anticoagulants; 51% of patients with HAS-BLED greater than CHADS2 were on anticoagulants. Patients at risk for stroke (no anticoagulation with CHADS2 = 2) improved from 40% on admission to 27% on discharge. Fifty percent of patients with HAS-BLED scores greater than CHADS2 were discharged on anticoagulation. Average annual stroke risk for the patient populations was 4-6% and annual bleeding risk was 1.8-3.7/100 patient years (2-3% per year). Warfarin teaching was documented in 34% patients.

Discussion: This analysis supports that physicians document stroke risk much more frequently than bleeding risk and that decision making to start anticoagulation is still not ideal when comparing the bleeding and stroke risk. Many patients with bleeding risk greater than stroke risk were started on anticoagulation while bleeding risk is often not documented. These findings reveal a potential gap in our clinical decision-making and present an area for quality improvement. To address this, the authors created an afib order set to be used in the electronic medical record with mandatory documentation of CHA2DS2-VASc and HAS-BLED scores. Included are definitions and parameters of each scoring system and each score’s risk. Atrial fibrillation medications, pertinent labs and patient teaching are also included. It is the authors’ hope that this intervention will reinforce the need to address both bleeding and stroke risk before starting anticoagulation. A retrospective analysis to evaluate effectiveness of this quality measure will take place in the future.
ILLINOIS POSTER FINALIST - RESEARCH Manjusha Das, MD

Antibiogram of VRE causing Urinary Tract Infections as a retrospective study from MMC, Springfield Illinois

Das, Manjusha M.D., Sundareshan, Vidya M.D. M.P.H, Southern Illinois University

The prevalence of Vancomycin-resistant Enterococci (VRE) has steadily been increasing in the hospital setting for nosocomial infections. Data from the Centers for Disease Control and Prevention reported that during 2006 and 2007, 30% of all enterococci infections within hospitals in the United States are VRE. Of the total percentage of VRE, approximately 80% are species E. faecium. The objective of our study was to determine the prevalence of VRE at our institution and determine the best therapy for treatment based on the susceptibilities to a panel of antimicrobials.

We performed a retrospective analysis of any enterococci isolate found in the urine from August 2012 to August 2014 at Memorial Medical Center, in Springfield Illinois. The microbiology department used the VITEK system which is a microbial identification system to determine the susceptibilities to each of the isolates found. The isolates were then broken down into those susceptible and those resistant to a select group of antimicrobials, thus generating an antibiogram for each isolate. The antimicrobials which were tested included: gentamicin, streptomycin, nitrofurantoin, daptomycin, linezolid, ciprofloxacin, levofloxacin, erythromycin, tigecycline, tetracycline, and doxycycline. The results showed a total of 180 enterococci isolates collected from in urine cultures. Of these 180, nearly 60% were E. faecium and 40% were E. faecalis. Of the E. faecium group 94% were resistant to ampicillin and 100% produced beta lactamase. From the E. faecalis group 100% were susceptible to ampicillin and 100% were beta lactamase producers. Further data analysis is currently in process to stratify which of these isolates were symptomatic UTIs versus colonization as well as which antibiotic was used for treatment.

Our results so far are comparable to those found nationally, where E. faecium was the predominant organism isolated which was also found to be more resistant to ampicillin compared to E. faecalis. Daptomycin is the preferred agent for treatment of ampicillin resistant VRE, however there are many downsides to the use of it. There is a lack of FDA approval for E. faecium infections, and inability to concentrate in the genitourinary system. Other antibiotics have the risk of toxicity the drug interactions, and the cost limit the use of linezolid and quinuprisitin/dalfopristin in treatment of VRE, especially with prolonged use. Ampicillin resistant strains, which produce beta lactamase, can be treated with ampicillin with sulbactam, and aminopenicillins should be considered first-line therapy for empiric treatment of ampicillin sensitive enterococcal UTIs, with the exception of penicillin allergy or recent E. faecium infection. Further research is to be completed in evaluating overall outcomes in those enterococci infections which were treated but the results will help in VRE associated UTI treatment guidelines. This would ideally aid in clinician awareness, supporting antimicrobial stewardship goals, and in treatment direction.
Preparing for the Primary Care Clinic: An Ambulatory Boot Camp for Internal Medicine Interns

Lindsay Esch MD, Amber Nicole Bird MD, Julie Oyler MD, Wei Wei Lee MD, Sachin Shah MD, Amber T. Pincavage MD

Background: Fourth year medical students often have limited exposure to primary care education in their last year of medical school and interns often report being unprepared to start internal medicine continuity clinic. Although boot camps have been used at the beginning of post-graduate training programs to improve preparedness and clinical skills for clinical work, there has not been adequate research regarding how to best prepare interns for primary care clinic. Thus, we created and implemented an ambulatory boot camp.

Aim: To implement and assess the impact of an intern ambulatory boot camp on primary care knowledge, confidence, and curricular satisfaction.

Methods: During July 2014, 38 internal medicine interns attended ambulatory boot camp prior to starting primary care clinic. The boot camp included one half day of clinically focused case-based didactic sessions on common ambulatory topics including diabetes, hypertension, hyperlipidemia, health maintenance screening, shoulder pain and knee pain. This was followed by another half day of orientation to the clinic, outpatient team and EMR. To evaluate the curriculum, interns anonymously completed a 15 question pre-test on topics covered in the boot camp and were re-assessed with an identical post-test after the boot camp. The interns were also surveyed regarding their confidence, satisfaction with the boot camp experience and exposure to ambulatory education in medical school.

Results: There were 38 interns who participated in boot camp and all (100%) completed tests and surveys. Prior to the boot camp, few interns reported confidence managing common outpatient conditions: 55% for hypertension, 50% for hyperlipidemia, 42% for health maintenance screening, 32% for diabetes, and 11% for musculoskeletal complaints. Only 15% of interns felt they had received sufficient training in medical school to manage primary care patients. On average, the interns reported 2.9 months of primary care clinic rotations during medical school. At the time of boot camp, it had been 15 months since their last primary care clinic experience on average. The average pre-test knowledge score was 6.95/15 (46.3%). After the boot camp, the average post-test knowledge score significantly improved to 11.42/15 (76.1%) (p<0.001). After completion of the boot camp, 100% of interns reported that the boot camp was good preparation for ambulatory clinic, 100% felt that ambulatory boot camp should be a required component of internship, and 97% felt that the lectures boosted their confidence in managing common conditions encountered in the primary care clinic.

Conclusions: The intern ambulatory boot camp improved intern knowledge of commonly encountered medical topics in the primary care clinic. The participants thought it was good preparation for the ambulatory clinic and it should be a required component of internship. The intern ambulatory boot camp may be an effective way to improve the preparation of interns for primary care clinic.
ILLINOIS POSTER FINALIST - RESEARCH Adriana G Olariu, MD

Risk of Crohn’s Disease Recurrence after Surgical Resection: Implications of Tobacco Use and Preoperative Corticosteroids

First Author: Adriana G Olariu, MD 1,2 Richard Hodin, MD 2 Liliana Bordeianou, MD 2 1, Department of Medicine, Resident, Louis Weiss Memorial Hospital, Chicago, IL 2, Department of Surgery, Massachusetts General Hospital, Boston, MA

Introduction: Up to 30% of patients with Crohn’s disease (CD) experience postoperative recurrence within 1 year after ileocolonic resection (ICR). We sought to describe the patterns of recurrence and identify the prognostic factors associated with higher risk of clinical recurrence (Harvey-Bradshaw index \(\geq 8\)).

Methods: A total of 170 consecutive CD patients (2008-2014) treated with ICR at Massachusetts General Hospital were included. Outcomes including endoscopic, clinical and surgical recurrence were recorded. Cox proportional hazard regression models were used to identify the clinical, pathological, and environmental variables that predict clinical recurrence.

Results: After a median follow-up of 30.5 months (interquartile range, 10.8-51.75 months), 103 patients (58.9%) developed disease recurrence. Endoscopic recurrence was identified in 89 patients (50.3%), and confirmed by biopsy in 70 patients (78%). Clinical recurrence occurred in 53 (30.3%) of all patients and 10 patients (5.7%) required a new surgical intervention for their disease. Cox regression models identified 4 variables associated with increased risk of clinical recurrence: smoking in the 6 months prior to surgery (HR=2.36, 95% confidence interval [CI] 1.32-4.23; P=0.03), presence of comorbidities (Charlson Comorbidity Score \(\geq 1\); HR=1.98, 95% CI 1.09-3.57; P=0.02), preoperative use of corticosteroids (HR=2.07, 95% CI 1.15-3.71; P=0.01) and inflammation at the resection margin (HR=2.06, 95% CI 1.12-3.79; P=0.02). The effect of preoperative corticosteroids use was dose-dependent (HR=1.76-6.78, P<0.001). Disease location, behavior, and history of prior resection did not increase the risk of recurrence (P>0.1, all).

Conclusion: Corticosteroid-dependent CD patients appeared to have higher risk of postoperative clinical recurrence, with risks increasing further in smokers with medical comorbidities and positive inflammation at margins. It remains unclear whether corticosteroid taper prior to surgery would make a difference in recurrences, though dose-dependent corticosteroid effect is suggestive of this possibility.
Rates of infection for single vs multilumen peripherally inserted central catheter: A systematic review

First Author: Karthik Ragunathan, MD
Other Authors: Nikhil Kalva MD, Lori Grooms RN, John Farrell MD

Background: Central line associated blood stream infection (CLABSI) related to peripherally inserted central catheter (PICC) are associated with prolonged hospital stay, hospital readmissions, intravenous antibiotics and repeat procedures which can result in unnecessary costs to the healthcare system. Data regarding the CLABSI rates in PICC based on the number of lumens are available in very few studies. However there is no systematic review comparing infection rates between single and multi lumen PICC.

Objective: To determine if multilumen PICC carry higher risk of CLABSI when compared to single lumen PICC

Design: MEDLINE, EMBASE, and SCOPUS were searched to identify potential articles published from 1946 to October 2014. MeSH headings included in the search were peripherally inserted central catheter, PICC, infection, CLABSI, lumen. References from the identified articles were also reviewed. Studies comparing the prevalence of CLABSI among single-, double-, and triple-lumen PICCs were included. Studies that reported infection rates in only one type of PICC lumen, studies reporting infections in central line infections other than PICC were excluded.

Patients: Adult patients in inpatient and outpatient settings who received a PICC line.

Main Outcome Measurement: odds ratio of CLABSI rates in multi lumen vs single lumen PICC

Results: 360 articles were identified from the literature search, out of which 40 articles were selected from further review. A total of 5 articles met the inclusion criteria. Total number of patients who were included in the analysis under single, double and triple lumen categories altogether was 5966. All the 5 studies reported CLABSI rates in inpatient setting and four of the five studies were from patients admitted to large tertiary care referral hospital. CLABSI was more common in triple lumen (summary odds ratio, 5.5; 95% confidence interval 3.8 to 7.9) when compared to single lumen. Similarly, CLABSI was more common in double lumen (summary odds ratio, 2.0; 95% confidence interval 1.4 to 2.8) when compared to single lumen PICC. Both the results were statistically significant (p<0.0005)

Limitations:

1. No randomized studies available.
2. Studies are predominantly from large tertiary care referral hospitals and may represent a high risk population.
3. No published studies reporting CLABSI rates in outpatient settings.

Conclusion: Multilumen PICC is associated with a higher risk of infection when compared with single-lumen PICC. Applying the results of this systematic review to clinical practice can help physicians and residents to reduce the unnecessary costs associated with CLABSI from PICC. Although multi lumen PICC provide more convenience for drug administration and blood draws, clear justification should be applied
before choosing multi-lumen catheters in place of single lumen catheters to reduce the infective complications.
Impact of Evidence-Based Guidelines for Management of Clostridium Difficile Infection

Emily Cochard, MD Carol Rupprecht, MD Stephen Knaus, MD Lindsay Saum, PharmD

Clostridium difficile infection (CDI) is a prevalent and potentially fatal cause of infectious diarrhea in hospitals, thus responsible for a significant cost to the healthcare system and adverse patient outcomes.

In order to follow best evidence for treatment of CDI and improve quality care and patient outcomes, a group of internal medicine faculty, residents and pharmacists reviewed relevant literature to devise a set of evidence-based diagnosis and treatment guidelines for the teaching hospitalist service. These guidelines were publicized via a noon conference, an email, an internal website and a resident handbook. The guidelines emphasized severity-based treatment and provided institution-specific guidance for infection control and diagnosis of CDI. We analyzed data on all patients (79) treated for CDI at our hospital in a three-month period after publication of the updated guidelines in 2013. Outcomes examined included length of stay after diagnosis (mLOS), mortality, cost and readmission rate in the group of patients treated with guideline-based therapy and those not treated with guideline-based therapy. For patients treated with guideline-based therapy, the mLOS was shorter (7.45 days vs. 7.9 days), 30-day readmission rate was lower (29% vs. 38%), and mortality rate was lower (3.2% vs. 6.3%). Cost in the group treated with guideline-based therapy, however, was higher. None of these results reached statistical significance. The patients in the group treated with guideline-based therapy were more ill, as evidenced by a higher risk of mortality index. Interestingly, despite the educational resources provided, resident and hospitalist physicians followed guideline-based therapy only 45.2% of the time.

Residents (11 respondents) were surveyed after the most recent conference on the CDI guidelines. On a 5-point Likert scale, residents reported that the conference was educationally beneficial (4.18) and that attending the conference would change their management (4.36).

This study analyzed the effect of a best-practice guideline for treatment of CDI on patient outcomes and educational benefit within a hospitalist service in a teaching hospital. We discovered trends toward improved outcomes, but they did not reach statistical significance. We propose that development of best practice guidelines for quality care within an internal medicine residency program can improve education of residents and management of patients with CDI.
Evaluation of discrepancies in statin use recommendations between ATP3 and ACC/AHA lipid guidelines in a primary care population

Stephanie N Martin, MD, Amanda J Place, PharmD, BCACP, Karie A Morrical-Kline, PharmD, BCACP, Victor Collier, MD, FACP

Introduction: In 2010, over 700,000 people died of heart attack or stroke. This highlights the importance of preventing these common conditions. Controlling modifiable risk factors, such as low density lipoprotein (LDL) cholesterol, is one strategy to reduce these outcomes in atherosclerotic cardiovascular disease (ASCVD). Clinical trials show that use of HMG-CoA reductase inhibitors, or statins, reduce LDL and the risk of ASCVD. In November 2013 the American College of Cardiology and the American Heart Association (ACC/AHA) released new guidelines for treatment of cholesterol and reduction of ASCVD risk. These guidelines were a significant change from the 2002 Adult Treatment Panel III (ATP III) guidelines, as they shifted focus from risk based LDL targets to risk based percent LDL reduction. Multiple editorials published since then suggest the number of patients requiring treatment with statins will greatly increase but to date supporting evidence is lacking.

This study explores the hypothesis that under the new ACC/AHA cholesterol guidelines more individuals will qualify for statin therapy and those that do qualify will require higher intensity statin therapy.

Methods: This study was a retrospective chart review of patients age 40-75 seen in the Internal Medicine or Family Medicine clinics at the St. Vincent Primary Care Center (PCC) between November 2011 and November 2013 who had a lipid panel performed. The PCC is dedicated to caring for the underserved and teaching St. Vincent residents. Patient demographic and cardiovascular risk factor data were collected. Patient statin eligibility was assessed using ATP III guidelines and ACC/AHA guidelines in conjunction with the respective recommended risk calculators.

Results: Based on study eligibility criteria, 3,194 patients were identified. Of these, 301 patients were randomly selected and 299 were included in data analysis. At the time of their lipid panel, 202 patients were prescribed statin therapy and 97 patients were not. When comparing the two guidelines, over a quarter of patients not on statin treatment now qualify for statins (25.7%, p<0.001). Of the 97 patients on statins, 83 had sufficient data to calculate the appropriateness of statin intensity. Almost half of these patients (49.4%) now require higher intensity statin treatment. Subgroup analysis revealed that an additional 34 of 92 diabetic patients (37.8%) and an additional 39 of 101 patients (38%, p=0.019) older than 60 years now qualify for statin treatment.

Conclusion: Our study reveals that significantly more PCC patients qualify for statin therapy with the ACC/AHA guidelines than with ATPIII guidelines. Diabetic patients and the elderly were significantly more likely to be in this group. In addition, high intensity statins were recommended more frequently with the new guidelines. This data supports our hypothesis that the new guidelines will increase both quantity and intensity of statin prescribing in PCC patients.
The practice of ordering “serial markers” is ingrained in our practice culture. When a patient comes to the emergency room with any symptom remotely resembling cardiac symptoms at least one set of markers will be ordered, and as inpatient physicians any phone call of chest pain with prompt the reflexive statement “draw cardiac markers.” But what clinical value to these markers have and at what cost? Cardiac markers have been conventionally defined as a troponin along with CKMB or CK Panel (Total CK and CKMB). A cardiac marker series is held as three separate testing points usually six to eight hours a piece. This is done as the laboratory values are known to peak hours after injury has occurred. Historically CK and CKMB were the first identified possible markers of cardiac tissue injury. These markers however were not specific enough to the cardiac tissue and have since been replaced by Troponin as the primary marker of cardiac tissue injury. This replacement with Troponin as the standard is evident in our clinical conversations. Discussion amongst physicians concerns “what was the troponin” and does not include the other laboratory values. Despite the shift in how clinical decisions are made CKMB Panels have remained as part of the “serial marker” set. Saint Vincent Hospital Indianapolis is a 700 bed inpatient facility located in Indiana. The facility is the tertiary hub for a 16 hospital system covering central Indiana. Laboratory and billing information were reviewed for a 6 month period. The laboratory processed 11,901 Troponins and 11,349 CKMBs during this period. Inpatient billing charge for both of these labs were: $345.00 Troponin and $194.00 CKMB. Thus for a 6 month period in charges were created for cardiac markers. Of this in charges would have been from CKMB $2,201,706.00 in only 6 months. In the era of increasing cost conscience medicine and possible capitated care models providing high value care is going to be the gold standard of the future. One of the easiest places to improve care towards this goal is to examine practices that occur as part of a culture but do not actually influence clinical care or decision. Elimination of the CKMB from the standard cardiac marker series could eliminate as much as of charges to patients in a year’s time in one facility alone. The examination of the use of this one lab could, on a national scale, represent significant savings.
IOWA POSTER FINALIST - RESEARCH Chad C Ward, MD

DETECTION OF ARRHYTHMIC EVENTS: AN ASSESSMENT OF SCREENING

First Author: Chad C Ward, MD Michael J. Mirro, M.D., F.A.C.S

Background: More than 25 million Americans have experienced arrhythmia symptoms such as palpitations, dizziness, syncope, chest pain, and fatigue: however, only 2.3 million patients currently have a diagnosed arrhythmia. Cardiac monitoring is important for diagnosis and treatment of arrhythmic events. Devices record/store cardiac electrical activity for analysis. We evaluated the effectiveness of placing symptomatic patients on a 24-hour Holter monitor vs. a 30-day event loop-recorder.

Methods: A retrospective chart review was conducted on 553 patients (387 Holter and 166 loop-recorders) monitored for arrhythmias between January 1st and June 30th, 2009. Information collected for each patient included age, gender, monitor type, indication, ordering physician, and relevant health history. Each monitor was examined for arrhythmias: diagnosis and treatment was also collected.

Results: 70.0% of patients wore Holter monitors while 30.0% wore loop-recorders. In the Holter group, 40.1% reported no symptoms, and 29.2% had symptoms unassociated with arrhythmic events. Significantly fewer loop-recorders reported no symptoms (24.1%, p = 0.001) and symptoms unassociated with arrhythmia (18.7%, p = 0.013). Symptoms were most commonly associated with PVCs in the Holter group and intermittent sinus tachycardia in the loop group. Non-cardiology physicians ordered 6.9 Holters to 1 loop-recorder. Among cardiologists, the ratio dropped to 1.6:1. Finally, 47/48 devices ordered in the ED were Holter monitors.

Conclusion:

1. 30-day event loop recorders are more efficient at detecting arrhythmias with greater correlation between symptoms and proven arrhythmias.
2. 24-Hour Holter monitors are more popular, especially among non-cardiology physicians.
3. The diagnostic yield of Holter monitoring is very low.

*This abstract was published in a collection of abstracts describing the research projects that students completed during the Midwest Alliance for Health Education Summer Research Fellowship Program affiliated with Parkview Health in Fort Wayne, Indiana.

**The results and conclusion of this research paper was used to help implement a new protocol in the Parkview Health Emergency Department to increase the utilization of 30-day event loop recorders for patients presenting with symptoms of an arrhythmia.
Effects of Revised Consultation Room Design on Patient-Physician Communication

Allison Baughman, M.D., Folaranmi Ajiboye, M.S., Fanglong Dong, Ph.D., K. James Kallail, Ph.D., Justin Moore, M.D.

Introduction: Outpatient facilities are the primary point of healthcare contact for many Americans. The outpatient consultation room design remains largely unchanged since World War II despite increased utilization and the adoption of technology-mediated information sharing in clinical encounters. The purpose of this study was to evaluate the impact of revised consultation room design on patient-physician interaction in the outpatient setting.

Methods: The Table And Bed Laboratory Experiment (TABLE) study was a randomized controlled trial that took place in the fall of 2013 at the Center for Internal Medicine, University of Kansas School of Medicine-Wichita (KUSM-W) resident clinic. The study used a post-visit questionnaire completed by 59 patients to assess 6 domains of interest (satisfaction with the visit and the consultation room; mutual respect; patient trust in the physician; communication quality; people-room interaction; and interpersonal-room interaction) in two different room designs (a traditional room and an experimental room in which a pedestal table had replaced the examination table).

Results: Interpersonal-room interaction was enhanced in the experimental room when compared to the traditional room ($P = 0.0038$). Participants in the experimental room reported better access to the computer screen, increased provider information sharing, and more time engaging providers in conversation about information on the monitor.

Conclusions: Changing the layout of a consultation room has the potential to improve interpersonal communication through better information sharing and through improving patients’ interpersonal-room interactions. Clinicians who are interested in maximizing the benefits of clinical encounters should consider changing the layout of their consultation room, especially the positioning of the computer screen.
Barriers to Enter Weight Maintenance

First Author: Kaitlin M Ditch, MD Frank Dong PhD., Bobbie Paull-Forney, R.N., B.S.N., M.P.H., K. James Kallail, PhD., Justin Moore, M.D.

Introduction: Over one third of Americans are obese, including 29.9% of Kansans. The amount of weight loss maintained is closely linked to individuals’ adherence to lifestyle modification. Individuals enrolled in formal weight loss programs tend to maintain a larger weight loss than persons not enrolled. This suggests that studies are needed to focus on factors to improve long-term adherence to weight loss programs.

Objective: The purpose of this study was to identify specific factors associated with individuals not entering the weight maintenance phase of a community-based weight loss clinic.

Methods: A list of individuals who completed a weight loss program at Via Christi Weight Management in Wichita, KS was generated. These individuals were mailed a survey which addressed demographic information and explored factors associated with not entering the weight maintenance phase. Chi-square analysis was used to identify risk factors which differed between the groups.

Results: Among the 78 individuals who responded to the survey, 64.1% (n=50) reported entering the weight maintenance phase. Responders were predominantly female (n=61; 78.2%) and white (n=73; 93.6%). Neither sex, student status, marital status, presence of children, income, employment status, nor number of hours worked were associated with the likelihood of entering weight maintenance. Participants reporting a specific reason for not entering weight maintenance most frequently reported financial (n=28; 34.6%) or time (n=10; 12.4%) constraints (participants were allowed to choose more than one answer).

Conclusion: No single demographic variable was associated with failure to enter weight maintenance in this cohort. Poor adherence to long-term medical weight management programs is pervasive across social and demographic boundaries. Further studies are needed to explore ways to decrease perceived financial or time barriers.
IMPROVING ANTICOAGULATION MANAGEMENT

Julie Kielt, MD; Mustapha El-Halabi, MD; Sadaf Farooqi, MD; Kayla Gray, DO; Youness Hussein, MD; Najla Itani, MD; Robert Badgett, MD

INTRODUCTION: Warfarin is the most commonly prescribed anticoagulant in our resident clinic. The goal of this quality improvement project was to increase the Time in Therapeutic Range (TTR) in our clinic population.

METHODS: We used principles of Six Sigma and implemented a DMAIC (define, measure, analyze, improve and control) cycle. For data analysis, we used multiple linear regressions to separate secular from intervention effects. A chart review quantified characteristics associated with INR nonconformity. Sixty-six patient encounters were randomly selected from those clinic patients with INR values out of range and who were on warfarin and without bioprosthetic valves.

Based on the results of our chart review, for our interventions we chose:

(1) To merge warfarin management recommendations from the RE-LY trial (64% TTR) with the more recent 2013 ACCP guidelines, plus the Intermountain Health Care protocol. Our team used the Delphi consensus building tool to develop our protocol. After approval by clinic faculty, it was disseminated to all KUSMW-affiliated clinics.

(2) To address patients who consistently missed INR checks, nursing staff implemented a workflow modification. The intervention stops warfarin refills on patients who missed one month of INR checks.

(3) Initially we measured INR values as a proportion of values in range each month. However TTR more accurately reflects efficacy of anticoagulation over time and allows benchmarking to published reports. Thus using the OpenCPU project at UCLA, we collaborated with researchers at Boston Children’s Hospital to develop opensource software to measure our population TTR (https://public.opencpu.org/ocpu/github/anticoagulation/warfarin/www/).

RESULTS: From August 2011 to December 2013, we managed 84 unique patients. The INR proportion of values in range was 61.9%. Common associations with nonconformity included: not using standardized weekly dosing based on 5mg tablets (56%); dose adjustment discordant to our nomogram (41%); and late return for INR check (35%). After interventions, the proportion of values in range dropped to 44% for 54 unique patients, which corresponds with a TTR of 52.8%. Multiple linear regressions show no secular trend, but a significant association with our interventions (p=0.007).

CONCLUSIONS: KUSM-W has standardized anticoagulation management. We assessed the merits of monitoring INR with proportion of values in range versus proportion of time in range. Our impression is that simple proportion of values better reflect short-term workflow changes, while TTR offers long-term benchmarking against national rates. Interdisciplinary discussion regarding the drop of “in-range” proportion of values post-intervention, led to the observation that fewer patients are now managed by point-of-care-testing. We hypothesize that patients with better control have shifted to home monitoring and therefore are
not captured in our data reporting. In conclusion, initial results show a TTR similar to that of the RE-LY trial, but further data monitoring is required.
KANSAS POSTER FINALIST - RESEARCH Mohinder Reddy Vindhyal, MD

Cardio-Renal association for heart failure re-admissions

First Author: Mohinder Reddy Vindhyal, MD Brent Duran, Do Hussam Farhoud, MD K James Kallail, Ph.D.

**Background:** Heart Failure is the leading cause of morbidity and mortality, as well as hospitalization rates in the US. An impetus has been created to identify improved predictors to prevent hospital readmission. The average life span of patients admitted to the hospital for heart failure is 5.5 years. The aim of this study was to identify the causes and reduce heart failure re-admissions. Glomerular Filtration Rate (GFR) was one of the associations with heart failure re-admissions, which was studied in the Japanese population but was never studied in the American population. Even though the DOSE trial validates that the kidney function (GFR and/or creatinine) will return to normal status two months after placing them on high dose diuretics in heart failure patients, the study doesn’t mention about re-admissions or the change in renal function status (GFR/creatinine) within one month from discharge. Moreover Chronic kidney Disease patients were excluded from the study.

**Methods:** A retrospective cohort study was performed utilizing data from three community hospitals in the United States. A total of 132 patients with heart failure were evaluated over one year comparing GFR at admission and discharge and 30-day readmission status.

**Results:** There is a significant difference by readmission status in the change in GFR from admission to discharge. The GFR of patients readmitted in 30 days had an average decrease in GFR by 2.46 mL/min/1.73 m² whereas patients not readmitted in 30 days had an average increase in GFR by 1.92 mL/min/1.73 m². In the 28 readmitted patients, 13 (46%) had a decrease in GFR, 6 (21%) had an increase, and 9 had no change (32%). In the 99 patients not readmitted, 33 (33%) had a decrease in GFR, 48 (48%) had an increase, and 18 (18%) had no change.

**Conclusions:** A decline in renal function (GFR) over hospitalization in patients with heart failure is associated with an increase in readmission for heart failure. Providers should be cognizant of the need to optimize renal function (GFR) as well as cardiac function during hospitalization.
Changes in Glomerular Filtration Rate (GFR) following implantation of Continuous Flow Left Ventricular Assist Devices (LVAD)

Anub John, Amaninderpal Ghotra, Rahul Sinha, Emma Birks, Mark Slaughter and Kelly McCants

INTRODUCTION: Continuous Flow Left Ventricular Devices (LVAD) have replaced pulsatile flow pumps with survival estimated at 70% at two years. Renal dysfunction, defined as glomerular filtration rate (GFR) < 60, is common in patients with end stage congestive heart failure and may be due to cardiorenal syndrome or intrinsic kidney disease.

AIM: To determine the changes in renal function after implantation of continuous flow LVAD, in patients with renal dysfunction prior to LVAD use.

METHODS: A retrospective single center analysis was conducted in 47 patients implanted with continuous flow LVAD over a period of 2 years. Patients were divided into 2 groups based on the Modification of Diet in Renal Disease (MDRD) calculation for GFR at the time of LVAD implantation: GFR <60 (n = 28) and GFR >60 (n=19). GFR was calculated at 1, 3, 6 and 12 months post LVAD implantation in both groups. Baseline clinical patient characteristics including basic laboratory parameters, medications, outpatient vitals and number of hospitalizations were studied. T test and chi square tests were used to analyze the data.

RESULTS: In patients with GFR< 60 prior to LVAD implantation, a significant improvement in GFR was noted at 1 (p < 0.001), 3 (p < 0.001), 6 (p = 0.005) and 12 (p = 0.004) months post LVAD implantation (Table 1). 62% of patients (n= 26) with GFR < 60 acquired a normal GFR at 1 month and 45% of these patients (n= 11) on continued LVAD support at 12 months maintained a normal GFR. Renal function did not worsen with LVAD use in the group with GFR>60 prior to LVAD implantation. Among the patients with GFR < 60 with improved GFR at 1 month and on continued LVAD support at the 1 year follow up (n=11), 6 patients had reduced GFR (<60) with 17 hospitalizations; the other 5 patients continued to have normal renal function and had 11 hospitalizations at 1 year follow up period.

CONCLUSION: Following LVAD implantation in patients with renal dysfunction (GFR < 60), there is an increased perfusion of the kidneys as evident from the improvement in the GFR. The increase in GFR is the highest during the first month and then stabilizes by 6 months. Increased duration of LVAD support may lead to complications, thereby limiting the improvement in kidney function with time. This is evident from the increased hospitalizations in these patients.

Table 1: Changes in GFR before and after LVAD implantation in group 1 and group 2.

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<tr>
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<th>GFR &lt; 60</th>
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<th>GFR &gt; 60</th>
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<tr>
<td>GFR at admission(pre- LVAD)</td>
<td>41.29 ± 10.54</td>
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<td>86.05 ± 25.96</td>
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<td>GFR at 1 month (post LVAD)</td>
<td>72.35 ± 30.05</td>
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<td>91.61 ± 26.88</td>
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<td>GFR at 3 months (post LVAD)</td>
<td>68.08 ± 19.39</td>
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<td>88.07 ± 24.54</td>
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<td>GFR at 6months (post LVAD)</td>
<td>57.64 ± 23.88</td>
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<tr>
<td>GFR at 1 year (post LVAD)</td>
<td>60.85 ± 25.11</td>
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<td>87.87 ± 22.65</td>
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Does the addition of adjuvant intraoperative post-dissection tumor bed chemotherapy during GI neuroendocrine tumor debulking benefit patients?

First Author: Aman Chauhan, MBBS Second Author: Yi-Zarn Wang, MD Third Author: Robert A Ramirez, DO Fourth Author: Melissa A Stevens, MPH Fifth Author: J Philip Boudreaux, MD Sixth Author: Eugene Woltering, MD Seventh Author: Lowell Anthony, MD

Background: Midgut neuroendocrine tumor (NET) patients are often diagnosed at an advanced stage with extensive mesenteric lymph node and liver metastasis. The only treatment for potential cure and durable results is resection with extensive debulking. However, even with the most elegant surgical dissection/resection, macro and microscopic residual disease at the tumor resection bed remains a distinctive possibility. We hypothesize that local application of 5-florouracil (5-FU) within tumor bed would eliminate the microscopic residual disease post operatively.

Method: Surgical records of 188 consecutive patients who underwent extensive cytoreductive surgeries for stage IV, small bowel NETs with boggy mesenteric lymphadenopathy between 2003-2012 were reviewed. 85 Patients who had 5-Florouracil saturated gelfoam strips secured into their mesenteric resection defects served as the study group (n=85) with one hundred three patients who did not receive such intra-operative chemotherapy as the control (n=103). Survival from the time of diagnosis, postoperative morbidity and mortality between the two groups were collected and compared.

Results: Mortality rates at immediate, 30, 60 and 90 days post operative period were 3; 0; 1; 0; and 0; 2; 0; 4 respectively for study and control group. Minor complications (Clavien-Dindo Grade I and II) at 30, 60 and 90 day postoperative period were 12; 0; 1 and 12; 5; 5 respectively. Major complications (Grade III and IV) at the same time intervals were 2; 0; 2 and 2; 3; 2 for study and control groups. Most of all, the mean survival from time of histological diagnosis for the study patients was 210 months (17.5 years) as compared to 177 months (14.7 years) for the control group with a difference of 33 months (2.75 years).

Conclusion: Intra-operative tumor resection bed chemotherapy is a safe adjuvant without any discernible toxicity. Furthermore, it might provide survival benefit to midgut NET patients with extensive mesenteric lymphadenopathy undergoing extensive cytoreductive surgery without additional procedure related complications. Further studies are needed to validate the long term efficacy of this novel adjuvant intra-operative chemotherapy.
MARYLAND POSTER FINALIST - RESEARCH Paul E Miller II, MD

HIV and Coronary Arterial Remodeling from the Multicenter AIDS Cohort Study (MACS)


Background: Positive remodeling (PR), a plaque characteristic associated with risk for myocardial infarction, may be more prevalent in people with HIV. We evaluated the prevalence of PR using coronary CT angiography (CCTA) in HIV-infected (HIV+) and –uninfected (HIV-) men.

Methods/Results: Men enrolled in the Multicenter AIDS Cohort Study underwent CCTA if they were 40-70 years, had normal kidney function and no history of coronary revascularization. Multivariable logistic regression models were used to estimate the odds ratio (OR) of PR by HIV serostatus, adjusting for demographics and CAD risk factors. Analysis of PR among atherosclerotic segments further adjusted for plaque type and stenosis. The prevalence of PR was 8.4% versus 12.1% (p=0.10) for HIV- and HIV+ men, respectively. After adjustment, HIV+ men had twice the odds of PR [OR 2.01 (95% CI 1.20-3.38)], which persisted after adjustment for CAD risk factors [1.76(1.00-3.10)]. Higher systolic blood pressure, total cholesterol, diabetes medication use, older age, segment involvement score, mixed and non-calcified plaque, and stenosis>50%, were associated with increased odds of PR, while higher HDL cholesterol, higher nadir CD4 count, and black race were associated with lower odds of PR. In the segments with plaque, the association between HIV and PR persisted, but was not statistically significantly.

Conclusion: HIV+ men have more positively remodeled plaques, which may be partially related to having more coronary segments with plaque present and more non-calcified plaque. Longitudinal studies are needed to evaluate whether a greater prevalence of PR contributes to higher rates of myocardial infarction in HIV+ individuals.
MASSACHUSETTS POSTER FINALIST - RESEARCH Fadi Alkhatib, DO

Long Eye Lashes, and Too long To See Them!

First Author: Fadi Alkhatib, DO Second Author: John Dodd DO Third Author: Steven Dunn MD

Introduction Mucous Membrane Pemphigoid is a rare and debilitating disease that affects bodily mucous membranes, especially those of the eyes and oropharynx. Persons afflicted with mucous membrane pemphigoid often battle with trichiasis that adds to their discomfort and leads to corneal decompensation. It has been observed that pemphigoid patients with trichiasis must have their lashes epilated at an increased rate compared with those patients without pemphigoid. Hypertrichosis associated with increased local prostaglandin levels due to topical medication or other types of ocular inflammation has been well documented.

Methods Our pilot study examined 4 eyes with biopsy confirmed MMP and compared them to 4 healthy eyes from control patients. Tear samples were collected at the slit lamp with microcapillary pipettes and processed using an ELISA kit for Prostaglandins E2 (PGE2). Lashes both trichiatic and normal were epilated from a predetermined location; four weeks later lashes from the same location were re-epilated and measured using Castro-Viejo calipers. The primary end points were average prostaglandin E2 levels and lash length over a four-week period.

Results PGE2 levels in the control group ranged between 155 pg/ml – 310.50 pg/ml. The study group demonstrated levels ranging from 418 pg/ml – 2,325.3 pg/ml. Independent t-test calculations excluding sample (002SL) demonstrated a statistically significant difference between the mean of the control group 227.89 (SE +/- 32.09) and study group 472.23 (SE +/- 51.86); p=0.008. During the course of chart review it was noted that study patients were being seen every 3-4 weeks on average for lash epilation. The mean lash length (to the nearest mm) of each eye was recorded and the mean of each group was then compared to one another using an independent t-test. There was a statistically significant difference between the two groups with the average length of the control group at 4.08 mm (SE +/- 0.54); and the study group at 5.72 mm (SE +/- 0.19); p=0.02.

Discussion Mucous Membrane Pemphigoid patients had increased local prostaglandin levels that might play a role enhancing lash growth rate. Targeting prostaglandin to decrease complication from trichiasis and subsequent complication would need to be further investigated. This is a novel concept in regards to lash growth in response to inflammatory mediators and may help further our understanding of the complex interaction between the ocular and adnexal surface.
The effects of Candida Colonization and antifungal use on the outcomes of patients with Ventilator-Associated Pneumonia

First Author: Theodora Anagnostou, MD First co-author: Marios Arvanitis, MD Other co-authors: Themistoklis K. Kourkoumpetis MD, Panayiotis D. Ziakas MD2, Athanasios Desalermos MD, Eleftherios Mylonakis MD, PhD, 1Massachusetts General Hospital, Boston, MA, 2Rhode Island Hospital, Providence, RI; 3Mount Auburn Hospital, Cambridge, MA; 4Boston Medical Center, Boston, MA

**Background:** Mechanical ventilation (MV) is associated with colonization of the upper respiratory tract (URT) by a multitude of bacteria and fungi, which interact with important clinical implications. We investigated the effect of Candida colonization anywhere in the body as a comorbidity factor and a predictor of the outcome in patients with Gram-negative Ventilator Associated Pneumonia (VAP), as well as the potential role of prophylactic antifungal administration.

**Methods:** We retrospectively reviewed the medical charts of all 182 patients with VAP treated in the Intensive Care Units of the Massachusetts General Hospital over a 6-year period and compared the outcomes (mortality, length of MV, hospital stay) between Candida colonized and non-colonized patients. Continuous variables were reported as mean (SD) and compared using the T-test. Median (IQR) values were reported using the Mann-Whitney non-parametric test. Dichotomous outcomes were compared using the chi-square and Fisher exact tests. Odds ratios (OR) (95% Confidence Intervals, CIs) for VAP related mortality were reported after fitting logistic regression models. Level of significance was set to 0.05 and all tests were two-sided.

**Results:** Gram-negative bacteria were isolated in 71 patients (55%) and 47 of those (66.2%) were colonized with Candida spp. Body sites included URT (n=41; 57.8%), urine (n=13; 18.3%), abdominal fluid (n=1; 1.4%), and wound (n=7; 9.9%). There were no significant differences between colonized and non-colonized patients regarding SAPS II score. Interestingly, Candida colonization anywhere in the body was associated with longer hospital stay (36 vs. 25 days, p=0.04) and MV (21 vs. 14 days, p=0.05) and marginally higher mortality (17% vs. 8.3%, p=0.06), while colonization of the URT led to significantly higher mortality (25% vs. 5%, OR 6.17, 95% CI 1.20-31.55, p=0.04), which persisted after adjusting for age and colonization at other sites (OR 6.04, 95% CI 1.05-34.75). Also, patients with multiple colonized sites had higher mortality (46.2% vs. 7.7%, p=0.05), increased duration of MV (26 vs. 16 days, p=0.05), and length of hospital stay (41 vs. 30 days, p=0.04). URT colonization was associated with increased risk of colonization at other sites (44% vs. 18%, p=0.02). Surprisingly, prophylactic antifungals were associated with a higher mortality (66.7% vs. 33.3%, p=0.04) likely due to the multiple comorbidities in this population.

**Conclusions:** Candida colonization at multiple sites increases morbidity and mortality among patients with Gram-negative VAP, while prophylactic antifungals do not appear of any benefit.
The Baystate Frailty Study – Prevalence of Frailty in a Cohort of Hospitalized Elderly Patients

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Background: Elderly patients have limited physiological reserves and decreased ability to compensate for stress, resulting in a delayed return to baseline function and an increased vulnerability to in-hospital and post-discharge complications. The objectives of this study are to assess the prevalence of frailty and its association with in-hospital and post-discharge outcomes in hospitalized elderly patients (phase I) and to implement a coordinated care team approach to improve the outcomes of frail elderly patients (phase II).

Methods: This is a prospective study including patients older than 65 years admitted for urgent surgeries, trauma, elective orthopedic surgeries and 3 frequent medical diagnoses (heart failure, COPD, pneumonia). In the first phase, we collected measures of frailty at admission using Edmonton Frailty Scale which includes questions about general health status, cognition, functional independence, social support, medication use, nutrition, mood, self-reported performance and continence. Patients scoring >10 were classified as severely frail, 6-9 as mildly frail or vulnerable and 0-5 as non frail. Patients were followed with phone calls at one, two and three months after discharge. The study which is still ongoing will enroll a total of 200 patients admitted for urgent surgeries, 100 patients for medical conditions and 100 patients admitted for elective surgeries. We present preliminary results.

Results: Of the 212 patients who were enrolled till now, 110 were admitted for urgent surgeries or trauma, 38 for elective orthopedic surgeries and 64 for medical conditions. Mean age was 76.70 (SD = 8.3) and 131 were female (61.8%). 93.4% were admitted from home, 3.8% from assisted living and 2.8% from a nursing home facility. The mean Edmonton Frailty Scale (EFS) for the entire patient cohort was 5.10 (SD = 3.6). Mean EFS was 4.7 (SD = 3.4) for urgent surgery/trauma patients, 7.2 (SD = 3.1) for medical patients and 2.8 (SD = 3.0) for elective surgeries. One in four patients had more than 1 falls in the 6 months prior to admission. On the 3 objects recall test, one fourth of the patients were able to remember only one word. 68% of patients were on >5 medications before coming to the hospital and 20% admitted that they forget to take their medications sometime. 17% of patients admitted to being depressed and 19% having urinary incontinence.

Only 60% of the patients were able to walk 2 blocks in the 2-3 weeks prior to being admitted. Overall 61.3% of patients were vulnerable-mildly frail and 14.2% were severely frail. Medical patients were the most likely to be frail (72%) and patients undergoing elective surgeries the least likely (5%). 168 patients consented for phone calls follow up and we were able to obtain follow up for 121 at 30 days, 100 patients at 60 and 57 at 90 days. At 30, 60 and 90 days after discharge 29%, 48% and 64% of patients returned to baseline. At 90 days after discharge 34% of all patients and 60% of severely frail patients were readmitted at least once.

Conclusion: Less than half of the patients over 65 years of age hospitalized for urgent or emergent surgeries and for 3 frequent medical conditions were non frail. Medical patients were the most likely to be frail and had the higher score on EFS, followed by patients admitted for urgent surgeries. At 3 months after discharge one in 3 patients was not at the baseline level and two thirds of the frail patients were readmitted.
Changes in Health Care Spending and Quality 4 Years into Global Payment for Accountable Care Organizations

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Purpose: In an era of payment reform, the effect of global payment in accountable care organizations (ACOs) on health care spending and quality remains poorly understood. We evaluated changes in spending and quality 4 years into the Blue Cross Blue Shield of Massachusetts Alternative Quality Contract (AQC), a global budget risk contract with quality bonuses that began in 2009 with 7 ACOs and expanded to 17 ACOs in Massachusetts by 2012.

Methods: Enrollees whose provider organizations entered the AQC from 2009 to 2012 (4 intervention cohorts, N=490,000, 177,000, 97,000, and 583,000, respectively) were compared to similar commercially-insured individuals from control states (N=966,000). Using 2006-2012 claims, we employed a difference-in-differences linear multivariate model controlling for age, sex, comorbidities, and indicators for intervention, year, and their interactions. We decomposed spending results by year, category of service, site of care, risk-contracting experience, and price versus utilization. We compared process and outcome quality to national and New England Healthcare Effectiveness Data and Information Set (HEDIS) averages.

Results: In the 2009 cohort, claims spending grew on average $62.21 per enrollee per quarter less than control over 4 years (p<0.001), a 6.8% savings. Analogously, the 2010, 2011, and 2012 cohorts had average savings of 8.8% (p<0.001), 9.1% (p<0.001), and 5.8% (p=0.04), respectively, by the end of 2012. Savings on claims were concentrated in the outpatient facility setting, specifically procedures, imaging, and tests (8.7%, 10.9%, and 9.7%, respectively, p<0.001). Organizations with and without risk-contracting experience saw similar average savings of 6.3% and 7.7%, respectively, over 4 years (p<0.001). About 40% of savings were explained by lower volume. Pre-intervention trends were not statistically different between intervention and control (-$4.57, p=0.86), suggesting savings were not driven by inherently different trajectories of spending. No differences in coding intensity were found. In sensitivity analyses, estimates were robust to alterations in the model, variables, and sample. Notably, claims savings were exceeded by incentive payments to providers (shared savings and quality bonuses) in 2009-2011, but exceeded incentives payments in 2012, generating net savings.

Improvements in quality among intervention cohorts generally exceeded New England and national comparisons. Quality performance on chronic care measures increased from 79.6% pre-intervention to 84.5% post-intervention in the 2009 cohort, compared to 79.8% to 80.8% for the HEDIS national average, a 3.9 percentage-point relative increase. Analogously, preventive care and pediatric care measures increased 2.7 and 2.4 percentage points, respectively. On outcome measures, achievement of hemoglobin A1c, LDL cholesterol, and blood pressure control grew by 2.1 percentage points per year after the AQC, while HEDIS averages remained relatively flat.

Conclusions: After 4 years, organizations in the AQC had lower spending growth relative to control and generally outperformed national averages on quality measures. The AQC experience may be useful to policymakers, insurers, and providers. Combining global budgets with pay-for-performance may encourage provider organizations to slow spending and improve quality.
MEXICO - POSTER FINALIST - RESEARCH Sonia Rodriguez, MD

Prevalence of pathology renal findings not associated to disease activity in patients with Systemic Lupus Erythematosus (SLE).

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INTRODUCTION: Kidney involvement, generally related to lupus nephritis (LN) is one of the cardinal manifestations of SLE, associated with a 6-fold increase in mortality. However, in patients with SLE, kidney abnormalities are not always caused by LN.

The aim of this study was to identify the pathologies not associated with lupus activity and different from LN according to the International Society of Nephrology/Renal Pathology Society (ISR/RPS) that occur in patients with SLE.

METHODS: We conducted a retrospective descriptive study. All patients with diagnosis of SLE in which a renal biopsy was performed between 1987 and 2013 were identified from our institute, a tertiary care center in Mexico. SLE diagnosis was confirmed by reviewing the medical record (ACR 1982 criteria). All histopathological diagnoses other than LN according to the ISR/RPS classification of lupus nephritis were considered. Patients with a histopathological diagnosis different from LN, but associated with lupus activity were excluded. We obtained demographic data, disease characteristics, comorbidities and treatment received from medical files. We used descriptive statistics for this study. Results are expressed as number (percentage) or mean±SD.

RESULTS: We identified 622 patients with diagnosis of SLE and renal biopsy performed. In 564 of them, diagnosis of SLE was confirmed after reviewing the medical file, 75 of these biopsies had a diagnosis different from LN, but 27 of them were excluded due to a histopathological diagnosis associated with SLE activity.

Thereby we included 48 patients (8.5% of the biopsies performed in patients with a confirmed diagnosis of SLE), with a mean age of 36±2.4 years; 44 (92%) patients were women. The mean duration of disease was 6.9±7.1 years. The mean disease activity (SLEDAI-2K) was 13.1±6.5 points, while the cumulative damage (SLICC) was 2.3±2.1 points. Thirty four (71%) patients had hypertension and 13 (27%) diabetes mellitus. The more frequent histopathological diagnoses were arteriolosclerosis, observed in 24 (50%) cases and diabetic nephropathy in 7 (15%). Global and segmental glomerulosclerosis and podocytopathies were reported in five biopsies (10%) each. In 28 (58%) patients there was concomitant form of classified LN.

CONCLUSIONS. This is the largest case series reported of nephropathy not associated with activity in patients with SLE. The prevalence was 8.5%, however this entity presents alone in a low percent of the biopsies. The most frequent histopathological diagnoses were arteriolosclerosis and diabetic nephropathy, which disagrees with previously reported series.
The E3 ligase Casitas B Lineage Lymphoma b (Cbl-b) Modulates Peripheral Regulatory T cell Function via p27kip1 in patients with Systemic Lupus Erythematosus.

First Author: Jorge Rafael Romo Tena, MD

Background/Purpose: The interplay between effector and regulatory T cells (Tregs) is a key element among peripheral tolerance mechanisms in Systemic Lupus Erythematosus (SLE). Resistance to suppression has been recently acknowledged as part of the defects shown by T cells from SLE patients. The E3 ligase Cbl-b has been shown to modulate T cell unresponsiveness in SLE. However, its potential role in the regulation of peripheral Tregs tolerance has not been fully addressed. The aim of this study was to assess the expression of Cbl-b and its relationship to the resistance to suppression phenotype in SLE patients.

Methods: We included 25 patients with SLE (10 in remission and 15 with active untreated disease) according to the classification criteria of the American College of Rheumatology and 25 age and gender-matched healthy controls. PBMCs were isolated by density gradient and effector (CD4+CD25-) and Tregs (CD4+CD25+CD127-) were purified by magnetic selection. The expression of Cbl-b and p27kip1 was analyzed by Western blotting. Interaction between Cbl-b and p27kip1 was addressed by immunoprecipitation (IP). Proliferative responses were assessed in allogeneic and autologous cocultures by CFSE. Differences were assessed by t Student test. p<0.05 was considered as statistically significant. In all cases, an informed consent was obtained, and the ethics committee approved this study.

Results: We found diminished Cbl-b expression in Tregs from SLE patients in comparison to healthy controls (1.3±1.0 vs 2.8±1.8, p=0.002), which was associated with resistance to suppression in proliferation assays (r=0.553, p=0.041). Moreover, this phenomenon was related to deficient expression of the cell cycle regulator p27kip1 in Tregs from SLE patients when compared to healthy controls. We also found by IP assays, that p27kip1 interacts with Cbl-b in Tregs. We found no significant differences regarding to disease activity.

Conclusion: Our data suggest that the ligase Cbl-b is able to regulate the interplay between effector and Tregs, particularly, the resistance to suppression via ubiquitination of p27kip1 in SLE patients. To our knowledge, this is the first study to demonstrate that p27kip1 is able to interact with Cbl-b, which might constitute another mechanism by which this ubiquitin ligase is able to modulate the T cell receptor activation threshold.
Epidemiology of Takotsubo cardiomyopathy in US: An analysis of NIS data

Sourabh Aggarwal, Yashwant Agrawal, Devin Malik

Introduction  Takotsubo cardiomyopathy (TC) is a transient systolic dysfunction of the apical/mid segments of left ventricle that mimics myocardial infarction but without any obstructive coronary artery disease. It is an increasingly reported entity with unclear etio-pathogenesis. This study was done to identify the patient and hospital characteristics of patients diagnosed with TC in USA.

Methods  We queried Healthcare Cost and Utilization Project’s Nationwide Inpatient Sample (NIS) data using for patients discharged with primary diagnosis of TC using ICD9 code of 429.83 for TC. NIS represents 20% stratified sample of US community hospitals data in US. Data was extracted for years from 2007 to 2011. Patient characteristics (age, gender, insurance, residence) and hospital characteristics (ownership, teaching, size, and location) were identified and analyzed. For individual variables, analysis was done for available data, missing data being excluded.

Results  We identified 26,090 patients diagnosed with TC. Age was available for 19,469 patients, with 65-84 being affected most commonly (45.5%) and 69.5% patients were above the age of 65. Females were affected more than males (89.3% vs 10.7%). Most patients were covered by Medicare insurance (48.89%).

Most of diagnoses were made in Private, not-for-profit hospitals (84.5%), hospitals in metropolitan areas (93.6%), hospitals with large bedside number (54.8%). Both teaching and non-teaching hospitals were equally associated with diagnosis of TC (50.1% vs 49.9%) Geographically, most patients were diagnosed in southern part of USA (31.4%) and least in north-east part (19.1%).

Discussion  This study, largest on TC till date, identifies epidemiology of TC in USA with most patients being elderly (>65 years of age) and females. Further studies need to be done to identity risk factors in detail to better prevent and manage TC.
Chapter Winning Abstract

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Introduction: Paclitaxel have been implicated with severe adverse effects such as acute pain syndrome, and vesicant extravasation injury owing to its excipient (Cremophor EL). Replacing this excipient with a non-toxic biomaterial will reduce these adverse effects. Using human prostate adenocarcinoma (HPA), we studied the efficacy of our formulation.

Methods: Ptx-GGbPEG was formulated via nanoprecipitation and surface-coated with ligand specific for human prostate specific membrane antigen. Using Human xenograft prostate tumor induced mice; the efficacy of the formulation was studied. The following regimens were administered (i) saline; (ii) GGbPEG alone 40mg/kg; (iii) commercial paclitaxel 40 mg/kg; (iv)Ptx-loaded GGbPEG-Aptamer 40 mg/kg. Post treatment histological staining of the excised tumors was analyzed by an independent Pathologist.

Results: In vitro cytotoxicity of Ptx-GGbPEG on HPA cell lines showed prolonged cytotoxicity (< 10% viability after 72 hr) when compared to commercial paclitaxel (35% viability, p<.05). Furthermore, the formulation showed increased in vivo efficacy and specificity when compared to commercially available paclitaxel resulting in decreased tumor volume. At 60 days, mean tumor volumes were 194.1 mm3, 187.9 mm3, 166.2 mm3 and 96.2 mm3 for saline, GGbPEG alone, commercial paclitaxel and Ptx-GGbPEG respectively (p < 0.05). H & E staining showed well-defined cell boarders and hyperchromatic nuclei with mitoses in the saline and GGbPEG treated groups whereas group with commercial paclitaxel and ptx-GGbPEG were extensively necrotic.

Conclusion: Prolonged cytotoxicity and specificity of our formulation may provide a better alternative to currently used paclitaxel by reducing the frequency of drug use, thus decreasing the overall side effects.
Cost of Mediterranean Diet Compared to Dietary Expenditures Recommended by the United States Department of Agriculture

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Introduction: The Primary Prevention of Cardiovascular Disease with a Mediterranean Diet study concluded that consuming a diet rich in virgin oil and nuts can reduce the incidence of myocardial infarction, stroke and death due to cardiovascular causes. While the Mediterranean diet presents an appealing recommendation for preventative medicine, the financial feasibility of dietary adherence is unknown.

Methods: We estimated the cost of this diet by using the spring 2013 shopping list obtained from the Predimed website. It was translated and found to be approximately 2100 calories per day. The cost of this diet was then estimated by going to three grocery retailers. For items not available at any of these stores, the closest substitute was chosen or the item cost from another retailer was used. The costs recorded were the current price at the time of shopping. For most items, we chose the option that was the lowest cost per volume or weight. Weekly expenditures were calculated using Excel for each store and also using the cheapest item combination of the three stores. Totals were compared to the June 2013 USDA food plan weekly costs over four economic levels and percentage of an individual budget based on median per capita income.

Results: The three stores had weekly per person expenditures of $126.88, $111.26 and $106.90. When combining the lowest cost items from each store, the cost was $96.99. To initially begin eating the diet, one would have to spend $241.29 to purchase all of the items, many of which could be used in subsequent weeks. When using the lowest combination of costs compared to the USDA thrifty, low-cost, moderate-cost and liberal plans, the diet was more expensive by $58.59 (153%), $45.79 (89%), $33.39 (52%) and $20.49 (27%) respectively. Looking at the US Census statistics in 2012 dollars the cost would be 25%, 20% and 18% of the total budget for those at the median per capita level in Grand Rapids, Michigan and the United States respectively.

Conclusion: The Mediterranean diet, as it is effective in preventing cardiovascular disease, presents a very appealing recommendation for preventative medicine but could be burdensome financially to patients. The yearly expenditure of such a diet could be over $4900 per person, which would make it inaccessible to a large part of the population. More studies are needed to find an effective and affordable diet that addresses both nutritional and financial disparities within the U.S.

Introduction: An abdominal aortic aneurysm (AAA) is defined when infra-renal aortic diameter is at least 3.0 cm. The United States Preventive Services Task Force (USPSTF) made recommendation in 2005 that all men between the age of 65 to 75 years and who have ever smoked should be screened one time for AAA by abdominal ultrasonography. However, the clinical impact of these recommendations are unknown in the American population.

Methods: We queried Healthcare Cost and Utilization Project’s Nationwide Inpatient Sample (NIS) for AAA and AAA rupture using ICD9 codes 441.4 and 441.3 respectively. The NIS represents 20% of all hospitals data in US. All the data was extracted for years 2000-2010. The prevalence and in-hospital mortality for pre-screening years (2000-2004) was compared with post-screening years (2006-2010). Chi square was used to find statistical significance.

Results: A total of 527,801 hospitalizations secondary to AAA and AAA rupture were analyzed for the study period. AAA prevalence decreased from 61.72 to 58.77 per 10,000 total hospitalizations with in-hospital mortality decreasing from 3.5% to 2.12% (p value <0.001). On sub-analysis, the decrease in prevalence was chiefly in 65-84 age group (77.19 to 74.54 per 100 AAA admissions, p <0.001), with increase in 84+ age group (6.37 to 8.6 per 100 AAA admissions, p<0.001) and no significant change in 45-64 age group (16.16 to 16.51 per 100 AAA admissions, p value >0.05). Prevalence increased in males (77.84 to 78.13 per 100 AAA admissions, p <0.001) and decreased in females (22.13 to 21.81 per 100 AAA admissions, p<0.001). Decrease in mortality was uniform in all age and gender sub-groups.

The prevalence of AAA rupture decreased from 9.51 to 7.03 per 10,000 total hospitalizations (p<0.001). On sub-analysis decrease in prevalence was reciprocated in 65-84 age group (70.08 to 64.94 per 100 AAA rupture admissions, p value <0.001) and males (73.23 to 71.7 per 100 AAA rupture admissions, p value <0.001). However, prevalence of AAA rupture increased in age group 45-64 (14.41 to 15.43 per 100 AAA rupture admissions, p value <0.001), age 84+ (15.21 to 19.2 per 100 AAA rupture admissions, p value < 0.001) and females (26.28 to 28.28 per 100 AAA rupture admissions, p value <0.001).

Discussion: Our study reveals that post screening recommendations, hospitalizations for AAA decreased significantly with decrease only reciprocated in the age group 65-84 years. Also hospitalizations and in-hospital mortality from AAA rupture decreased in males and age group 65-84, with increase in hospitalizations for the 45-64 and 84+ age group and females. The possible explanation is better screening as outpatient resulted in decreased morbidity with decreased hospitalizations from AAA and AAA rupture in susceptible population. Our study also makes the case to consider extension of recommendations to include other susceptible groups.
Ofatumumab for Rheumatoid Arthritis: A Cochrane Systematic Review and Meta-analysis

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Ofatumumab is a unique anti-CD20 monoclonal antibody with its epitope more proximal and distinct from the epitope recognized by rituximab or by other anti-CD20 monoclonal antibodies. The proximity of this epitope probably accounts for the high efficiency of B-cell killing than other B-cell-deleting antibodies and makes it ideal for use in rheumatoid arthritis (RA). We conducted a systematic review and meta-analysis assessing the benefits and harms of ofatumumab in reducing disease activity and pain and improving function in people with RA. To date, there is no systematic review or meta-analysis assessing ofatumumab for treatment of RA.

Methodology: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2014, Issue 1), MEDLINE (from 1946), EMBASE (from 1947), ClinicalTrials.gov, and the International Clinical Trials Registry Platform (ICTRP) search portal for randomized controlled trials comparing ofatumumab alone or in combination with disease-modifying anti-rheumatic drugs (DMARDs) or biologics to placebo or DMARDs or biologics alone or in combination with DMARDs, with no restrictions with regard to the dosage. Two authors independently assessed search results, trial quality and risk of bias, and extracted data. Our search identified three trials with low risk of bias that included 654 patients (383 ofatumumab and 271 placebo) for analysis. A stable methotrexate dose was allowed in all patients.

Benefits: Compared with placebo, patients in the ofatumumab group were 2.3 times more likely to achieve an ACR 20 (20% clinical improvement) response (RR 2.3, 95% confidence interval (CI) 1.76 to 3.01). Similarly, patients in the ofatumumab group are 3.1 times more likely to achieve an ACR50 (RR 3.12, 95% CI 1.98 to 4.91). The number needed to treat to achieve an ACR50 response was six. Only one trial found improvement in ACR70 response. A significant reduction in disease activity was found in ofatumumab-treated patients as compared with those in the placebo group. Quality of life also significantly improved with the ofatumumab treatment, as measured by SF-36 summary score (MD 2.48, 95% CI 2.23, 2.73).

Harms: In terms of withdrawal, total withdrawals and withdrawals due to adverse events were not statistically different between ofatumumab and placebo users. However, withdrawal due to lack of efficacy was four-times higher in the placebo group as compared with patients treated with ofatumumab (RR 0.24, 95% CI 0.10 to 0.60). The risk of adverse events was 1.5 (95%CI 1.37 to 1.72) in the ofatumumab group as compared with the placebo group. The incidence of serious adverse events, however, was not significantly different between patients treated with ofatumumab and those who received placebo (RR 1.72, 95% CI 0.91 to 3.26). The heterogeneity of the trials was low ($I^2$=0%).

Conclusion: This systematic review and meta-analysis suggests that ofatumumab is efficacious and safe for treating patients with RA as compared with placebo. The adverse events profile appears to be
acceptable at the present, but long-term trials and postmarketing surveillance are required to assess sustained efficacy and harms.
Reducing Unnecessary Routine Lab Tests for Hospitalized Medical Patients

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Introduction: Routine ordering of basic blood tests in the hospital drives up healthcare costs, increases risk of iatrogenic anemia and nosocomial infections, and extends length of stay. Reducing unnecessary labs may ultimately improve patient safety and outcomes, increase satisfaction, and lessen financial burden.

Objective: We aimed to reduce the number of routine complete blood counts (CBCs) and electrolyte panels ordered on Medicine teaching services at Mayo Clinic Hospital in Rochester, MN.

Methods: This quality improvement project took place at Mayo Clinic Hospital, Saint Mary’s Campus, and involved two general medicine teaching services. Stakeholders were identified, including patients, providers, nurses, lab technicians, and hospital administrators. Interviews were conducted with members of each group in order to determine factors contributing to the problem, and a root cause analysis was performed outlining those factors and barriers to change. Factors contributing to the ordering of unnecessary lab tests included resident inexperience, unclear expectations set by supervising physicians, and ease of ordering daily morning labs. Based on root cause analysis, provider education was selected as an intervention strategy. For the initial Plan-Do-Study-Act (PDSA), residents were asked to list “Daily Labs” as a numbered problem in their progress notes and indicate whether daily CBCs and/or electrolyte panels were necessary for each patient. The outcome measured was the average number of routine labs per patient. Total numbers of CBCs and electrolyte panels were measured for three days before and after the intervention, and data was compiled in a run-chart.

Results: 54 patients were admitted to the medicine 1 and 3 teaching services during our 6-day period of analysis. 71 CBCs and 125 electrolyte panels were ordered on 32 patients in the 3 days preceding intervention. 45 CBCs and 68 electrolyte panels were ordered on 34 patients in the 3 days post-intervention. The average number of labs per patient-day for the three days prior to intervention was 2.7. The average number of labs per patient-day for the three days after intervention was 1.8.

Conclusion: Encouraging providers to routinely consider and document necessity of daily labs led to a 33% reduction in tests ordered per patient-day. While the scope of duration in this initial PDSA cycle was limited, results indicate that provider training and accountability can potentially decrease unnecessary routine lab tests. Future studies can be designed to assess sustainability and applicability of this intervention in addition to assessing impact on patient outcomes and cost of care.
The Relationship between Serum Electrolytes and Electrocardiographic Intervals

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Introduction: Hypokalemia, hypocalcemia and hypomagnesemia are thought to cause an acquired long QTc syndrome, but this association is based only on a few small case series. Here, we aimed to evaluate the relationship between serum electrolyte concentration and changes in QTc interval and QRS complex.

Methods: This retrospective cohort study included 8,498 consecutive participants admitted to the coronary care unit at an academic tertiary care center from 2004 through 2013 who had at least one serum potassium and magnesium level measurement. The means of serum potassium, ionized calcium and magnesium were then categorized and the reference groups were 4.0-<4.5 mEq/L, 4.8-<5.0 mg/dL and 2.0-<2.2 mg/dL, respectively. Multivariate analysis adjusted for age, sex, race, mean serum electrolyte level, antiarrhythmic and drugs known to cause QTc prolongation was used.

Results: Serum potassium and ionized calcium were inversely associated with the prolonged QTc interval; only hypermagnesemia independently increased the risk of widened QRS complex. The association between serum potassium and prolonged QTc interval was shown by the adjusted ORs (1.04 95% CI, 1.03-1.05, 1.01 95% CI, 1.01-1.02 and 0.99 95% CI, 0.98-0.99 for potassium levels of <3.5, 3.5-<4.0 and >4.0 mEq/L, respectively). Similarly, the association between serum ionized calcium and prolonged QTc interval was shown by adjusted ORs (1.02 95% CI, 1.02-1.03, 1.01 95% CI, 1.01-1.02 and 0.99 95% CI, 0.98-0.99 for ionized calcium levels of <4.4, 4.4-<4.6 and >5.0 mg/dl, respectively). Paradoxically, hypermagnesemia was associated with QTc interval prolongation (ORs: 0.98 95% CI, 0.98-0.99, 0.99 95% CI, 0.99-0.99 and 1.01 95% CI, 1.01-1.02 for magnesium levels of <1.8, 1.8-<2.0, and >2.4 mg/dl, respectively). After adjusting for duration of QRS complex, the relationship between hypermagnesemia and prolonged QTc interval was no longer present. However, hypermagnesemia was independently associated with a widened QRS complex (ORs: 0.97 95% CI, 0.96-0.99, 0.98 95% CI, 0.97-0.99, 1.03 95% CI, 1.01-1.05 and 1.09 95% CI, 1.07-1.11 for magnesium of <1.8, 1.8-<2.0, 2.2-<2.4 and >2.4 mg/dl, respectively).

Conclusion: Contrary to conventional wisdom, hypermagnesemia was associated with a prolonged QTc interval via a mechanism of widened QRS complex. We also observed a level-dependent relationship between hypokalemia and hypocalcemia and an increase in risk of QTc interval prolongation, but neither serum potassium nor calcium was associated with changes in duration of the QRS complex.
Renal Complications of Chronic Lymphocytic Leukemia/Monoclonal B-cell Lymphocytosis (CLL/MBL)

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INTRODUCTION. Renal dysfunction, including both renal failure and nephrotic syndrome, can be a complication of hematological malignancy. While the renal complications of plasma cell dyscrasia are well described, the prevalence and types of renal complications in patients with CLL/MBL are not well delineated, with most information deriving from case reports or small case series.

METHODS. We conducted a retrospective analysis of all 4033 patients with CLL/MBL followed at Mayo Clinic between 01/1995 and 06/2014 and identified all CLL/MBL patients who underwent a kidney biopsy during the course of their disease to evaluate either renal failure or nephrotic syndrome. Standard processing of renal biopsies included light microscopy, immunofluorescence, and electron microscopy.

RESULTS. Between 01/1995 and 06/2014, 49 of 4033 (1.2%) patients with CLL/MBL had a renal biopsy. The most common renal pathology included: membranoproliferative glomerulonephritis (MPGN; n=10, [20%]), CLL interstitial infiltration as primary etiology (n=6, [12%]), thrombotic microangiopathy (TMA; n=6, [12%]), and minimal change disease (MCD, n=5 [10%]). Nine of 10 (90%) MPGN cases were immune-complex-mediated. All 5 MPGN patients treated with rituximab and cyclophosphamide (RC)-based regimens had recovery of renal function compared to 0/3 patients treated with rituximab +/- steroids without inclusion of an alkylating agent. Two patients remained untreated, and 1 eventually needed chronic dialysis. CLL infiltration as the primary cause of renal abnormalities was primarily observed in relapsed/refractory patients (4 of 6), although occurrence in 2 previously untreated cases was also observed. All cases of MCD resolved with immunosuppressive agents (e.g. monoclonal antibodies with or without steroids) only. TMA primarily occurred as a treatment related toxicity due to pentostatin (4/6 cases), and resolved with drug discontinuation.

CONCLUSIONS. Renal biopsy plays an important role in diagnosis and management of CLL/MBL patients who develop renal failure and/or nephrotic syndrome. MPGN appears to be the most common etiology of renal disease in CLL/MBL patients with proteinuria, although MCD is another relatively common etiology. While MCD responds to immunosuppressive therapy, alkylating agent based treatment appears necessary for MPGN. CLL infiltration should be considered as a potential etiology, particularly in relapsed refractory patients. Survival data for each etiology are being abstracted and will be presented at the meeting.
Characterization of hypothalamic hunger and satiety signals with pulsed arterial spin labeling MRI

First Author: Priya Vijayvargiya, MD Other Authors: Barham K. Abu Dayyeh MD MPH, John D. Port MD PhD, Michael Camilleri MD

Introduction: The hypothalamus is the center for energy homeostasis in the brain regulating energy intake and expenditure to preserve a biologically-preset body weight. Two leptin-sensitive neuronal subsets situated within the hypothalamic arcuate nucleus have been identified: the neuropeptide Y and agouti-related peptide (NPY/AgRP) neurons, which potently increase food intake and reduce energy expenditure, and the proopiomelanocortin (POMC) neurons, which reduce food intake and increase energy expenditure.

Aims: To characterize the hypothalamic signals of satiation by magnetic resonance imaging (MRI) with pulsed arterial spin labeling (PASL) in response to a nutrient drink, and to compare these signals and their relationship with the maximal tolerated volume (MTV) ingested on a liquid meal tolerance test in non-obese healthy volunteers.

Methods: We prospectively studied the hypothalamic response to feeding using PASL MRI (3 Tesla MRI scanner) in 20 healthy subjects. All subjects had normal scores, comparable to those of lean references, on the 21-item Three-Factor Eating Questionnaire (TFEQ-R21). The liquid meal tolerance test used was Ensure® (Abbott Labs, Abbott Park, IL) ingested at a rate of 120ml every 4 minutes. Sequential dynamic PASL MRI scans were obtained from each subject after a period of 8 hours fasting and repeated at 15 minute intervals during the liquid meal tolerance test, at the time of reported MTV, and 30 minutes after MTV. Cerebral blood flow in brain regions of interest (ROI) was quantified and reported as (ml/g/min). Repeat measures analysis of variance, and multivariate linear regression were used for statistical analysis. Data show mean ± SD.

Results: Age of the 20 white subjects was 33 ± 7.4 years, 10 were female, and BMI was 25.6 ± 3 kg/m². Male and female subjects had similar baseline characteristics. The MTV for the entire cohort was 1220 ± 317 ml. There was no gender difference in the MTV (p=0.14). Baseline (pre-meal) hypothalamic signal on PASL MRI was positively correlated with MTV on univariate (β=0.45, p=0.04) and multivariate analysis (β=0.53, p=0.018) after adjusting for gender and BMI. On repeat measures analysis, hypothalamic PASL MRI signal decreased significantly after ingesting the MTV of the liquid meal and this decreased signal persisted 30 minutes later, compared to the control region of the posterior frontal cortex, which did not change with meal ingestion (p=0.04). Females had a more robust decrease in hypothalamic signals after meal ingestion compared to males (β=-0.16, p=0.07).

Conclusions: PASL MRI provides a novel brain imaging technique able to dynamically quantify satiation signals within the hypothalamus. This novel approach, which does not require ionizing radiation, will enable interrogation of the neural circuits regulating appetite, satiety and satiety in humans in health and in obesity.
Analysis of a Guideline-Derived Resident Educational Program on Inpatient Glycemic Control

William B. Horton, MD, Andrew Q. Weeks, MD, J. Matthew Rhinewalt, MD, Richard D. Ballard, MD, and Frederick H. Asher, MD

Introduction The link between uncontrolled hyperglycemia and increased patient morbidity, mortality, and length of hospital stay is well-established. Consensus guidelines recommend basal plus bolus insulin regimens rather than sliding scale insulin alone for inpatient glycemic control. We sought to determine the effects of a resident educational program designed to encourage use of proper insulin regimens on glycemic control and length of stay.

Methods We performed a quality improvement project at an academic medical center in Jackson, Mississippi. All patients admitted to two inpatient medicine teams and placed on an insulin regimen from February to May 2014 were included. We compared the following variables before and after resident education: percentage of patients on basal plus bolus regimens, mean fingerstick glucose (FSG), length of hospital stay (LOS), and rates of hypoglycemia (FSG < 70 mg/dL) and severe hypoglycemia (FSG < 40 mg/dL). Sixty patients were included in the pre-education group and sixty-five in the post-education group. A two-tailed T test was used for all continuous data and a p-value < 0.05 was considered statistically significant.

Results After education, more patients (23% vs. 8%; p-value 0.024) were placed on basal plus bolus regimens. We observed a decrease in mean FSG (158.7 mg/dL vs. 165.1 mg/dL; p-value 0.028) and LOS (5.03 days vs. 6.98 days; p-value 0.042). Rates of hypoglycemia (4.6% to 1.5%; p-value < 0.001) and severe hypoglycemia (0.71% to 0.24%; p-value 0.089) increased. Discussion Our resident educational program significantly increased the number of patients receiving guideline-based inpatient insulin therapy and reduced mean FSG and LOS. Rates of hypoglycemia showed a statistically significant increase while rates of severe hypoglycemia did not. Larger multicenter studies with adjustment for potential confounders are needed to further assess the impact of educational intervention on inpatient glycemic control.
MISSISSIPPI POSTER FINALIST - RESEARCH Arnaldo F Lopez-Ruiz, MD

Protective Role of Acute Testosterone Infusion during Acute Kidney Injury (AKI)

Arnaldo Lopez-Ruiz, Andrea Soljancic, Kiran Chandrashekar, Luis A.Juncos

Introduction: Ischemia-reperfusion (I/R) injury commonly causes AKI during cardiac or aortic surgery and is associated with 60% mortality. The incidence and severity of I/R-induced AKI is higher in male surgical patients compared to females. Acute conditions like myocardial infarction or sepsis are associated with low testosterone levels. It is known that testosterone exerts cytoprotective actions through vasodilatation and modulating inflammation. Since I/R-induced AKI in males is associated with low testosterone levels, we believe that reduced testosterone levels during acute conditions like AKI contribute to increased renal damage due to greater intrarenal inflammation and vasoconstriction.

Hypothesis: “Infusing a bolus dose of testosterone during AKI reduces the pro-inflammatory response and improves the renal hemodynamics abnormalities leading to a lower renal dysfunction”

Methods: 4 groups of male SD rats; Sham, Sham + Testosterone, I/R-AKI and I/R-AKI + Testosterone. AKI was induced by placing intra-abdominal clamps in both renal pedicles for 40 min (ischemic period); clamps were then released and the rats followed for 48hs (reperfusion period). Testosterone propionate (20 µg/kg/min iv) was given at 3 hours post ischemia. During reperfusion, urine and blood were collected to evaluate renal function (plasma creatinine) and tubular injury (urine KIM-1). After 48hs, the renal medullary blood flow (RMBF) was measured in vivo and then the kidneys were harvested to measure intra-renal TNFa (Tumor necrosis factor-alpha) and VEGF (vascular endothelial growth factor) using Elisa Kits.

Results: Plasma creatinine (0.5 mg/dl vs 2.2mg/dl) and urine KIM-1 (380 pg/24h vs. 2200 pg/24h) were higher in AKI rats vs. controls (Sham). Also, RMBF was lower in rats with AKI (9 tpu vs 19 tpu) vs. controls. Intra-renal TNFa was elevated in AKI rats vs. controls (1.2 pg/mg vs 5.9 pg/mg). However, intra-renal VEGF was markedly reduced post-AKI (35 pg/mg vs 12 pg/mg). Rats receiving testosterone had lower creatinine (1.4 mg/dl vs 2.2 mg/dl) and less tubular injury (1300 pg/24h vs 2200 pg/24h) than rats with AKI. Furthermore, testosterone improved RMBF (15 tpu vs 9 tpu), reduced intra-renal TNFa (3.1 pg/mg vs 5.9 pg/mg) and increased intra-renal VEGF (21 pg/mg vs 12 pg/mg).

Conclusion: A bolus dose of testosterone given after the ischemic period improved renal function (creatinine) and attenuated tubular injury (KIM-1). Also, testosterone improved the RMBF, reduced intra-renal TNFa (pro-inflammatory cytokine) and increased intra-renal VEGF (cytoprotective factor), suggesting that a bolus dose of testosterone following cardiac or aortic surgeries may improve renal function in patients who have developed AKI.
Incorporation of the 2013 ACC/AHA Lipid Guidelines into the Management of Patients with Diabetes

First Author: Purvi G Patel, MD Stephanie Canham, MD Emily Fondahn, MD Melvin Blanchard, MD.

Significance: 100 million people worldwide are affected by diabetes mellitus and atherosclerotic cardiovascular disease (ASCVD) is the principal source of disability and death in diabetics. With the release of the 2013 ACC/AHA Lipid Guidelines, lipid management is now based on the correct intensity of statin therapy rather than a goal LDL. Diabetics, ages 40-75, should be on a moderate or high intensity statin based on the presence of clinical ASCVD and the 10-year risk score. Our internal medicine residency clinic was at goal for percent of patients with an LDL less than 100 (56%). Our clinical observation suggested that resident physicians may have difficulty with the implementation of these new guidelines in their continuity clinic. This quality improvement project aimed to assess and improve compliance with the 2013 ACC/AHA lipid guidelines for patients with diabetes in a large Internal Medicine resident clinic.

Methods: The charts of patients with diabetes with a lipid panel checked were reviewed monthly. The patients were evaluated for clinical ASCVD and had an ASCVD risk score calculated. Compliance to the new guidelines was determined by assessing whether patients were prescribed the correct intensity statin. A baseline compliance rate was determined between the months of 3/2014-6/2014. Monthly chart audits have continued to monitor compliance with the guidelines over time. All patient charts were then reviewed a second time after at least three months to assess improvements made at follow-up appointments.

Quality improvement initiatives included a brief 5 minute presentation and hand-out to residents and attendings regarding the lipid guidelines at 5 conferences, updating the diabetic note template to include ASCVD risk score, and encouraging use of ASCVD calculator applications via e-mails to the staff.

Results: 474 diabetic patients ages 40-75 were assessed for recommended management according to the new lipid guidelines. At baseline, 52% of patients were on the correct intensity statin which increased to 55% after various initiatives and to 63% on follow-up analysis. 23% had a chart history of ASCVD, but the vast majority had an ASCVD risk score of greater than 7.5 (83.1%). The percent of patients with a documented ASCVD risk score increased from 9.1% to 51.1%.

Value & Sustainability: Despite knowledge of clinical guidelines, physicians may not readily incorporate new guidelines into their clinical practice. The 2013 ACC/AHA lipid guidelines dramatically shifted how we perceive and treat hyperlipidemia. In our clinic, we found that about half of patients with diabetes were on the correct intensity statin, which increased slightly after education and changing a note template. We did have a substantial increase in calculation and documentation of the ASCVD risk score. Continued work is needed to identify further barriers to incorporation of the new lipid guidelines.
MISSOURI POSTER FINALIST - RESEARCH Dhivya Sugumar, MBBS

Improving documentation of Advance Directives and Code status in the outpatient setting by Resident Physicians

Dhivya Sugumar M.D, Lakiea Sidney MS, Eric S. Armbrecht PhD, Chitra R Uppaluri MD.

Data reveals that primary care physicians (PCPs) are in the most optimal position to discuss advance directives (AD) and code status with their patients, yet only 18 – 36% of adults have a completed AD. Residency training is a critical time where physicians must develop the skills and knowledge to discuss these topics with their patients to ensure that these discussions are done both effectively and timely after graduation.

At baseline, 11% of Internal Medicine Residency continuity clinic patients had a documented AD, and only 7% had a documented code status. Pre-intervention surveys revealed that 90% of resident PCPs acknowledged the importance of outpatient discussion of ADs and code status, but only 4% routinely discussed these topics with their patients. To bridge this gap and improve documentation of advanced directives and code status by resident PCPs in the outpatient setting 1) educational sessions during noon conference by a palliative medicine specialist explaining the technical aspects of ADs were done 2) a reminder code status prompt in the clinic note template was implemented and 3) A palliative care sub specialty clinic was started, where residents would specifically address ADs and long term goals with their clinic patients.

Six months post intervention 2, chart reviews revealed a 58% increase in code status documentation by resident PCPs. Since implementation of interventions 1 and 3, documentation of advance directives by resident PCPs has increased by 32%. Innovative ways to increase resident awareness and education of the importance of discussing AD and code status in the outpatient setting can be successful and translate long term into improved quality of care, especially at the end of life.
Extracorporeal photopheresis as second-line treatment for acute graft-versus-host disease: Impact on six month freedom from treatment failure

Li Zhou, Emma Das-Gupta, Hildegard Greinix, Ryan Jacobs, Bipin N. Savani, Brian G. Engelhardt, Adetola Kassim, Nina Worel, Robert Knobler, Nigel Russell, Madan Jagasia

Extracorporeal photopheresis (ECP) is a promising treatment for corticosteroid-refractory or dependent acute graft vs host disease (GVHD). However, traditional clinical endpoints used in studies to evaluate treatments of this complication incompletely capture a patient’s clinical response. Six month freedom from treatment failure (FFTF) has been proposed as a novel clinical trial endpoint and is defined by the absence of death, malignancy relapse/progression, or addition of next line of systemic immunosuppressive therapy within 6 months of intervention and prior to diagnosis of chronic GVHD. In this study, we analyzed 128 patients enrolled from three centers treated with ECP as second-line therapy for acute GVHD.

Our study demonstrated that 6 month FFTF correlates strongly with overall survival at 1 year (78.9%), 2 years (70.8%), and 3 years (69.5%). Furthermore, the incidence of 6 month FFTF was 77.3% with a 2-year survival of 56%. Grade of aGVHD (grade 2 vs. 3-4) at onset of second-line therapy was an important determinant of outcome, as measured by survival (HR 2.78, P <0.001), non-relapse mortality (HR 2.78, P=0.001) and 6 month FFTF (HR 3.05, P <0.001).

Our study supports the use of 6 month FFTF as a clinical trial endpoint for evaluating second line treatments in steroid-refractory/dependent acute GVHD, and demonstrates the efficacy of ECP in this patient population.
NEVADA POSTER FINALIST - RESEARCH Amhoud Farooq, MBBS

Unexpected effects of amino acids and NMDA receptor in the treatment of Acute liver failure and acetaminophen hepatotoxicity.

First Author: Ahmad Farooq, MBBS Anaum Maqsood ,MBBS Ahsan Farooq , MBBS Rafaz Hoque , MD Wajahat Mehal , MD

ABSTRACT BODY: Background: TLR4 and NLRP3 inflammasome activation are responsible for many inflammatory liver disease but little is known about their regulation. The NMDA receptor is known to be present on macrophages and its role in immune regulation has not been investigated. We used the NMDA ligand aspartic acid (AA) to test the role of NMDA activation in liver inflammation. Aims: To test if AA can modulate TLR4 and NLRP3 inflammasome signaling and liver injury via its known NMDA receptor.

Methods: The NLRP3 inflammasome was activated by LPS and ATP in primary mouse macrophages, Kupffer cells and human peripheral monocytes in the presence and absence of AA and production of pro-IL1 beta and IL-1 beta assayed. NMDA receptor and beta-arrestin 2 dependence of AA effects was examined in the RAW 264.7 cells using siRNA knockdown. AA was supplemented in vivo in the presence or absence of beta-arrestin 2 knockdown in the LPS/d-Gal hepatitis and acetaminophen hepatotoxicity. Liver tissue was examined for injury and inflammation by histological grading and serum transaminases.

Results: AA suppresses in vitro TLR4 and NLRP3 inflammasome dependent inflammation in human peripheral monocytes, mouse peritoneal macrophages and Kupffer cells as assessed by levels of pro-IL1 beta and IL-1 beta. AA immunosuppressive effects require NMDA and beta-arrestin 2. In vivo AA supplementation decreases liver inflammation and injury in the LPS/d-GalN hepatitis (hemorrhage 1.03 +/- 0.3 versus 3.89 +/- 0.2, ALT 744 +/- 406 versus 12560 +/- 5295, P < 0.05), and acetaminophen hepatotoxicity (necrosis 0.1 +/- 0.1 versus 1.4 +/- 0.1, hemorrhage 1.77 +/- 0.2 versus 2.5 +/- 0.6, liver transcript for pro-IL-1 beta and Nlrp3 caspase 1 and serum IL-1 beta release, P < 0.01). AA induced in vivo protection is dependent on NMDA and beta-arrestin 2.

Conclusions: Aspartic Acid acts through NMDA and beta-arrestin 2 to suppress TLR4 and NLRP3 mediated pro-inflammatory signaling and hepatitis. Aspartic acid has potential as a therapeutic agent in the treatment of acute liver failure.
Practices and Utilization of DVT Prophylaxis at a Community Hospital

Shahrukh Hussain Khan, Sumit Sehgal, Ranjit Makar, Aditi Singh

Deep venous thrombosis prophylaxis is an important preventive modality which should be utilized in appropriately selected patients. However, medications used for prophylaxis do not come without risk. The current CHEST guidelines recommend that patient’s be appropriately risk stratified to avoid improper use of pharmacological or mechanical prophylaxis in low risk population. The aim of our study was to determine if clinicians appropriately adhere to guidelines in our community hospital. Proper use has both patient safety as well as cost implications.

We analyzed proper utilization of DVT prophylaxis in the inpatient setting to determine if clinicians implement practice current evidence based recommendations. We conducted a retrospective observational study at single center community hospital. All admissions between 4/1/14 to 4/4/14 were reviewed which included 330 patients. Among them 182 non-surgical adult patients were identified. Mean age 52.7 with 49% male patients. Average length of hospitalization was 3.4 days. In patients with DVT prophylaxis enoxaparin was used in 67 (36.8%) followed by heparin 9(4.9%). Early ambulation was selected for 43(23.7%) patients.

A DVT template was used in 154 (84.6%) patients. Padua prediction scale (PPS) was used for DVT risk stratification. All 11 parameters were abstracted from charts. Calculated mean PPS was 1.57. Pharmacological or physical DVT prophylaxis was used on low PPS score (PPS <4) on 95 (52.2%) floor patients while only 83(45.6%) patients received appropriate prophylaxis per guidelines. 4 (2.2%) patients were not placed on any prophylaxis even with high PPS score. In conclusion, we found that clinicians should be more cautious in DVT prophylaxis. Our data suggests that medications are likely overused. Efforts and policies should be made to have judicious use of DVT prophylaxis in non-surgical patients.
NEW JERSEY POSTER FINALIST - RESEARCH Abhinav Agrawal, MD

Are we being an Oxy-moron: The overuse of oxygen in a community hospital setting.

First Author: Abhinav Agrawal, MD Paavani Atluri, MD Koteswararao Thella, MD Anar Modi, MD Mana Rao, MD Imran Ismail, MD Tisha Tan, MD Madhu Paladugu, MD

Introduction: Oxygen is one of the most important and yet the most misused therapy in an in-patient hospital setting. In spite of having clear indications physicians often tend inadvertently order oxygen on every patient being admitted. This leads to wastage of resources and increases the cost of healthcare. More importantly, oxygen therapy is not benign and has deleterious adverse effects. Our objective was to study the overuse of oxygen and institute an intervention to prevent the wastage of resources and prevention of such potential adverse events.

Methods: We designed a pilot project and implemented on one of our telemetry units. We first assessed the patients on a single inpatient floor at bedside and looked into their electronic health records for indication of oxygen, co morbidities, orders for oxygen therapy, orders for titration, actual implementation of the physician orders by nurses and respiratory therapist. Our intervention was to educate the residents, nurses on the targeted floor and respiratory therapists about the potential adverse effects of overuse of oxygen, importance of titration of oxygen to a set goal, indications and expenses involved in the usage and wastage of oxygen therapy. After 4 weeks of intervention, we collected post-intervention data using the same parameters on the same floor.

Results: The total number of patient’s in the pre-intervention and post intervention arms were 40 each. In the pre-intervention arm, 28 patients had active orders of oxygen of which 24 had indications to be on oxygen therapy. 18 patients were using oxygen. 12 patients were using oxygen without being titrated to the goal of saturation >92%. In the post-intervention arm 22 patient’s were on oxygen of which all the patient’s had an indication to use oxygen (p-value - 0.6825). 20 of these 22 patients were using NC thus with a significant P-value of 0.0447 after an intervention. Only 4 of these patients were on therapy without titration (p value – 0.0761). Based on our calculations, the total annual saving after 1 intervention on a floor having 40 patients was $2441.12.

Conclusion: Based on our results, we concluded that oxygen is often used a placebo because of lack of awareness of its potential hazards as mentioned above and its expenses involved. This involves: (1) Oxygen therapy being initiated without an appropriate indication. (2) Wastage of oxygen and oxygen delivery devices in patients who are off the floor or are doing well without oxygen therapy (due to lack of titration). (3) Lack of awareness about adverse effects of oxygen. By the means of education of the physicians, trainee physicians, nurses and ancillary staff, we calculated that we could save a significant amount of expense and also avoid the preventable adverse effects of overuse of oxygen therapy.
Monmouth Emergency Evaluation Tool (MEET) - a unique tool to predict observation status.

First Author: Abhinav Agrawal, MD Sarfaraz Jasdanwala, MD Manan Parikh, MD Prashant Rawla, MD Imran Ismail, MD Warren Walkow, MD

Introduction: Observation status, as delineated under CMS-1599F- Inpatient Prospective Payment System, which encompasses the "two midnight rule", requires hospitals to determine whether a patient is likely to stay for greater than two midnights in the hospital. Determination of whether the patient is either an inpatient status or an observation status has a significant financial impact on both the hospital and the patient. A scale that can reliably and consistently distinguish between patients who are likely to stay for less than 48 hours and who are likely to stay for more than 48 hours would be invaluable. Correct stratification early on in the course of admission can help hospitals adopt strategies that can partially mitigate the substantial financial losses incurred in caring for general internal medicine observation patients. At the same time, it can also facilitate the interaction between the admitting physician and patient regarding the patient status. Objective: To develop and retrospectively validate a scale that can reliably predict length of stay less than 48 hours.

Methods: The scale was devised at the Department of Medicine, Monmouth Medical Center. In devising the scale, experience gained by reviewing several thousand observation cases over several years by the faculty member mentoring the project, along with the insight obtained by reviewing the current literature and about 1000 recent observation admissions at MMC by the authors was utilized. The scale was validated retrospectively. A list of 400 consecutive patients on medicine service who were discharged by a physician from MMC in less than 48 hours after being admitted between the months of January 2013 and December 2013 was generated from medical records. Patients who were transferred to other hospitals for inpatient care, expired, left against medical advice (AMA), transferred to hospice, transferred to other departments were excluded from the list. Similarly, a contemporaneous consecutive list of 414 patients who were discharged by a physician from MMC after greater than 48 hours was generated. The scale was then applied to these patients by reviewing their electronic medical records and the data was tabulated and analyzed with the help of MS office Excel sheet and QuickCalcs-Graphpad software.

Results: MEET score of greater than or equal to 3 predicts a length of stay less than 48 hours with 90.5% sensitivity (95% CI between 87.10%-93.15%) and 93.47% specificity (95% CI between 90.64%-95.51%). Conclusion: MEET score is easy and quick to calculate as it utilizes parameters readily and routinely available in the ED records at the time of admission. Based on the high sensitivity and specificity of the MEET scale as shown by retrospective validation, it is recommend that it be studied in a prospective fashion at MMC ED.
NEW JERSEY POSTER FINALIST - RESEARCH Tasnim Imran, MD

Association of Obstructive Sleep Apnea and Pulmonary Hypertension: a meta-analysis

First Author: Tasnim F. Imran, MD Spencer Liu BS, Tanzib Hossain MD, Marya Ghazipuray MS, Hormoz Ashtyani MD, Bernard Kim MD

**Background:** Mild pulmonary hypertension (PH) may occur in patients with obstructive sleep apnea (OSA), even in the absence of cardiac or lung disease. There is limited data on the development and severity of pulmonary hypertension in patients with obstructive sleep apnea without underlying cardiac or lung pathology, and the response of continuous positive airway pressure (CPAP) treatment on pulmonary artery (PA) pressures.

**Methods:** The Pubmed, Medline, Cochrane reviews, Central Registry of Controlled Trials, Web of Science, and EMBASE databases were searched (the latest search date: October 2014) with the following keywords: obstructive sleep apnea and pulmonary hypertension, sleep apnea, pulmonary artery pressure.

**Results:** A total of 1,152 patients filled our criteria from 17-pooled studies. Of these studies, 8 met criteria for mean PA pressures defined as greater than 25 mmHg. The prevalence of PH in patients with OSA was calculated to be 30.6% from the literature. The pooled mean PA pressure was 33 mmHg +/- 9.7 for patients with OSA who had PH. OSA patients with PH have a mean deviation of 3.29 +/- 0.68 higher BMI than those without PH (t-value: 5.37, p<0.0001). Five studies measured PA pressures pre and post continuous positive airway pressure (CPAP) therapy. The mean reduction in PA pressures was 6.69mm/HG (95% CI -12.63, -0.74) after CPAP treatment.

**Conclusions:** We conclude that OSA may be associated with PH (mean PA pressures of 33 mmHg +/-9.7) even in patients without coexisting cardiovascular or lung disease and in the absence of significant daytime hypoxemia. Even patients with severe OSA were noted to have only a modest increase in PA pressures. Potential mechanisms leading to daytime PH in patients with OSA include hypoxic pulmonary vasoconstriction, hypoxia induced endothelial dysfunction, and pulmonary vascular remodeling. OSA patients with PH tend to have higher BMIs than those without PH. Pulmonary hypertension is an independent predictor of mortality in patients with obstructive sleep apnea. CPAP may reduce pulmonary vessel reactivity to hypoxia and improve pulmonary endothelial function, which may reduce PA pressures to near normal. It may potentially lead to reversal of PH in some patients, but further studies with larger sample sizes and longer duration are needed to confirm this hypothesis.
Peritoneal Carcinomatosis in Colorectal Cancer: Proposed Algorithm for Cytoreduction/HIPEC

First Author: Nara Lee, MD Joseph Skitzki, MD Valerie Francescutti, MD

Background: As a natural progression of colorectal cancer, transcoelomic spread to the peritoneum result in peritoneal carcinomatosis (PC). Historically, this was approached as generalized disease with systemic therapy, but locoregional approach with cytoreduction and hyperthermic intraperitoneal chemotherapy (HIPEC) has gained wide acceptance. Given the inherent morbidity and mortality, patient selection is paramount, yet challenging due to limited practical clinical tools available. It is our attempt to reduce the confusion and assist in the decision process by providing a treatment algorithm.

Methods: Published literature in the PubMed database regarding peritoneal carcinomatosis in colorectal cancer was reviewed. Based on the available evidence, algorithm is proposed to aid in patient selection for cytoreduction/HIPEC.

Results: Peritoneal Carcinomatosis Index (PCI) of 20 is widely accepted as the threshold above which cytoreduction/HIPEC should be reconsidered as a treatment option. If PCI < 20 and complete cytoreduction can be achieved through peritoneal stripping, cytoreduction/HIPEC should be considered. If PCI <20, but prospect of complete cytoreduction is unlikely, systemic therapy is recommended with restaging CT afterwards to determine candidacy for cytoreduction/HIPEC. For PCI >/= 20, systemic chemotherapy is preferred over locoregional therapy for achieving complete cytoreduction is more difficult with increased risk of surgical complications. If restaging CT shows favorable response to systemic therapy and complete cytoreduction is probable, cytoreduction/HIPEC may be considered at that time. If unresponsive or progressive disease on systemic therapy, locoregional therapy is of limited benefit.

In synchronous peritoneal metastases with primary tumor, if primary tumor is asymptomatic and PCI < 20, resection of the primary tumor and cytoreduction/HIPEC for PC should be considered with curative intent. If asymptomatic and PCI >/= 20, systemic therapy with repeat CT to determine tumor response is recommended. If favorable, primary tumor resection with cytoreduction/HIPEC may be considered. For symptomatic primary tumor, mixed data exists regarding primary tumor resection thus decision should be made on an individual basis. If resection of symptomatic tumor is performed, we suggest systemic therapy with repeat CT to assess response. Based on the treatment response and PCI, cytoreduction/HIPEC may be considered as discussed above.

Conclusion: Although the cornerstone of treatment decisions involves a thorough discussion between the multidisciplinary team and the patient, we present treatment algorithms to assist in patient selection for cytoreduction/HIPEC. These algorithms should be used in conjunction with clinical expertise, patient's comorbidities, performance status and surgical risk stratification.
NEW JERSEY POSTER FINALIST - RESEARCH Abdul Hameed Zaid, MBBS

Interprofessional education: establishing a collaborative medicine-pharmacy research program.

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Introduction: It is imperative that students and professionals understand how to assess medical literature and conduct clinical research as medical research is vital to the progress of evidence-based medicine (EBM). A strong research foundation is an invaluable asset in judging study merit and making clinical practice decisions. Interprofessional collaboration (IPC), where participants from two or more professions learn from and with each other, is an important model in medical education. This study was conducted to determine the impact of an IPC research certificate program in improving the competence of healthcare residents and students in interpreting medical research.

Methods: Our study utilized the before-and-after study design in which an eight-hour research certificate program was provided to internal medicine residents and students as well as pharmacy residents. The program was conducted by experienced clinical pharmacists with significant research experience. It consisted of four, two-hour topic lectures on statistical concepts and clinical trial design, developing research questions and abstract writing, developing and performing platform and poster presentations, grant writing/submission and manuscript development. Participants completed the Fresno test, a validated educational tool designed to assess knowledge of basic EBM concepts, both before and after attending the program. Changes in test scores were used to assess the impact of the program on research competence. Participants were required to attend all four lectures in order to be included in the study, and each participant served as his or her own control. Test scores were evaluated using the Student's two-tailed T test for analysis. A medicine resident who did not participate in the program reviewed and interpreted all test results.

Results: The program was open to 51 participants and a total of 41 healthcare residents and students completed the program. EBM knowledge scores on the 212-point Fresno test increased from a baseline mean of 96.5 +/- 16 points (46%) to 133.7 +/- 22 points (61%) (p<0.001) upon completion of the program. These results were consistent across all disciplines; medical students, medical interns and residents as well as pharmacy residents demonstrating significant improvement in interpreting data and understanding concepts at the core of medical research.

Conclusion: An interprofessional collaboration (IPC) research certificate program increased evidence-based medicine (EBM) research knowledge, as demonstrated by a validated research test. IPC research certificate courses may be considered for incorporation into both medical and pharmacy resident training programs.
Improving the Documentation of Nutritional Supplements in an Outpatient Primary Care Clinic

First Author: Christopher Bunn DO Lida Fatemi DO, Christina Rea MD, Elizabeth Snyder MD, Jens Langsjoen MD

Introduction: Research indicates that 15 -20% of Americans have taken some form of supplement in the last 12 months. One study demonstrated over half of patients don’t disclose supplement use because providers don’t specifically ask. Joint Commission requires documentation of supplements during medication reconciliation but the current EMR formulary does not contain a complete registry of common over-the-counter (OTC) supplements. Supplements must be tediously entered manually as miscellaneous medications. The lack of auto-populating makes documenting patient’s herbal supplements prohibitively difficult. This lack of medical documentation could result in adverse drug-supplement interactions. Our objective is to improve the documentation of supplements during electronic medication reconciliation.

Process Mapping and Defining the Problem: The current system for documenting supplements fails in multiple ways, but three main pathways were identified for intervention. The areas for improvement included changing the electronic medication reconciliation process by creating an auto-populating folder of supplements. Educating providers about the importance of supplement documentation and instructing providers to directly ask patients about supplement use.

Interventions: A computerized folder entitled “Supplements” was created in the EMR. This folder contains evidence based dosing of 65 supplements, 32 Chinese herbal preparations and 5 OTC proprietary herbal blends. The folder appears whenever the add medication tab is activated. When a supplement is selected from the folder, a dose, route, and frequency are automatically reconciled into the patient’s medication list.

Fifty two providers were polled regarding their attitudes toward supplements. 20% indicated that they did not perform supplement reconciliation and 68% indicated that supplement reconciliation was somewhat difficult with the current system. 23% responded that they were least concerned about patient safety and supplement use. Providers were educated about JHACO requirements for supplement reconciliation and the possible dangers of common supplement-medication interactions. Providers were trained on how to use and document supplements with the new folder. After six months of educational interventions providers will be surveyed. Changes in their attitudes toward supplement medication reconciliation along with their self reported reconciliation habits will be assessed.

In order to prompt patients to disclose supplement use providers were instructed to ask patients “In addition to your prescribed medications, do you use any supplements, vitamins, minerals, herbs, nutritional supplements or over the counter medications?”

Measuring the Outcome: In the four months before the interventions, 91 supplements were documented as patient medications in the EMR. In the four months following the interventions, 230 documented supplements appeared in patient’s medication lists. This represents a 130% increase in supplement documentation.

Conclusion: Using a dedicated supplement folder that automatically populates dose, route, frequency and indication improves the documentation of OTC supplements in an outpatient primary care clinic.
NEW MEXICO POSTER FINALIST - RESEARCH Benjamin R Deaton, MD

Trajectory and Long Term Outcomes in Patients with MRSA bacteremia

Ben Deaton, Laia Vazquez, Cristina Vazquez-Guillamet, Renee Mercier, Rodrigo Vazquez-Guillamet. University of New Mexico Hospital, Albuquerque, NM.

Introduction: MRSA is an important cause of bacteremia. It remains the most common pathogen in health care associated bacteremia and carries significant morbidity and mortality. The aim of our study was to describe the trajectory and long-term outcomes of patients with MRSA bacteremia and the interplay between bacterial, treatment, and host factors in determining outcomes.

Methods: We included all patients admitted to the University of New Mexico Hospital between January 1st, 2002 to December 31st, 2013 who were either admitted with or developed MRSA bacteremia during their hospital stay. The first episode of bacteremia was considered the index case for each patient. Candidate predictor variables included: host data (age, co-morbidities, McCabe-Jackson score, MRSA carriage status, bacteremia Pitt score and criteria for complicated bacteremia), bacterial characteristics (USA strain, Panton Valentine Leukocidin production (PVL), presence of Accessory Gene Regulator – AGR) and treatment data (drug and duration). The main outcomes were mortality at 90 days and 1 year. The secondary outcomes were hospital readmission during the same period and nursing home residence. Predictors were evaluated using survival analysis.

Results: We identified 242 distinct patients with MRSA bacteremia. Mean age was 51.8 ± 16.0 years, 175 (72.3%) were male, 95 (39.3%) Caucasian and 90 (37.2%) Hispanic.

The most common sources of bacteremia were injection drug use (26%) and endocarditis (23%). USA 100 (35.5%) and USA 300 (60.5%) strains were the most prevalent. The vast majority of patients received vancomycin (237 patients, 97.9%) with a median duration of treatment of 31 days (IQR 14-42 days).

41(16.9%) patients died during the index hospitalization. Mortality at 3 months was 23.5% and 37.4% at 1 year. 62 patients were readmitted between 3 months and 1 year with infectious diseases being the main cause in 30 (73.2%) patients. Independent predictors of mortality at 3 months were age (HR 1.03; 95%CI 1.01-1.05), liver disease (HR 2.0; 95%CI 1.0-4.0) and ICU stay (HR 3.7; 95%CI 1.7-8.1). Duration of treatment of at least 4 weeks was protective (HR 0.3; 95%CI 0.2-0.8). For 1 year mortality, same variables remained significant with the addition of septic shock (HR 2.4, 95% CI 1.2-4.8.)

Conclusion: Age, liver disease, markers of severity of acute illness (ICU stay, septic shock) and duration of treatment impact mortality at 90 days and 1 year following MRSA bacteremia. Corrected for co-morbidities, there was excedent mortality at 1 year. Most readmissions were due to infectious processes.
NEW YORK POSTER FINALIST - RESEARCH Puvanalingam Ayyadurai, MBBS

HIV ASSOCIATED PULMONARY ARTERIAL HYPERTENSION IN A COHORT OF HIV INFECTED AFRICAN AMERICANS.

First Author: Puvanalingam Ayyadurai, MBBS

Background: Pulmonary arterial hypertension has been described in HIV patients. This is believed to be due to HIV virus per sec. The prevalence of HIV associated pulmonary artery hypertension has been estimated to vary from 0.5% to 2.6%. The purpose of this study is to find out the prevalence of HIV associated pulmonary hypertension among African Americans with HIV infection and analyse the clinical feature of this entity.

Materials and methods: A retrospective analysis of 2512 African American (males-- 1230; females-- 1282) patients with HIV infection who were seen in the Bronx Lebanon hospital and it's affiliated clinics from 2009 to 2014 were evaluated for the presence of pulmonary hypertension. Mean age of all the patients who were analysed was around 50.12. Both inpatients and outpatients were analysed involving patients of all age and both sexes. Pulmonary hypertension diagnosis was made by using Echocardiogram. For all the patients other tests like chest X ray, CT chest and in selected cases, specific laboratory tests had been done to rule out other secondary causes.

Results: Out of the 2512 HIV infected African American patients analysed, 260 (10.35%) patients had pulmonary hypertension of any cause. Out of the 260 HIV patients with pulmonary hypertension, 48 patients (1.91%) were found to be having HIV associated pulmonary arterial hypertension. Of these males were 20, females --28. Prevalence among females was 2.1% and among males 1.6%. The average CD4 count of the entire sample was 362.42. The mean CD 4 count of these patients with HIV associated pulmonary arterial hypertension were found to be 316.57 (p value >0.05) implying that the CD 4 count level does not correlate with the occurrence of pulmonary arterial hypertension in HIV patients. Mean pulmonary artery systolic pressure for all these 48 patients was 42.30. (SD+- 1.8).

Conclusion: HIV associated pulmonary arterial hypertension prevalence in this study is higher than the data obtained from other series. This is the first study done exclusively among African Americans. This study was done in the post HAART era and there is no significant difference in the prevalence of HIV associated pulmonary arterial hypertension from the pre HAART era. This implies that the HAART therapy does not alter the course of pulmonary arterial hypertension.

Limitation: This study was done as a retrospective study in a hospital set up and all limitations of retrospective and hospital based studies apply. Also in this study Echocardiogram was used to document pulmonary arterial hypertension which may not be as accurate as pulmonary arterial catheterization.
NEW YORK POSTER FINALIST - RESEARCH Amit Bhanvadia, MD

Shifts in the Microbiota Following Antibiotic Therapy for Clostridium difficile Infection Favor Enterobacteriaceae

Bhanvadia, Amit Yang, Joy Smith, Mark B. Marwil, Zachary Kassam, Zain Grossman, Evan Lawlor, Garrett Alm, Eric Martello-Rooney, Laura

Background: Clostridium difficile infection (CDI) is the leading health care-associated infection in the United States and a significant public health threat. Standard antibiotic treatment with metronidazole or vancomycin for primary and recurrent CDI are suboptimal; however, restoration of a ‘healthy’ gut microbiome by fecal microbiota transplantation has been promising for recurrent CDI. It is understood that CDI occurrence and recurrence is linked to a dysbiotic microbiome, however there is a paucity of data examining microbial signatures in relation to antibiotic therapy.

Aims: Our aim was to examine the microbiome in patients pre- and post-CDI treatment to determine microbial predictors of severity and response to specific therapeutic strategies.

Methods: We enrolled 18 patients prospectively at 2 hospital sites in Brooklyn, New York. CDI patients were identified via toxin+/PCR+ stool samples and diarrhea symptoms in keeping with clinical guidelines. Samples were collected at 4 distinct time intervals: Day 0 (diagnostic sample), T=2 days (post-treatment), T=7 days, and T=14-21 days. Stool samples were placed into 1mL RNAlater and stored at -80°C until analysis. Clinical meta-data obtained at each time interval to assess clinical severity included vital signs, abdominal pain and distension, number of bowel movements, components of the Hines VA criteria and laboratory data. Extracted DNA was multiplexed with molecular barcodes and sequenced on an Illumina HiSeq 2000.

Operational taxonomic units (OTUs) were called using an in-house pipeline, SmileTrain, which utilizes UCLUST. OTUs were then clustered by sample profile using the Ward method, with Shannon-Jensen Divergence as a distance metric. The coherence of Enterobacteriaceae OTUs upon clustering with sample profiles was assessed for significance by computing the UNIFRAC distance. A null distribution was obtained by randomizing the taxonomic labels.

Results: A general trend toward an increase in the relative abundance of Enterobacteriaceae (gram-negative facultative anaerobes) was observed following antibiotic therapy. We suggest that this clade is able to expand since a niche space previously occupied by sensitive strains is released upon antibiotic therapy. While this family-level classification is general and includes commensal species, it also boasts a variety of other pathogens such as Salmonella, Klebsiella, and Shigella.

Conclusions: The lack of targeted strategies in current CDI treatments fails to address the specific manner in which these therapies are effective. In this study, we identified a bacterial community that becomes abundant with CDI treatment regardless of the antibiotic regimen employed. The goal of this investigation is to put forth a model of bacterial identification that predicts future response to therapy.
NEW YORK POSTER FINALIST - RESEARCH Sunny Goel, MD

Relationship of Body Mass Index With All-Cause and Cardiovascular Mortality and Hospitalizations in Patients with Chronic Heart Failure- "The Obesity Paradox"

Sunny Goel, MD Abhishek Sharma, MD Carl J. Lavie, MD Jeffrey S. Borer, MD Ajay Vallakati, MD Francisco Lopez-Jimenez, MD, MSC Armin Arbab-Zadeh, MD, Ph.D Debabrata Mukherjee, MD, MS Edgar Lichstein, MD

Background: Clinical studies have indicated the existence of an “obesity paradox” in patients with chronic heart failure (HF), i.e., reduced mortality among patients who have elevated body mass index (BMI) compared to normal weight reference groups. We aim to investigate the relationship of BMI with all-cause and cardiovascular (CV) mortality and hospitalizations in patients with chronic HF.

Methods: A systematic search of studies published between 1966 to January 31, 2014 was conducted using Pub Med, CINAHL, Cochrane CENTRAL and the Web of Science databases. We identified studies reporting rate of total mortality, cardiac mortality and risk of hospitalization in patients with HF in various BMI categories (<20 kg/m² (low); 20-24.9 kg/m² (normal reference); 25-29.9 kg/m² (overweight); 30-34.9 kg/m² (obese); >=35 kg/m² (severely obese)) were identified. Event rates were compared using a forest plot of relative risk using a random effects model assuming inter-study heterogeneity.

Results: Two study authors independently reviewed 124 articles reporting the outcomes of interest and identified 6 studies for final analyses (N=22807). After mean follow up period of 2.85 years, the risk for adverse events was highest among patients with low BMI: Total mortality RR 1.27 [95% CI 1.17 – 1.37]; CV mortality 1.20 [95% CI 1.01 –1.43]; and re-hospitalization 1.19 [95% CI 1.09 – 1.30]. Risk of CV mortality and hospitalization was lowest in overweight patients (RR0.79 [95% CI 0.70 - 0.90] and 0.92 [95% CI 0.86-0.97] respectively). Increasing degree of obesity failed to achieve a statistically significant effect on CV mortality (0.82 [0.64-1.05] and 0.71 [0.50-1.01] for obese and severely obese, respectively) and on hospitalization (0.99 [0.92-1.07] and 1.28 [0.88-1.87] for obese and severely obese, respectively.

Conclusion: Risk of total mortality and CV mortality and hospitalization was highest among chronic HF patients who were underweight as defined by low BMI, whereas risk of CV mortality and hospitalization was lowest in the overweight. Further prospective studies are needed to investigate this association and apparent “overweight paradox” and explore potential underlying mechanisms for this association.
NEW YORK POSTER FINALIST - RESEARCH Huijuan Liao, MD

The Etiology and Risk Factor Analysis in Hypercalcemic Crisis

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Introduction: Hypercalcemic crisis is a rare but life-threatening condition involving the decompensation of hypercalcemia (usually when serum calcium > 13-15 mg/dL) with significant disturbance to cardiac, renal, gastrointestinal and neurological function. Although major textbooks have thorough and detailed reviews of hypercalcemia, there are no articles elaborating specifically the etiology and pathophysiology of hypercalcemic crisis. The goal of this study was to identify the etiologies and risk factors of hypercalcemic crisis.

Methods: We performed a retrospective review from 01/2012 to 05/2014 of patients with hypercalcemia at our tertiary care center and analyzed their characteristics. Sixty-two patients with severe hypercalcemia (adjusted serum calcium level by albumin = 13.5 mg/dL) were identified from 262 of hypercalcemia. Demographic and clinical characteristics, such as age, gender, race, etiologies (e.g. primary hyperparathyroidism (pHPT), malignancy, or other causes), serum calcium level, clinical manifestations including gastroenterology, renal, cardiovascular, altered mental status, EKG changes, precipitating factors (dehydration, acute kidney injury (AKI), infection) were evaluated.

Results: Our study revealed that there were no differences in the etiologies between hypercalcemic crisis (pHPT/malignancy/others: 15%/60%/25%) and severe hypercalcemia without crisis (pHPT/malignancy/others: 7.1%/64.3%/28.6%, P = 0.617). Compared with severe hypercalcemia without crisis, the serum calcium level was significantly higher in hypercalcemic crisis (16.9±1.8 mg/dL vs 14.8±1.1 mg/dL, P < 0.001). However, no differences in serum calcium level were observed among the subgroups of different etiologies in hypercalcemic crisis (P = 0.662) or severe hypercalcemia without crisis (P = 0.423). The logistic regression analysis showed that serum calcium level (OR = 3.66; 95% CI: 1.83 to 7.31) and age (OR = 1.06; 95% CI: 1.00 to 1.13) were independent risk factors for hypercalcemic crisis. Specifically in our risk-prediction model, 1 mg/dL increase serum calcium concentration increases 2.7 times the odds of hypercalcemia crisis; one year increase in age increases the odds of hypercalcemic crisis by 61%. The multivariate linear regression analysis showed that significant predictors of serum calcium level in hypercalcemic crisis were age (β = -0.694, P = 0.001) and AKI (β = 0.449, P = 0.013).

Conclusion: To our knowledge, this is the first and most comprehensive study to investigate the etiology and risk factors of hypercalcemic crisis. Our constructed risk-prediction model makes possible the rapid and easy calculation of risk for hypercalcemic crisis. The accurate assessment of risk before investigating etiology has an important place in hypercalcemic crisis screening. The implementation of our risk-prediction model is expected to improve clinical and critical care practice in hypercalcemic crisis.
NEW YORK POSTER FINALIST - RESEARCH Ronald A Luna, MD

Patient satisfaction: Is it linked to quality and cost of care?

First Author: Ronald A Luna, MD Second Author: Linda Williams, MD Third Author: Daniel Pomerantz, MD Fourth Author: Prasanta Basak, MD Fifth Author: Stephen Jesmajian, MD

Introduction. Patient satisfaction surveys are used to gauge the quality of service of hospitals. However, the relationship between patient satisfaction and other metrics such as quality and cost of care remains unclear.

Methods. We examined the association between the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient satisfaction survey scores and core measures performance, Medicare spending, mortality rates, readmission rates and emergency department wait times in 2,206 US hospitals (282 teaching and 1924 non-teaching). We used the 2013 data from the Medicare Hospital Compare website.

Results: Patient satisfaction (score of 9 or 10 in HCAHPS overall rating) is positively associated with core measures performance in myocardial infarction, heart failure, pneumonia and surgical care improvement (Spearman’s rank coefficient ?= 0.23, P < 0.001). Patient satisfaction is negatively associated with risk-adjusted spending per Medicare beneficiary (?= -0.18, P <0.001), risk-standardized all-cause 30-day readmission rate for myocardial infarction, heart failure and pneumonia (?= -0.26, P < 0.001) and time from emergency department arrival to departure for admitted patients (?= -0.21, P < 0.001). We found no association between patient satisfaction and 30-day risk-standardized all-cause mortality for myocardial infarction, heart failure and pneumonia (?=-0.01, P=0.38). In addition, there was no difference in patient satisfaction between teaching and non-teaching hospitals (70% and 69% respectively, P=0.095).

Conclusion. High patient satisfaction is associated with adherence to core measures, low spending, low readmission rate and short emergency department wait time. Patient satisfaction can be used as an indicator of quality of care and other hospital metrics.
Absence of ST Elevation in Lead V1 Predicts Worse Long-term Outcomes in Patients with First Anterior ST Elevation Myocardial Infarction

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Background: The extension of ST elevation to leads V5–6 is associated with larger infarct size in patients with anterior ST-elevation myocardial infarction (STEMI). However, the significance of presence or absence of ST elevation in lead V1 in the setting of anterior STEMI has not been elucidated.

Methods: We performed a retrospective analysis of 190 consecutive first anterior STEMI patients who underwent coronary angiography. ST elevation in lead V1 >0.1mV on the admission electrocardiogram was recorded. Patients were divided into those with and without ST elevation in V1. Creatine kinase level was measured serially at approximately a 6-h interval before and after catheterization, as clinically indicated, with the highest level designated as the peak creatine kinase. Baseline characteristics, echocardiographic and angiographic findings, as well as in-hospital and 1-year major adverse cardiac events (MACE) defined as all-cause death, recurrent myocardial infarction, and target vessel revascularization were compared between patients with and without ST elevation in V1.

Results: Of the 190 patients, 148 patients (78%) had ST elevation in V1 and 42 (22%) did not. There was no significant difference in baseline characteristics between the two groups. Patient without ST elevation in V1 had a higher peak creatine kinase value (median; 3688 IU/L vs. 2563 IU/L, p=0.02). There was a trend toward lower left ventricular ejection fraction in patients without ST elevation in V1 (median; 35% vs. 38%, p=0.06). The prevalence of ST elevation in leads V5–6 was higher in patients without ST elevation in V1 (88% vs. 70%, p=0.02). Patients without ST elevation in V1 had a higher rate of Killip class 3 or 4 on admission (26% vs. 10%, p=0.008) and a lower rate of proximal left anterior descending artery culprit lesion (36% vs. 58%, p=0.01). At 1-year follow-up, patients without ST elevation in V1 had a higher incidence of MACE (38% vs. 13%, p<0.001), driven by a higher incidence of all-cause death (26% vs. 5%, p<0.001). On multivariate analysis, absence of ST elevation in V1 was an independent predictor for 1-year MACE after adjusting for age, Killip class on admission, left ventricular ejection fraction and ST elevation in leads V5–6 (Odds ratio 2.82; 95% confidence interval 1.09–7.26; p=0.03).

Conclusion: Absence of ST elevation in V1 was associated with larger infarct size and an independent predictor for 1-year adverse cardiovascular events in patients with first anterior STEMI.
Indwelling Urinary Catheters in Hospitalized Patients: Appropriate Use, Discontinuation and Follow-up: A Quality Improvement (QI) Project

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**Background and Objective:** Urinary catheters (UC) are commonly used in hospitalized patient, often for inappropriate indications. Once a catheter is removed, a post-removal follow up with quality measures is also indicated. The following project was initiated at our hospital following a UC removal in an older female, with inadequate follow up leading to urinary retention and an unhappy caregiver. Inappropriate use of UCs is associated with poor quality of care and morbidity.

**Methods:** This QI project was setup at the request of IPRO to improve physician knowledge and skills in managing indwelling UC catheter discontinuation and follow-up. The study was conducted over 2 months; every UC insertion in patients in the department of medicine was reviewed for indication, catheter removal and follow up for retention post-removal. Prior to starting the study, education was imparted to care providers and via prompts during interdisciplinary team rounds to increase physician awareness about catheter insertion, removal and assessment means post-removal.

The primary endpoint was timely removal of indwelling UCs. Secondary endpoints included follow up post catheter removal using clinical assessment, indirect assessment (bed wet or not wet) and where indicated post void sonogram. Patient caregiver involvement was also assessed.

**Results:** During the total study period, total 90 patients had an indwelling UC during the hospital stay over period of 2 months. 7% of patients with catheters had them on admission, 93% were inserted (64% ED, 20% medical floor and 9% in ICU). Following education, a significant increase was noted in providing follow up assessment (clinical or indirect) following catheter removal. 80% catheters were discontinued, while 20% were discharged with catheters in place. Post void sonogram was used in 4% of patients only. Discussions relating to catheter removal with family/caregiver and documentation improved from 42% to 76%. Instructions to providers of care (NH/Rehab) were documented in 20% in first month, but increased to 42% in 2nd month; they related to patients discharged to home or nursing home with indwelling urinary catheters.

**Conclusions:** A simple educational intervention is effective in raising health care provider awareness of the appropriate handling of indwelling UCs, including indications, removal, and follow-up with discharge instructions. Favorable response to such performance improvement strategies helps improve quality of care and caregiver satisfaction in a short period of time.

**Reference**

Evaluation of a Practical Low-Cost Quality Intervention to Improve Adherence to Evidence-Based Cancer Screening Recommendations in 642 Patients

First Author: Alejandro Recio Boiles, MD Jose N. Galeas Soriano, Parham Eshtehardi, Pavlos Msaouel, Andrew H. Gutwein, Richard J. Gralla.

Introduction: Current cancer screening rates remain lower than those targeted for Healthy People 2020, for cervical cancer (83%, target 93%), breast cancer (72%, target 81%) and colorectal cancer (59%, target 71%). A major issue continues to be non-adherence of providers to United States Preventive Task Force Service (USPSTF) recommendations that is directed at the significant reduction of morbidity and mortality, by approximately 350,000 and 100,000/year respectively. We tested whether distribution of USPSTF recommendations in a Health Maintenance (HM) card format among house staff of a teaching institution would lead to an increase in guided action and documentation, and subsequently could show a reduction in health care costs by avoiding over- and under-screening of cancer.

Methods: In January 2013, HM cards including up to date USPSTF recommendations were distributed to house staff and posted in each medicine clinic exam room. We compared data before and after the implementation of HM cards through review of appropriate electronic medical record (EMR) charting during the relevant periods, for screening documentation in accordance with the recommendations. Any screening action not following age or interval range consistent with USPSTF recommendations was considered inappropriate. We thus compared primary care visits in December 2012 (before card distribution, n = 336) with December 2013 (a year after distribution of cards, n = 306), using randomly selected and retrospectively reviewed EMRs.

Results: Cancer screening adherence to USPSTF recommendations had a significant increase by 40.8% (p<0.0001) for cervical, 33.2% (p<0.0001) for breast and 20.5% (p<0.0001) for colorectal cancer. Inappropriate screening actions were reduced by 26.8% (p<0.0001) for cervical and 32.8% (p<0.0001) for breast cancer. Only a 1.1% reduction (p= 0.829) was observed for colorectal cancer.

Conclusions: The HM card was found to be an effective and inexpensive approach which educated about cancer screening and most importantly had an impact on adherence to updated USPSTF recommendations. This intervention reduced unnecessary testing and radiation exposure; potentially it should reduce costs. Given prior studies indicating benefit by linking an EMR with cancer screening, the addition of this simple and universally available card should be tested to determine if the combination of these methods further enhances compliance with evidence-based screening recommendations.
Is echocardiogram and left ventriculography both necessary in patients undergoing elective left heart catheterization?

First Author: Daniel C Rodriguez, MD Ram Balasubramanian MD, Joshua Fogel PhD, Vijay Shetty MD, Adnan Sadiq MD, Jacob Shani MD, Robert Frankel MD

**Background:** In the retrospective study of 96235 patients who underwent coronary angiography, 81.8% of the patients had left ventriculography and nearly 88% of the patients had a very recent ejection fraction assessment by another modality (within 30 days) and had no intervening diagnosis of new heart failure, myocardial infarction, hypotension or shock. We sought to analyze if there are significant differences in the assessment of ejection fraction and wall motion abnormalities between left ventriculogram and transthoracic echocardiogram in patients undergoing elective left heart catheterization. We also focused to study if there are significant changes in renal function after left ventriculogram.

**Methods:** We performed a retrospective analysis of 98 consecutive patients who had elective cardiac catheterization with a left ventriculogram at Maimonides Medical Center from November 2009 to November 2012 and who have had a transthoracic echocardiogram and renal function tests within 48-72 hours of the cardiac catheterization. Patients who had emergent left heart catheterization and those who had presented with STEMI and NSTEMI were excluded from the study. Patient(s) who had complicated PCI such as acute in-stent thrombosis were also excluded. The basic demographics, comorbid conditions, renal function, left ventricular ejection fraction and wall motion abnormalities were analyzed.

**Results:** There were very high percentages for agreement in the assessment of ejection fraction and anterobasal segment wall motion findings. Anterolateral, apical, and inferior segments had high percentages for agreement with minor disagreement all in the 20% range. Inferobasal segment had the lowest percentage for agreement at 66.3% and highest percentage for minor disagreement at 32.7%. The greatest percentage for major disagreement was for ejection fraction at 7.1%.

**Conclusions:** In summary, there are no significant differences in the reporting of ejection fraction by echocardiography and left ventriculography. However compared to echocardiogram, left ventriculogram might provide more incremental information about wall motion abnormalities in anterolateral and inferior segments which could be clinically significant. Hence we conclude that the use of left ventriculography in patients undergoing elective cardiac catheterization should be individualized based on the risk benefits and the clinical scenario.
Does an Upright T Wave in Lead V1 Predict Left Anterior Descending Artery Lesion and/or a Left Circumflex Artery Lesion on Cardiac Catheterization?

First Author: Naveen Sablani, MD, MS, Drew Murray, Praveen Chatani, Young Lee, MS, Bonnie Simmons, DO, Soheila Talebi, MD, Roger Chirurgi, MD, George Fernaine, MD, FSCAI, Getaw Worku Hassen MD, PhD

**Background:** An upright T wave (UTW) in V1 can be a normal variant in some cases, but it is considered abnormal especially if it is very tall and new. Few studies have investigated the significance of a UTW on V1 in predicting the presence of significant coronary artery disease (CAD). We investigated whether an UTW in lead V1 was associated with a left anterior descending (LAD) lesion in addition to association with left circumflex artery disease (LCfx), RCA or multi-vessel lesions.

**Methods:** We conducted a retrospective chart review of patients who presented with symptoms of acute coronary syndrome (ACS), or had positive stress test and underwent cardiac catheterization (cath). We evaluated patients with a significant UTW in V1 (= 0.15 mv) in their pre-cath electrocardiogram (ECG) and compared it to their post-cath ECG. We sought to determine if there was a relationship between UTW in V1 and location of coronary lesion.

**Results:** Out of 263 patients studied 53 (20.2%) patients had a significant UTW in V1, 29 (55%) had lesions in the LAD, and 10/29 (34%) had proximal LAD lesion. Post intervention 21 (39%) of 53 patients had normalized their T wave in V1. Nine (42%) out of 21 patients had involvement of the LCfx and another artery. Eleven (52%) patients had involvement of the LAD and another vessel. Only 5/21 (24%) patients had some involvement of the RCA. Of the 20 patients who did not have a change in T wave polarity, 13 (65%) patients had a lesion in the RCA.

**Conclusion:** A significant UTW in V1 may signify a lesion in the LAD, among other vessels, and in the appropriate clinical setting the presence of significant CAD should be suspected. Our study was limited by a small sample size. A large scale study in patients undergoing cardiac cath may elucidate the relationship between a UTW and the presence of significant CAD, specifically whether LAD is involved in ACS or as a preceding ominous sign for Wellens Syndrome.
NEW YORK POSTER FINALIST - RESEARCH Anawin Sanguankee, MD

Association Between NSAIDs and Clostridium difficile-associated Diarrhea (CDAD): a Systematic Review and Meta-Analysis

First Author: Anawin Sanguankee, MD Co-Autors: Nitipong Permpalung, MD Sikarin Upala, MD Suthanya Sornprom, MD

**Objectives:** *Clostridium difficile* infection is a leading cause of nosocomial diarrhea in developed countries. The incidence of community-acquired *Clostridium difficile*-associated diarrhea (CDAD) has increased in the past decade. Studies evaluating the associations of increased risk of community-acquired CDAD and the use of non-steroidal anti-inflammatory drugs (NSAIDs) have yielded inconclusive results. We conducted a systematic review and meta-analysis to compare the odds of NSAID exposure in patients with CDAD versus patients without CDAD in both community-based and healthcare-associated settings.

**Methods:** Established procedures were followed (MOOSE guidelines) to complete this study. Relevant observational studies indexed in the Cochrane Central Register of Controlled Trials, PubMed/MEDLINE, and EMBASE up to October 2014 were analyzed and data were extracted from nine studies. Of these, eight studies were included in the meta-analysis. The quality of observational studies was assessed using the Newcastle-Ottawa quality assessment scale.

**Results:** A search of the databases resulted in 987 articles, of which 971 were excluded. The nine studies from which data were extracted involved over 39,000 subjects. The pooled odds ratio for history of NSAID use in participants with CDAD compared with controls was 1.41 (95% CI 1.06–1.87; p<0.01), indicating a significant increased odds of CDAD among patients exposed to NSAIDs.

**Conclusions:** To the best of our knowledge, this is the first study of its nature to demonstrate the association between the use of NSAIDs and increased risk of CDAD. Further studies to evaluate if any specific types of NSAIDs can increase the risk of CDAD are warranted.
The Correlation of TIMI Risk Scores with Extent of Coronary Artery Disease in a Multi-Ethnic Patient Population Presenting with Non-ST Elevation Myocardial Infarction

First Author: Ali A Torbati, MD Joyce Chou, MD, Nyla Malik, MD, Preston Garnes, MPH, Francois Dufresne, MD

Introduction: Current literature demonstrates that in patients with non-ST-elevation acute coronary syndrome (includes unstable angina and non-ST-elevation myocardial infarction (NSTEMI)) who are referred for cardiac catheterization, the initial Thrombolysis in Myocardial Infarction (TIMI) risk score at presentation correlates with: angiographic severity, extent of coronary artery disease (CAD), death, and ischemic events. In this study, we explored the correlation of the initial TIMI risk scores with the extent of CAD specifically in patients with NSTEMI.

Methods: A retrospective cross-sectional study was conducted on 200 consecutive multi-ethnic patients with an initial diagnosis of NSTEMI who underwent coronary angiography from August 1, 2012 to December 30, 2013 at an urban community teaching hospital. Patients who did not have NSTEMI as one of the final diagnoses in the discharge summary and patients with history of previous coronary artery bypass graft (CABG) or recent cardiac catheterization and any ST elevation changes during same admission were excluded from this study. TIMI score was calculated based on the seven standard variables of NSTEACS TIMI scoring. Patients were divided into two risk groups based on their initial NSTEACS TIMI scores. One group had TIMI scores = 4; the other > 4. Stenosis = 70% in any of the epicardial vessels and = 50% in left main was considered as significant. Descriptive statistics and ?2 bivariate analysis were performed.

Results: A total of 133 patients were included in this study. Of these, 77 (57.89%) were male and 56 (42.11%) were female. The age range was 30-94 years old with a mean age of 67.64 ± 13.05 years and median of 68 years old. The average TIMI score was 2.98 ± 1.33. 119 (89.5%) patients had TIMI scores =4 and 14 (10.5%) patients had TIMI scores > 4. After reviewing cardiac catheterizations results, no significant difference was reported between patients in the two TIMI score risk groups.

Conclusion: In contrast to previous studies, our study done on a multi-ethnic population at an urban community hospital demonstrated that after reviewing cardiac catheterization results of patients with NSTEMI, no significant difference was found with regard to presenting TIMI score and angiographic severity at time of catheterization. Our results suggest the need for further investigation of the relation between risk scores and specific subtypes of acute coronary syndromes.
**NEW YORK POSTER FINALIST - RESEARCH Marius Viseroi, MD**

**Impact of Troponin Elevation Among Critically Ill Patients**

First Author: Marius Viseroi, MD Jonathan Ang MD, Tia Mansouri, Philip Kaseska, Prasanta Basak MD, Stephen Jesmajian MD

**INTRODUCTION:** Cardiac troponin I (cTnI) is a myocardial contractile protein, the plasma level of which increases after myocardial damage. Troponin elevations are common in critically ill patients, and often are associated with an adverse prognosis. Whether this effect is related to the severity of the underlying disease process or to primary cardiac involvement per se, is unclear. We investigated the frequency of elevated troponin levels and its association with mortality and association with the need for ventilator, inotropic and sedative support.

**METHODS:** We conducted a retrospective chart review of all patients admitted to the ICU from October 2011 to 2012. APACHE II score, and use of any inotropes, sedation and ventilator support were also recorded. Inclusion criteria included patients admitted to the ICU with cTnI measurement and EKG recording within the first 24 hours of admission. Patients diagnosed with acute coronary syndrome, those who underwent major surgery within one month prior to admission or cardio pulmonary resuscitation prior to admission, were excluded. Continuous variables were presented as mean values. The student T-test was used to observe for any difference between groups.

**RESULTS:** A total of 145 patients were included in the study. There was no difference in APACHE II scores at baseline for both groups (p=0.48). The overall prevalence of elevated cTnI was 15%. The mortality rate was 28% for patients with normal cTnI (n=31) and 48% for those with elevated cTnI levels (n=10). Among the population with elevated troponins, only 6 had a history of coronary artery disease (CAD) and 1 patient died (mortality rate of 16.7%). Also, still in the group with elevated troponins, 16 patients had no documented history of CAD but 9 patients died (mortality rate of 56.25%).

There was a trend towards a greater need for inotrope support in the high cTnI group (29% in normal cTnI group vs 41% in elevated cTnI group, p=0.0752). There was no difference between groups for ventilator support (59% vs 68% p=0.1862) and sedation (25% vs 27% p=0.7471).

**CONCLUSION:** Our findings demonstrate that in critically ill patients, troponin elevation is associated with a higher risk of mortality, even after adjustment for severity of illness. This risk was regardless of their history of CAD. Thus making the need for obtaining a troponin level in critically ill patients crucial for prognostication. Further studies are necessary to explore other subsets of patients and their relation to troponin elevation.
The Efficacy and Safety of DPP4 Inhibitors compared to Sulfonylureas as add-on Therapy to Metformin in Patients with Type 2 diabetes: A Meta-analysis

Basem M Mishriky, MD, Doyle M Cummings, PharmD, FCP, FCCP, Robert J Tanenberg, MD, FACP

Purpose: Recent guidelines recommend metformin as the best initial drug for Type 2 diabetes (T2D). However, there is no consensus for add-on therapy if metformin fails to achieve the therapeutic goal. Sulfonylurea (SU) are an older while dipeptidyl peptidase-4 inhibitors (DPP4-I) are a newer class of antidiabetic medication. We performed this meta-analysis to determine the efficacy of DPP4-I compared to SU as add-on therapy to metformin in inadequately controlled T2D.

Methods: We searched MEDLINE, CENTRAL, EMBASE, and CINAHL for randomized trials comparing DPP4-I to SU as add-on therapy to metformin in inadequately controlled T2D and reported a change in A1c from baseline to a minimum of 12 weeks. Number needed to harm (NNH) was calculated for statistically significant side effects.

Results: Sixteen studies [1-16] were included. Pooled results showed a significantly greater reduction in A1c from baseline to 12 weeks favoring SU (MD[95%CI]= 0.21%(0.06,0.35)) but no significant difference at 52 and 104 weeks between the two groups (MD[95%CI]= -0.01%[-0.07,0.05] and -0.06%[-0.13,0.02] respectively). There was a significantly greater weight reduction at 12, 52, and 104 weeks favoring DPP4-I (MD[95%CI]= -1.57Kg[-1.85,-1.28], -2.11Kg[-2.49,-1.72], and -2.13Kg[-2.58,-1.68] respectively). The proportion of patients achieving A1c< 7%, irrespective of hypoglycemia, showed no difference between the groups at 12, 52, and 104 weeks (RR[95%CI]= 0.93[0.78,1.12], 1.03[0.95,1.12], and 1.01[0.93,1.09] respectively). However, there was a statistically significantly greater proportion of patients achieving A1c< 7% with no hypoglycemia episodes in the DPP4-I group at 52 and 104 weeks (RR[95%CI]= 1.20[1.05,1.37] and 1.53[1.16,2.02] respectively). Incidence of hypoglycemia (=1 episode) was significantly lower at 12, 52, and 104 weeks in DPP4-I group (RR[95% CI]= 0.32[0.22,0.45]; NNH=8, 0.14[0.08,0.24]; NNH=6, and 0.15[0.11,0.20]; NNH=5 respectively). The percentage of patients with hypoglycemia (=1 episode) was higher with the SU compared to DPP4-I (20% vs 6% at 12 weeks, 20% vs 2% at 52 weeks, and 27% vs 4% at 104 weeks respectively).

Conclusion: While both SU and DPP4-I can be considered as options for add-on therapy to metformin in inadequately controlled T2D, SU results in a significantly increased risk of hypoglycemia and weight gain. By contrast; DPP4-I produce 0.4-0.6% reduction in HbA1c, lower risk of hypoglycemia, and weight loss.

"Seven Is the New Ten" – Comprehensive Quality Improvement Project to Adopt Restrictive Transfusion Strategies in a Community Hospital

First Author: Rahul Singh, MD, Charin Hanlon, MD, FACP

**Introduction:** An estimated 13,785,000 units of packed red blood cells (PRBC) were transfused in the US in 2011 of which an estimated 57.9% were found to be from the medical service. Risks of blood transfusion include infections and transfusion reactions.

In 2012, the American Association of Blood Banks released new guidelines for PRBC transfusion in hospitalized, hemodynamically stable patients. These guidelines set a threshold Hb of =7 g/dL in critically-ill patients, and a Hb =8 g/dL for surgical patients, for patients with pre-existing cardiovascular disease, or for patients with symptoms (tachycardia, chest pain or hypotension not corrected by crystalloids).

**Methods:** An IRB-approved retrospective study of inpatient PRBC transfusions at our hospital was conducted in 2013. The average pre-treatment Hb was noted to be 7.42 ± 0.92 (p=0.0009) and average number of units transfused were 1.78 ± 0.58 (p=0.1133). The average number of units transfused were =1.5, and 31% of the time 1 unit was given.

This data prompted a quality improvement initiative to improve in hospital transfusion strategies. The PDSA cycle included the following interventions. Hospital administration created a “Transfusion Safety Officer”. A transfusion committee championed by the Blood Bank Director was formed. In addition, a series of hospital wide didactics centered on restrictive transfusion practices were held, targeting nursing and physicians of all disciplines. A public relations campaign was launched by the hospital involving posters, newsletters, bulletins, and emails centered around slogans “7 is the new 10” and “1 is better than 2.” Four months after this, a new computerized physician order set was created by the Transfusion Committee and instituted in September 2014. The order set specifically separated out chronic anemia from acute blood loss anemia. Under the chronic anemia tab, practitioners can select the reason for PRBC transfusion based off of AABB guidelines, but are restricted to only transfusing 1 unit of PRBC at a time. Finally a new “My Report” has been built within EPIC EMR to allow a physician to see their transfusion average Hb and number of units ordered.

An IRB-exempt review of PRBC transfusions after the quality improvement impact and post CPOE go-live date was conducted. A total of 493 PRBC transfusions in non-acute blood loss patients were given between 9/11/14-11/1/14. The average pre-treatment Hb 7.0 of which 59% of the time 1 unit was PRBC was ordered.

**Conclusions:** A comprehensive, interdisciplinary QI project can successfully reduce unnecessary PRBC transfusions. By applying the PDSA cycle and harnessing the power of the EMR, we can improve the rapidity with which physicians adopt new evidence based guidelines. The success of a hospital-wide QI
project of this magnitude hinges on a motivated project management team able to engage all necessary stakeholders, to include the hospital C-Suite.
A Novel Outpatient Curriculum to Improve Residents’ Awareness and Knowledge of High Value Care (HVC)

Eric Walford, MD; Stacey Sheridan, MD; Richard Wardrop, MD; Brooke McGuirt, MBA; Thomas Miller, MD

Introduction: Health care costs are unsustainably high and continue to rise. As much as 87% of the estimated $700B in annual wasted healthcare costs can be attributed to the actions of physicians. In response, organizations like the American College of Physicians (ACP) have developed curricula aimed at teaching HVC to physicians in training. We assessed the need for a HVC curriculum within a large university-based Internal Medicine training program and pilot-tested a customized curriculum focused on HVC in the outpatient setting.

Methods: In May 2014, surveys were distributed to all internal medicine residents at the University of North Carolina (UNC) to assess their beliefs about HVC and their knowledge about the costs and effective use of medical tests. We then developed a novel HVC curriculum composed of three sessions as part of the existing faculty-led clinic conferences. The first session presented ABIM Choosing Wisely recommendations that applied to ambulatory medicine in the format of a Jeopardy game show. The remaining sessions used outpatient-focused cases from the ACP’s HVC curriculum, adapted to include data specific to UNC Hospitals, including actual costs of tests. Following the sessions, post-intervention surveys were distributed to all internal medicine residents.

Results: 32 of 69 categorical internal medicine residents (46%) completed baseline surveys on HVC, including 12 PGY-1, 11 PGY-2, and 9 PGY-3 residents. On baseline pre-survey, 53% were familiar with the term “High Value Care”, 54% were aware of published HVC guidelines, 56% felt they knew how to avoid wasteful testing, and 16% felt they knew the cost of common tests. On baseline pre-survey of residents' knowledge, residents answered correctly on 25% of healthcare spending questions, 21% of questions on costs of common tests, and 60% of questions on low-yield testing.

Thirteen out of 37 residents (35%) scheduled in clinic during intervention weeks attended at least one session and completed both a pre- and post- survey. When comparing pre- and post-survey responses, residents demonstrated improvement in familiarity with HVC (62% to 85%), awareness of published HVC guidelines (54% to 85%), and familiarity with costs of common tests (23% to 54%). These residents also answered more questions correctly on the topic of healthcare spending in the United States (26% to 49%). With a sample size of thirteen, none of these changes were found to be statistically significant.

Conclusions: The pre-survey results demonstrate a lack of understanding of key HVC topics, including costs of common tests and awareness of published guidelines. A new, customized curriculum on HVC improved residents’ familiarity with both HVC and healthcare costs. Curricula of this format may need further optimization before widespread implementation.
Is There a Gender Disparity in the Management of STEMI?

First Author: Srinivasa Madhavan, MD Thomas Haldis, DO Susan Farkas, MD

**Background:** Women with STEMI (ST elevation Myocardial Infarction) tend to have higher mortality, which has been attributed in part to not receiving appropriate and timely management compared to men. Accordingly, a standardized protocol for the management of STEMI should eliminate any putative gender disparity. We sought to ascertain if there was any difference in management between men and women, when a standardized protocol was followed for management of STEMI.

**Methods:** Data for this study were obtained from a prospective STEMI database registry from a tertiary care community-based teaching hospital with a standardized STEMI management protocol. Consecutive patients admitted between January 2010 and June 2013 with clinical and electrocardiographic finding of STEMI were included in the study. All statistical tests were two tailed with p<0.05 considered to be significant. Chi square test for categorical variables and t test of the means were performed.

**Results:** A total of 843 patients were enrolled in the study; 215 (25.5%) were women. Mean age of the women was significantly greater than men (68±15 vs. 61±13 years, p<0.0001). Chest pain was the most common presenting symptom in both men and women (45% and 40 % respectively, p=0.203). An electrocardiogram (EKG) was obtained earlier after hospital presentation in men than women; 73% men and 59% women had an EKG within 10 minutes of being evaluated by the first medical contact (p<0.0001). A significantly higher number of men underwent thrombolysis (17% vs. 9%, p<0.005). The time to percutaneous coronary intervention (PCI) from the time of diagnosis was similar in men and women (101±73 vs. 105±58 minutes, p=0.534). Mortality was higher in women than men (4.0% vs. 1.4%, p=0.0255). Post-hoc analysis with stratification of the cohort based on time to first EKG showed no statistically significant difference in mortality between men and women.

**Conclusion:** The results from our large cohort study concludes that, with a standardized protocol for management of STEMI, there was no difference in time to PCI from the time of diagnosis, between men and women. However, we identified a delay in obtaining the initial EKG in women, which appeared to impede the diagnosis of STEMI, which in turn could have lead to the higher mortality among women despite similar duration from diagnosis-to-PCI. We recommend improving the time to first EKG in patients presenting with symptoms suggestive of acute coronary syndrome in order to facilitate early diagnosis and treatment of STEMI.
Statin Therapy Impact on Postoperative Outcomes in Cardiac Surgery: A Meta-Analysis of Randomized Controlled Trials

First Author: Shadi Al Halabi Second Author: Saqer Alkharabsheh Third Author: Hadi Al Halabi Fourth Author: Ayman A. Hussein Fifth Author: Mina K. Chung

Introduction: Postoperative complications of cardiac surgery are common and associated with increased morbidity and mortality. Statins have been proposed as one of the interventions which may help reduce the incidence of postoperative complications. We performed a meta-analysis of randomized controlled trials (RCTs) comparing statin therapy to placebo in preventing post cardiac surgery outcomes.

Method: We searched Pubmed, Medline, Embase and Cochrane for prospective RCTs that compared the effect of statins to placebo on incidence of postoperative complications in patients undergoing cardiac surgery. Study quality was assessed using the Jadad score. Heterogeneity of the studies was analyzed by Cochran’s Q statistics. Mantel Haenszel relative risk and mean difference were calculated using the fixed effect model.

Results: Ten RCTs met our inclusion criteria and included 998 patients. Statin use was associated with shorter hospital (Mean difference -0.59 days; 95% CI -0.78, -0.40; P<0.001) and ICU stay (Mean difference -0.11 days; 95% CI -0.21, -0.00; P =0.05) compared to placebo. No differences in the incidence of myocardial infarction (RR 0.79; 95% CI 0.32, 1.99; P= 0.25) or acute kidney injury (AKI, RR 0.44; 95% CI 0.18, 1.12; P= 0.08) after cardiac surgery were found between the two groups. There was no evidence of heterogeneity or publication bias among the reported outcomes.

Conclusions: In patients undergoing cardiac surgery, statin therapy is associated with decreased hospital and ICU stay. However, it had no effect on myocardial infarction or incidence of AKI.
The Impact of Fellow Involvement on Quality Measures and Patient Satisfaction of Colonoscopy in Newly Established Gastroenterology Fellowship Program


Background: Studies have demonstrated conflicting data regarding the impact of trainee involvement during colonoscopy. To the best of our knowledge, there has been no study evaluating the effect on the quality of colonoscopy in a newly established gastroenterology fellowship program.

Purpose: To examine whether fellow participation during screening or surveillance colonoscopy affects the adenoma detection rate (ADR), polyp detection rate (PDR), cecal intubation rate (CIR), and patient satisfaction.

Method: This was a retrospective study of colonoscopies performed in an academic center from July 2012 to December 2013. Comparison of ADR, PDR, CIR, and patient satisfaction were examined when performed by fellows with supervising staff endoscopists (n=424) and those performed by staff endoscopists without fellow participation (n=558). Statistical analyses were performed by using logistic regression.

Results: There was no evidence of a lower rate of polyp detection in colonoscopies with a fellow present (OR 0.83; 95% CI 0.64, 1.07). Findings were similar for adenoma detection (OR 0.94; 95% CI 0.7, 1.24; P=0.65), CIR (OR 0.92; 95% CI 0.58, 1.46; P=0.73), and patient satisfaction (OR 0.59; 95% CI 0.16, 2.23).

Conclusion: Involvement of a fellow during colonoscopy in newly established gastroenterology fellowship program didn’t affect patient satisfaction, cecal intubation, adenoma, and polyp detection rates.

Table 1: Comparison of Quality Indicators and Patient Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>With Fellow (n=442)</th>
<th>Without Fellow (n=558)</th>
<th>OR</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDR %</td>
<td>44.44</td>
<td>51.07</td>
<td>0.83</td>
<td>0.64-1.07</td>
<td>0.15</td>
</tr>
<tr>
<td>ADR %</td>
<td>26.65</td>
<td>27.96</td>
<td>0.94</td>
<td>0.7-1.24</td>
<td>0.65</td>
</tr>
<tr>
<td>Cecal Intubation %</td>
<td>91.51</td>
<td>92.11</td>
<td>0.92</td>
<td>0.58-1.46</td>
<td>0.73</td>
</tr>
<tr>
<td>Patient Satisfaction %</td>
<td>96.88</td>
<td>98.13</td>
<td>0.59</td>
<td>0.16-2.23</td>
<td>0.44</td>
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New disease specific graded prognostic assessment of brain metastasis from lung, breast, melanoma and renal malignancies.

First Author: Vyshak Alva Venur, MD Vidhya Karivedu, MD Rupesh Kotecha, MD Samuel Chao, MD Paul Elson, ScD Manmeet Ahluwalia, MD

BACKGROUND: Brain metastases (BM) are a serious complication of systemic malignancies. Common cancers causing BM include small cell and non-small cell lung cancer (SCLC, NSCLC), breast, melanoma, and renal cancer. The disease-specific Graded Prognostic Assessment (DS-GPA) is a useful tool for evaluating prognosis in BM. We evaluated the DS-GPA at our tertiary care institute.

METHODS: The Cleveland Clinic's IRB approval was obtained and the enterprise database was used to identify BM patients treated between 2000 and 2013. The primary endpoint was overall survival (OS) from BM diagnosis. Data for more than 20 variables including patient, tumour, and BM characteristics, local, and systemic therapies was recorded. Multivariate analysis was performed. Stepwise variable selection (entry, retention criteria of p=.10 and p=.05, respectively) was used to identify factors that were independent predictors of overall survival. Suitable cut-points were assigned to the measured factors by recursive portioning algorithm. Weighing system was used to assign "points" to each factor and define the risk groups. Final GPA was internally validated using a bootstrap algorithm.

RESULTS: Two thousand two hundred forty seven BM patients were included in this retrospective analysis (largest single center experience). Primary malignancy was NSCLC-1128(50%), breast-449(20%), melanoma-233(10%), renal-224(10%) and SCLC-213(9%). Median age at BM diagnosis was 60 (range, 24-93); 54% were female. Median number of BM was 2 (42% had 1, 25% had >5). Most patients had good performance status (70% had KPS>80). Initial treatment was whole brain radiotherapy (WBRT) in 43%, 24% underwent stereotactic-radiosurgery (SRS), 12% received WBRT and SRS, 11% were treated with surgery and WBRT, 3% underwent surgery and SRS. Eight four percent of patients have died at the time of analysis. Median OS for the cohort was 8.8 months (95% C.I., 8.1-9.5). DS-GPA was prognostic for each cancer (all p<.0001); however separation between groups was variable. Considering clinical factors not used to determine the DS-GPA, revised indices were developed that improved prognostication. The factors, in addition to DS-GPA, included in the revisions are: breast cancer- number of extra-cranial metastases (ECM), controlled primary (PC), BM location, and leptomeningeal disease; NSCLC - PC, number of ECM, histology, hemorrhagic metastases, and gender; melanoma - number of ECM and age; renal - PC and BM-free interval; SCLC - PC, and number of ECM. Median OS (in months) for the revised GPA groups ranged from 3.1-27.6 (breast), 2.5-26.4 (NSCLC), 2.3-15.4 (melanoma), 3.5-41.6 (renal), and 3.5-15.3 (SCLC).

CONCLUSIONS: A revised DS-GPA is proposed which can serve as a useful tool to guide the treatment decisions for patients with brain metastasis. They also provide important stratification in clinical trials of these patients.
Association of Early Physician Follow-up and 30-Day Readmission After Hospitalization for Heart Failure Among Patients in a Residency-Based Ambulatory Clinic

Joanna Aquino-Laban, MD; Julius Laban, MD; Maricor Docena, DO; Ron Jones, MD; Michael Oravec, MPH

PURPOSE/OBJECTIVE: Heart failure (HF) is one of the most common reasons for hospitalization associated with high risk of readmission. Recent studies have shown that early physician follow-up, defined as within 7 days of discharge, decreases 30-day readmission rate. However, despite the growing evidence supporting early follow-up, many patients still do not receive it. This study was conducted to determine the association between early physician follow-up and 30-day readmission after hospitalization for HF among patients in a residency-based ambulatory clinic.

METHODS: This is a retrospective observational cohort study of records from an internal medicine residency clinic and a 460-bed community hospital in Akron, OH. Inclusion required each of the following criteria: outpatients with active diagnosis of HF or other related diagnoses, hospitalization for HF from January 2010 to November 2013, symptomatic with known structural heart disease (American College of Cardiology/American Heart Association Stage C), reduced ejection fraction on echocardiogram (EF < 40%), and prescribed guideline-directed medical therapy. Follow-up intervals after discharge from the hospital were noted and stratified as follows: = 7 days, between 8-14 days, or > 14 days. The primary outcome was 30-day readmission for HF. Statistical significance was tested using Pearson’s chi-squared test of independence for categorical variables and a one-way ANOVA for continuous variables. Multivariate logistic regression was used to model predictors of 30-day readmission, adjusting for post-hospital follow-up time, age, race, gender, and insurance status.

RESULTS: A total of 107 patients were included in the study. Of these, 39 completed an outpatient follow-up within 7 days, 32 between 8-14 days, and 36 after more than 14 days. The 30-day readmission rate for those who completed a follow-up visit within 7 days (21%) was significantly lower (p < 0.0001) than those who followed up between 8-14 days (50%) or > 14 days (78%). Patients who followed up between 8-14 days were over 3 times as likely to be readmitted as patients who followed up within 7 days (OR 3.6, 95% CI 1.2-10.8, p = 0.0218), while those who did not follow up within 14 days were over 12 times as likely to be readmitted (OR 12.6, 95% CI 4.0-39.2, p < 0.0001).

CONCLUSION: Physician follow-up within 7 days after hospitalization for HF is associated with lower 30-day readmission rate among patients in a residency-based ambulatory clinic. However, only one-third of the study population had early physician follow-up. Therefore, quality improvement initiatives are recommended.

First Author: Tariq Hammad, MD. Usman Ahmad, MD. Yaseen Alastal, MD. Osama Dasa, MD. Osama H. Alaradi, MD. Ali Nawras, MD.

Background: The evaluation of pancreatic lesions through the use of endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) plays an essential role for patients with indeterminate imaging as a critical first step toward developing an appropriate treatment plan for benign or malignant pancreatic lesions. Rapid on-site evaluation (ROSE) of EUS-FNA material coupled with cytopathologist guidance (CG) to the endoscopist allows for adjustments in technique and acquisition of additional passes if required.

Purpose: The aim of this study was to evaluate the influence of ROSE and CG on the diagnostic yield of EUS-FNA for the differential diagnosis of pancreatic lesions at a tertiary care center.

Methods: This study is a retrospective review of all EUS-FNA of pancreatic lesion performed at a single tertiary care center over a 25 month period between January 2011 through February of 2013 with the presence of ROSE. Patient’s gender, age, final diagnosis, ROSE result, type of lesion (solid or cystic), number of needle passes, and any surgical or autopsy pathology if available were analyzed. All patients underwent close clinical follow up for at least 9 months after the procedure.

Results: 203 EUS-FNA pancreatic cases were identified. Of these 125 were positive for malignancy or neoplasm. There were 80 adenocarcinomas, 37 mucinous neoplasms, 7 endocrine neoplasms, 1 solid pseudopapillary tumor. The remaining 78 cases of which 70 were negative for neoplasm/benign, 7 had atypical cells, and 1 was unsatisfactory. Overall, EUS-FNA with ROSE and CG achieved sample adequacy in 99% of the cases [202/203]. Matched surgical/autopsy specimen were available for 30 cases on follow-up. ROSE with CG resulted in an increase number of passes obtained for 17 of these cases. Of the 30 matched cases 29 were accurately diagnosed with the use of EUS-FNA and ROSE: 24 were neoplastic and 5 were negative for neoplasm. The one false negative case was determined to be atypical cells by EUS-FNA, but was found to be adenocarcinoma (See the table). Of the 25 neoplastic/malignant cases: 19 adenocarcinoma, 3 pancreatic endocrine neoplasm, 1 solid pseudopapillary tumor, 1 intraductal papillary mucinous neoplasm, 1 mucinous cystic neoplasm. The accuracy of EUS-FNA for pancreatic malignancy/neoplasm was 96% [24/25]. Overall accuracy when examining matched specimens was 97% [29/30].

Conclusion: The use of ROSE with CG improves cytological adequacy and the diagnostic yield of endoscopic EUS-FNA. The communication and feedback allow for improved sensitivity and providing more accurate results while only utilizing the appropriate number of passes required.
OHIO POSTER FINALIST - RESEARCH Bin Hu, MD

Vitamin D Inadequacy in Patients of Northeast Ohio

First Author: Bin Hu, MD Yun Xia, MD, Jung Kim, MD, Thomas Marnejon, DO, David Gemmel, PhD, Timothy Barreiro DO

Introduction: This study aimed to determine prevalence of vitamin D inadequacy (vitamin D < 30 ng/mL) and assess effects of season, ethnicity, and age on prevalence in patients from a large urban medical center in Northeast Ohio. We also compared prevalence of vitamin D inadequacy in our patients with the National Health and Nutrition Examination Surveys (NHANES) during 2001-2006.

Methods: We analyzed routine demographic characteristics and all serum 25(OH) D2 and D3 levels measured over a two year cycle from our hospital and outpatient database. We also analyzed vitamin D level in relationship to seasonal division.

Results: Of the 15,693 patients the mean age was 59 ± 6.1 year old, 67.6% females, 82.2% non-Hispanic whites, 12.1% African Americans, 5.7% other ethnicity. We found vitamin D inadequacy in 63.7% (n=10001), which was eight times higher than the general US population (8%, NHANES 2001-1006). Only 36.3% (n= 5692) had normal levels of vitamin D, much lower than the 92% adequacy rate from NHANES.The overall prevalence of vitamin D deficiency (vitamin D < 20 ng/mL) was 38.4%, 35.8% in non-Hispanic whites, 56.3% in African American, and 39.1% in others racial and ethnic cohorts. Prevalence was higher in African American than White (relative risk (RR) = 1.3), and younger patients (RR1.59 age =30 yr, 1.59 age 31-50 yr, 1.24 age 51-70 yr) than age =71 yr. There was no significant difference seen in relationship to the four season division or gender. The overall prevalence of vitamin D insufficiency (vitamin D = 20 ng/mL but <30 ng/mL) was 25.3%, 26.3% in non-Hispanic whites, 17.9% in African American, and 26.3% in others. Prevalence was higher in non-Hispanic whites than African Americans (RR =1.47). There was no difference among younger patients (RR 1.08 age = 30yr, 1.01 age 31-50 yr, 1.02 age 51-70 yr) versus age =71 yr. There was no significant difference related to the four season division or gender.

Conclusion: Our retrospective cohort study revealed an alarmingly high prevalence of vitamin D inadequacy and significant difference between our patients and a national secondary populational database (NHANS 2001-2006). African American and younger age were risk factors for vitamin D deficiency. Northeast Ohio has 302 cloudy days every year, which could explain why there was no seasonal variation in vitamin D levels. We recommend more aggressive screening and treatment for the at risk population.
Reversibility of Statin Induced Myalgia and Myositis with High Dose Vitamin D Supplementation.

First Author: Maksim Y Khayznikov, MD Hemachrandra K Pandit R Kumar A Wang P Glueck CJ MD

Introduction: Statin-induced myalgia is a common cause of statin intolerance resulting with up to 20% of patients having to discontinue their lipid lowering medications. Low serum vitamin D has also been found to interact with statins to cause myalgia, myositis, myopathy, and myonecrosis. Some data suggests that statin-induced myalgia can be resolved by vitamin D supplementation. Our specific aim was to assess safety and efficacy of vitamin D supplementation in 146 patients intolerant to 2 or more statins and the potential reversibility of their musculoskeletal complaints.

Methods: We studied 74 men and 72 women (age 59 ±14 years) intolerant to 2 or more statins because of myalgia, myositis, myopathy, or myonecrosis, and found to have low (<32 ng/ml) serum vitamin D. We prospectively assessed whether vitamin D2 supplementation (50,000-100,000 units/week) to normalize serum vitamin D would allow successful re-challenge therapy with statins. Follow-up evaluation on vitamin D supplementation was done in 134 patients at 6 months (median 5.3), 103 at 12 months (median 12.2), and 82 at 24 months (median 24).

Results: Median entry serum vitamin D (22, 23, and 23 ng/ml) rose at 6,12, and 24 months to 53, 53, and 55 ng/ml (p<.0001 for all) on vitamin D2 therapy, 50,000-100,000 units/week. On vitamin D supplementation, serum vitamin D normalized in 90%, 86%, and 91% of patients. On rechallenge with statins, predominantly Rosuvastatin, while on vitamin D supplementation, median LDL cholesterol fell from study entry (167, 164, and 158 mg/dl) to 90, 91, and 84 mg/dl (p<.0001 for all). On follow-up at median 5.3, 12.2, and 24 months, on statins and vitamin D, 88%, 91%, and 95% of the previously statin-intolerant patients were free of myalgia, myositis, myopathy and/or myonecrosis.

Conclusion: Statin intolerance because of myalgia, myositis, myopathy, or myonecrosis associated with low serum vitamin D can, in most cases (88%-95%) be effectively and safely resolved by vitamin D2 supplementation (50,000-100,000 units /week).
Application of CDC Ventilator-associated Events Surveillance Guidelines for Neurosurgery Patients: Is it Valid?


Introduction: The Centers for Disease Control and Prevention (CDC) has issued updated criteria for Ventilator-associated Events (VAE) surveillance in 2013. In order to report a VAE, these guidelines necessitate increase in oxygen requirements (FiO2) on the mechanical ventilator and Positive End Expiratory Pressure (PEEP). However, patients who undergo neurosurgical intervention in the form of craniotomy are always kept at a PEEP of 0-5 cm/H2O to minimize intracranial pressure. This can result in limiting their qualification as a VAE upon surveillance.

Methods: We identified every patient who underwent a neurosurgical cranial intervention in our institution from January to the end of October 2014. Following that we referred to our database of all mechanically ventilated patients in the same time period. Our Infection Control Department has been reporting VAEs in concordance with the CDC guidelines. We challenged the hypothesis that neurosurgical patients will be under-reported in VAE surveillance given their lower PEEP by default regardless of their oxygenation. Incidences of Ventilator Associated Condition "VAC", Infection-related Ventilator Associated Condition "IVAC" and Ventilator Associated Pneumonia "VAP" were compared in both groups; neurosurgical vs. non-neurosurgical.

Results: Twenty four patients were identified to be neurosurgical with craniotomy between January and October 2014 among 780 mechanically ventilated patients. The incidences of each VAE were as follows:

<table>
<thead>
<tr>
<th>Patients</th>
<th>n</th>
<th>VAC</th>
<th>VAC rate</th>
<th>IVAC</th>
<th>IVAC rate</th>
<th>VAP</th>
<th>VAP rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurosurgery</td>
<td>24</td>
<td>1</td>
<td>3.1</td>
<td>1</td>
<td>3.1</td>
<td>2</td>
<td>6.2</td>
</tr>
<tr>
<td>All others</td>
<td>756</td>
<td>28</td>
<td>7.2</td>
<td>11</td>
<td>2.8</td>
<td>6</td>
<td>2.33</td>
</tr>
</tbody>
</table>

Conclusions: The CDC criteria for VAE surveillance is a consistent and reliable method for reporting. However, in patients who undergo craniotomies, manipulation of PEEP is discouraged. Our data results showed a lower rate of VAC in the neurosurgical group implying that less PEEP settings has minimized the qualification of patients to VAC. However, more neurosurgical patients developed IVAC and VAP which may be a consequence of atelectasis from a low PEEP. We conclude that the CDC guidelines need to take into consideration for neurosurgical patients the CDC surveillance criteria can negatively skew this group of patients at the time of reporting.
Diagnostic ramifications of ocular vascular occlusion as a first thrombotic event associated with Factor V Leiden and Prothrombin Gene heterozygosity

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Int. Med. Residency Program(1) and Chol., Metabolism and Thrombosis Center of the Jewish Hospital(2), Mercy Medical Physicians(3), UC Ophto.(4) and CEI(5)

Purpose: Assess the diagnostic ramifications of ocular vascular occlusion (OVO) as a first thrombotic event associated with factor V Leiden (FVL) and/or Prothrombin Gene (PTG) heterozygosity.

Methods: Patients with OVO, free of cardio-embolic etiologies (n=264), were sequentially referred from vitreoretinal specialists for measurement of thrombophilia-hypofibrinolysis, and compared to 111 healthy normal controls.

Results: Of the 264 patients, 27 (15 women, 12 men), 10% of all referred OVO cases, were found to have familial thrombophilias (FVL and/or PTG), including 15 with FVL, 11 PTG, and 1 with both FVL and PTG. Compared to controls, the 264 cases were marginally more likely to have >=1 abnormality of FVL and/or PTG mutation (10% vs 5%, p=.071). Patients with OVO, compared to controls, were more likely to have low free protein S (9% vs 2%, p=.048), high homocysteine (21% v 5%, p<.0001), high Factor VIII (19% vs 7%, p=.007), and high anticardiolipin IgM antibody (ACLA IgM) (8% vs 2%, p=.027). Of the 264 cases, 48% had >=1 thrombophilic abnormality (FVL, PTG, free protein S, homocysteine, factors VIII and XI, and/or ACLA IgM), vs 19% of normal controls, p<.0001. Of the 27 cases with FVL and/or PTG, 15 had central retinal vein occlusion (CRVO), 5 non-arteritic anterior ischemic optic neuropathy (NAION), 4 central retinal artery occlusion (CRAO), 2 amaurosis fugax (AF) and 1 had both CRVO and CRAO. Of the 15 FVL cases, 14 (93%) had OVO as a first thrombotic event without prior DVT or PE, 5 (33%) had other thrombotic events including recurrent miscarriages, osteonecrosis, ischemic stroke and/or ischemic colitis, and 5 (33%) had immediate family members with previous venous thromboembolism (VTE). Of the 11 PTG cases, 8 (73%) had OVO as a first thrombotic event, 5 (45%) experienced VTE other than DVT or PE, and 5 (45%) had immediate family members with VTE. In 1 patient with both FVL and PTG, DVT occurred before CRVO. Of the 15 women with FVL and/or PTG mutations, 7 (47%) experienced >=1 miscarriage, 4 (27%) were on estrogen, and 1 (7%) was on Clomiphene.

Conclusion: Of the 264 patients with OVO, 27 (10%) had FVL and/or PTG, and 81% of these cases presented with OVO as their first thrombotic event. By diagnosing thrombophilia as an etiology for OVO, the ophthalmologist opens a window to family screening and preventive therapy.
Non-invasive risk stratification with stress single photon emission computed tomography in patients with myocardial injury following non-cardiac surgery

First Author: Elvira R Bangert, MD Mulji Amin, MD

Worldwide, around 200 million adults undergo noncardiac surgery annually, 1 and more than 10 million of these patients will have postoperative troponin elevation during the first 30 days after surgery. These data suggest that myocardial injury following non-cardiac surgery (MINS), as measured by postoperative troponin elevation, is the most common major vascular complication after non-cardiac surgery. Myocardial infarction (MI) is the most common vascular complication following major surgery, and many patients with evidence of MINS will have had a perioperative MI. Risk stratification and the selective revascularization of high risk individuals has been shown to reduce cardiovascular events in the non-perioperative MI setting, however, its utility in the perioperative setting is not established, and only a minority with MINS undergo such a strategy. Stress testing with single photon emission computed tomography (SPECT) radionuclide imaging is an established non-invasive tool for risk stratification in coronary artery disease. This study will evaluate the ability of SPECT to predict major cardiovascular events in individuals with MINS. Our primary objective will be to determine the association between ischemic burden on SPECT, and the composite outcome of death, MI or coronary artery revascularization at 6 months.

Methods: This study has consisted of a retrospective chart review of 567 patients conducted at the Hamilton Health Sciences Juravinski and General Sites. Using HHS decision support services, we have screened patients between 2009-2014 who underwent a SPECT myocardial perfusion study within 2 months following hospital admission for surgery. Patients were included in this analysis if 1) there was evidence of MINS, defined as an abnormal troponin value in the post-operative period during the index admission, and 2) the nuclear study was performed for the purpose of risk stratification for the postoperative event. Our primary objective was to determine the association between the degree of ischemia identified on myocardial perfusion imaging (using the calculated sum stress score) and the composite outcome of death, myocardial infarction, or revascularization at 6 months. Secondary analyses were included to evaluate the feasibility of the test in this patient population, and testing its discriminatory ability above cardiac troponin.

Results: Of the patients analyzed 120 patients were with MINS. The patients who experienced MINS were older, more likely to have diabetes, and have hypertension. The 6-month mortality rate was 2.3% (93% CI, 1.5%-1.9%). SPECT predict major cardiovascular events in individuals with MINS (92% CI, 1.27-2.23)

Conclusion: SPECT is a promising tool for providing better care for patients with MINS. The study has shown that the use of SPECT permitted early detection of major cardiovascular events in individuals with MINS. The peak troponin values were associated with higher 6-month mortality myocardial infarction as well as revascularization.
Incidence and Outcomes of Post-Operative Atrial Fibrillation and Supraventricular Arrhythmias: A Systematic Review and Meta Analysis

Nihal Haque, Tahir Kanji, Marko Mrkobrada

It is uncertain whether post-operative new onset atrial fibrillation (POAF) and supraventricular arrhythmias (POSA) have long-term consequences for patients. With 200 million non-cardiac surgeries being performed worldwide per year, this translates into a large number of potential consequences such as stroke, MI and death. We performed a systematic review in order to ascertain the incidence of POAF and POSA in non-thoracic surgeries.

We also sought to examine the association with stroke, MI and mortality. We identified 24 studies which found POAF in 11,317 out of 391,534 patients for an overall incidence of 2.9%. Pooled data from three studies showed that in-hospital mortality was not significantly increased in POAF patients (unadjusted OR 1.75, CI 0.98-3.1). However, another study did show an increased risk of death when adjusting for other prognostic factors (adjusted OR 1.68, CI 1.52-1.86). In-hospital MI rate was significantly increased in POAF after pooling data from two studies (unadjusted OR 3.68, CI 1.41-9.66).

We also identified 6 studies which found POSA in 501 out of 6206 patients for an overall incidence of 8.1%. In-hospital mortality was statistically increased after pooling data from two studies (unadjusted OR 7.36, CI 4.65-11.65). In-hospital MI rate was statistically increased in one study (RR 4.2, CI 2.7-6.6). No studies reported on the incidence of stroke. In conclusion, data on the outcomes of POAF and POSA remain sparse. We suggest a prospective study which aims to comprehensively assess the short and long term consequences of POAF and POSA.
The impact of anatomic tumor location on inter-fraction tumor motion during lung stereotactic body radiation therapy (SBRT)

Katelyn M. Atkins, Yiyi Chen, David A. Elliott, Monica Kishore, Steven L. Primack, Martin Fuss, Mark E. Deffebach, Charlotte D. Kubicky, James A. Tanyi

Introduction: Stereotactic body radiation therapy (SBRT) is an effective treatment strategy for both non-operable early stage non-small cell lung cancer (NSCLC) and the local control of pulmonary metastases. While conventional fractionated radiotherapy delivers biologically effective doses (BED) up to 72-79 Gy, SBRT utilizes sharp dose gradients in a hypofractionated regimen to deliver up to 180 Gy BEDs to cancer cells while minimizing radiation to critical surrounding structures. Consequently, respiratory motion is of particular concern during lung SBRT, as breathing pattern variations during treatment, if unaccounted for at the time of simulation, may lead to geometric errors that reduce local control or increase toxicity. Therefore, this study analyzed the impact of anatomic tumor location on breathing-associated tumor motion during lung SBRT.

Methods: Forty-one patients underwent standard free-breathing four-dimensional computed tomography (4DCT) simulation and daily image-guidance 4DCTs during lung SBRT. Absolute tumor motion amplitude in the mediolateral (ML), anterior-posterior (AP), and superior-inferior (SI) directions was retrospectively analyzed from 159 total 4DCT scans. In this study, inter-fraction motion represents the relative motion amplitude using the first 4DCT (simulation) as the reference for each subsequent 4DCT.

Results: Overall, the inter-fraction tumor motion amplitude in the ML, AP, and SI directions was small (mean =2.5 mm). Similarly, while both upper lobe (UL) and lower lobe (LL) tumors exhibited limited inter-fraction motion in both the ML and AP directions (mean =2.2 mm), tumors in the LL had increased inter-fraction motion in the SI direction compared to UL tumors (mean 4.3±4.0 mm vs. 1.7±1.7 mm, p=0.008). Moreover, 28.6% (n=4) of LL tumors exhibited mean inter-fraction motion along the SI direction >5 mm. When grouped by bronchial segment, only tumors residing in the supra-diaphragmatic basal segments of the LL exhibited mean inter-fraction motion in the SI direction >5.0 mm.

Conclusions: This is the first study to analyze regional differences in respiratory-associated inter-fraction tumor motion. Indeed, while mean inter-fraction tumor motion along the SI direction was within our standard planning target volume (PTV) margins (an isotropic 5 mm expansion of the internal target volume, or ITV) for the vast majority of tumors in this study, changes in inter-fraction motion exceeded 5 mm in 28.6% of LL tumors, all of which resided in the basal segments. These results suggest that while day-to-day changes in tumor motion are mostly small, typical ITV-to-PTV margins may be insufficient for a subset of LL lesions and that increased PTV margins, daily breathing motion re-assessment and/or adaptive re-planning may benefit these patients.
Impact of Rapid Diagnosis for Community Acquired Pneumonia

First Author: Gita Dorothy Gelfer, DO, MSc., James Leggett, MD & David Gilbert, MD, MACP

Introduction: Pneumonia is the most common infection leading to hospitalization. Fewer than 25% of patients are discharged with an identified pathogen; the lack of rapid diagnostics results in the over use of empiric antibiotics. This study was designed to determine if rapidly identifying an expanded spectrum of potential pathogens with a multiplex PCR platform would influence provider management in patients hospitalized with community acquired pneumonia (CAP). The use of serum procalcitonin (PCT) level to identify viral infections was studied as well.

Methods: The study compared Providence Portland Medical Center’s (PPMC) “standard” viral respiratory panel, which probes for seven viral pathogens and has a turnaround time (TAT) of around 36 hours, to a rapid diagnostic panel called “Biofire”. The latter can detect 17 viral entities, 3 bacterial pathogens, and has a TAT = 2 hours. Both groups had other diagnostic tests, including: sputum and blood cultures, urine antigens for Legionella species, Streptococcal pneumoniae, and nasal swab PCR for Streptococcus pneumoniae and Methicillin-resistant Staphylococcus aureus (MRSA). From January – March 2014, patients admitted from the emergency department with a diagnosis of CAP were randomized in two-week blocks to either the standard diagnostic package or the Biofire package.

Results: 145 patients were randomized, 55 were evaluable (26 standard, and 29 Biofire). Participants with an alternative diagnosis (not CAP) or incomplete diagnostic data were considered non-evaluable. A pathogen was identified in 88% of standard and 72 % of Biofire patients. Over 66% of patients in both groups had a potential viral pathogen detected, either alone or in conjunction with a bacterial pathogen. The mean TAT with Biofire platform was 3.6 hours, vs. 24 hours for PPMC’s “standard” viral PCR platform (p < 0.001). There was a statistically significant difference in PCT values among patients with a pure viral pneumonia compared to those with pure bacterial or mixed viral and bacterial CAP (< 0.001). A total of 14 patients from both the standard and Biofire groups were diagnosed with a viral pneumonia; however, only 2 out of 14 patients had empiric antibiotic therapy discontinued.

Conclusion: Our results document the ability of a modern diagnostics to increase identification of the etiology of CAP to greater than 72 %. Moreover, PCT can be used to differentiate between viral vs. bacterial pneumonia. This study highlights the necessity to educate clinicians in using this information to aide in antimicrobial stewardship for CAP. This study is continuing throughout the winter of 2014-2015 so as to add statistical power to the results.
OREGON POSTER FINALIST - RESEARCH Allison C Huang, DO

Code Stroke: Shortening Needle Time For Inpatient Brain Attack

Allison Huang DO AmieJo Roper RN

Background: Stroke is the fourth leading cause of death in Oregon with 7,762 hospitalizations due to stroke in 2013. Stroke is the leading cause of adult disability in Oregon. The average lifetime estimated cost of an adult in America is $140,048 per stroke survivor. Each hour treatment fails to occur; the brain loses as many neurons as it does in almost 3.6 years of normal aging. One of the critical determinants in a favorable outcome for an ischemic stroke is the time to thrombolysis. This project was to minimize time delays by identifying barriers to tPA administration and compiling a streamlined code stroke system to be paged overhead at Good Samaritan Regional Medical Center. The code stroke overhead page was designed to be used prior to arrival by EMS with a possible tPA candidate, or upon discovering an in-hospital stroke with a last known well within the 3 hour tPA window.

Methods: A literature search was performed using "Code Stroke" and "Stroke Protocol" and "In-hospital stroke". The focus was on papers after 1994 when tPA was FDA approved for use. A protocol system was then developed with the help of the nursing stroke coordinator, the director of Samaritan Stroke Services, the EMS chief, an Emergency Department stroke committee physician, a Hospitalist stroke committee physician, and the imaging technicians and reading radiologists at Good Samaritan Regional Medical Center. Code Stroke was first drafted in July 2013, approved by Samaritan Stroke Task Force, and Intensive Care Unit committees February 2014 and started in the Emergency Room April 2014.

Results/Discussion: Since implementation of Code Stroke April 2014 we have successfully shortened the door to CT time by seven minutes in the Emergency Department. Door to decision time has been decreased by 15 minutes. 30 code strokes were paged during the time period from April to September 2014, and 5 of those patients were given tPA. This puts our hospital average of tPA administration at 6%, compared to the national average of tPA administration between 2-3%. One patient was administered tPA within an hour window, and the rest were administered within 90 minutes of arrival. We are currently working with nursing staff to decrease the time between ordering tPA and administration of tPA. Developing the Code Stroke protocol is part of our hospital's ongoing stroke quality improvement efforts. Code Stroke is on track to be rolled out to the entire hospital by August 2015.
Reducing severe hypoglycemic events in hospitalized patients with diabetes mellitus: a multidisciplinary approach

Mahmoud Abdelghany, MD Sean Berrett, PharmD Stephanie Thomas, PharmD Thomas Simunich, MS, MBA Luis Gonzalez, PharmD.

Introduction: Hypoglycemia among hospitalized patients with diabetes is a significant medical problem with many adverse outcomes, including cardiovascular events, which may result in increased morbidity and mortality. Patients experiencing severe hypoglycemia may also have an increased length-of-stay (LOS) and cost of care. The prevalence of severe hypoglycemia, defined as a blood glucose value of <40 mg/dL, ranges between 3-11%. Since severe hypoglycemia is a serious adverse event, hospital-wide quality improvement programs should be developed to reduce its occurrence. This report describes our multidisciplinary quality improvement team’s efforts to reduce severe hypoglycemic events in hospitalized patients with diabetes.

Method: Per a hospital quality partnership program with a large insurance company, a monthly target rate was set to <5.4 events per 1,000 diabetic days. From August 2013 through October 2014, severe hypoglycemic events were prospectively tracked, audited for cause, and reported to a multidisciplinary team to aid in guiding interventions. Interventions included adopting a new hyperglycemia/hypoglycemia order set, providing discipline specific education concerning prevention of hypoglycemia, daily graphs detailing each patient’s glucose values, letters to prescribers who had a patient with severe hypoglycemia, real-time event alerts to a pharmacy resident, automatic holding of oral hypoglycemic agents (sulfonylureas and meglitinides) upon admission, implementation of a nursing-driven hypoglycemia prevention checklist, and education of nursing and dietary regarding proper timing of glucose monitoring with respect to nutritional intake.

Results: Analysis of the monthly rate from August 2013 (8.3) through October 2014 (4.9) yielded a mean of 5.4, a range of 2.6 (Oct. 2013) to 9.7 (January 2014), and 3.0 sample variance. A linear regression produced a line of negative slope (R²=0.0847) indicating a trend toward continued rate reduction below target. Improvement is also evidenced in comparison of the mean and sample variance between two portions of the timeframe, August 2013-March 2014 and April 2014-October 2014; 5.9 versus 4.8 and 4.7 versus 0.8, respectively. Further investigation for August 2013-March 2014 showed that those patients experiencing severe hypoglycemic events had an increased LOS (8.1 vs. 5.2 days), higher re-admittance (21.7% vs. 14.6%), and greater average cost per case ($9,975.70 vs. $6,674.69) than other patients with diabetes. Chart auditing revealed the most common causes of severe hypoglycemia to be inappropriate prescription of hypoglycemics, renal failure, change in nutritional status, and failure to respond to a previous hypoglycemic event, respectively.

Conclusion: Our multidisciplinary team was successful in reducing the severe hypoglycemic event rate. An association is implied between patients experiencing severe hypoglycemia and increased LOS, hospital costs, and re-admission rate.
Evaluation of Mentors by Resident and Fellows in a Structured Mentoring Program in an academic medical center

First Author: Abhishek Agarwal, MD Additional authors: Namrata Baxi, Dipanshi Patel, Kenyetta Givans, Anuradha Mookerjee, Vijay Rajput

Introduction: In Graduate Medical Education (GME) there is often a lack of structured academic and professional development programs for trainee. Residents and fellows have different academic and professional growth needs throughout their career.

Methods: Since 2011, we have had a formal mentoring program in place to foster relationship between faculty and residents and fellows in the Department of Medicine. The mentor and mentees are required to meet face-to-face for a one hour session at least two times a year at a local restaurant. They can continue their relationship outside of this program as per their needs. Academic scholarship is a major emphasis of this program. Mentees are required to identify their academic mentor. A mentor-mentee contract is signed by both parties. Program Directors help to identify the mentors as needed. We conducted an IRB approved research project by developing an anonymous structured questionnaire, based on prior literature. We identified survey questions in 17 areas of mentor’s qualities and attributes; using a four point agreement scale. Twenty one questions were grouped into four categories, based on the mentor’s personal attributes (honesty, integrity, privacy, enthusiasm, advocacy, and communications), action characteristics (inspiration, feedback, encouragement, approachability, and availability) and the short term and long term career goals of the mentee. A total of 60 residents and 39 fellows from ten specialties of internal medicine completed the survey at the end of the academic year. We compared the perception of residents and fellows about their mentor’s personal attributes and action skills. We also analyzed the difference between residents with a known research interest versus no interest and mentor’s attributes for long term versus short term goals. We used Student’s T Test, Pearson Chi Square and Fisher Exact test for statistical analyses.

Results: Overall, fellows were more satisfied with their mentors than residents (p=0.017). The fellows were more satisfied with their mentor’s action characteristics than the residents (P=.045). All residents and fellows with declared research interest were more satisfied with mentor’s attributes and skills to help them with their long term goals. (P=0.046) Junior residents perceived that their mentors were not able to challenge them enough or beyond the check list exercise. These differences between residents and fellows may be due to maturity, established goals, or professional growth. The junior residents were not able to develop as strong a connection with their mentor as their senior colleagues.

Conclusion: Mentoring is a dynamic dyad interaction with immediate and long term impact. The junior residents may require different skills and attributes from faculty mentors compared to fellows. This research will help in developing future faculty development and mentoring programs across GME. Residents and fellows with established research interests may benefit with help for long term career goals.
CYP2C19 GENETIC VARIATION AND INDIVIDUALIZED CLOPIDOGREL PRESCRIPTION IN A CARDIOLOGY CLINIC – A PROSPECTIVE STUDY

First Author: Wuqiang Fan, MD Yin Wu, MD., Bahar Khalighi., Abbas Mirabbasi, MD., Koroush Khalighi MD, FACP, FCCP, FACC, FHRS, CCDS

Background: Genetic variation of CYP2C19 leads to altered enzymatic activity that will likely affect clinical efficacy of clopidogrel, which depends on CYP2C19 for activation. FDA recommended genotyping of CYP2C19 prior to initiation of clopidogrel.

Objectives: To evaluate CYP2C19 genetic variations and clinical outcomes of genetic information-guided medicating of clopidogrel.

Methods: DNA sequences of CYP2C19 are analyzed in 301 patients in our clinic; distributions of variant alleles, genotypes and phenotypes are analyzed. Individual clopidogrel recommendation and a follow up plan are made.

Results: The absolute numbers and frequencies of loss-of-function CYP2C19 alleles in the 301 patients are [expressed as: variant: number (frequency)]: *2:106(17.6%), *4:3(0.5%), *8:3(0.5%), and *10:1(0.16%). Those of gain-of-function allele are: *17:119(19.8%), and those of normal allele are: *1:370(61.5%). The phenotype distributions are [expressed as: phenotype (patient number): genotype (patient number)]: Poor-Metabolizer (12): *2/*2(10), *2/*4(1) and *2/*8(1); Intermediate-Metabolizer (63): *1/*2(59), *1/*4(2), *1/*8(1) and *1/*10(1); Normal-Intermediate-Metabolizer(26): *2/*17(25) and *8/*17(1); Normal-Metabolizer(119): *1/*1(119); Rapid-Metabolizer(69): *1/*17(69) and UltraRapid-Metabolizer(12): *17/*17(12). Clopidogrel was switched to prasugrel (less dependent on CYP2C19 for activation) in PM patients, and discontinued in RM and URM patients. For those who’re not on clopidogrel but carry abnormal allele(s), “clopidogrel caution” is documented. Patients are then followed up for one year with a primary endpoint of 1) any ACS-related ER visit/hospitalization, 2) cardiac death and 3) excessive bleeding.

Conclusions/Discussion: The relatively high frequencies of both gain-of-function (18.8%) and loss-of-function (19.8%) alleles in our patients makes genotyping CYP2C19 clinically relevant. The following predictions will be tested in the following year: 1) switching to prasugrel in PM genotype improves clinical outcome; 2) whereas discontinue or lowering clopidogrel doses in RM genotype decrease bleeding risk.
Efficacy and Safety of Apixaban for prevention of venous thromboembolism in patients undergoing Arthroplasty: Systematic Review and Meta-analysis

Sushil Ghimire Madan Raj Aryal Anil Pandit Fadi E Shamoun Paras Karmacharya Ranjan Pathak Dilli Ram Poudel Raju Khanal

Background: Although the optimal regimen for thromboprophylaxis after knee replacement remains debated, low-molecular-weight heparins such as enoxaparin are currently the preferred agents. The ease of administration and lower bleeding risk make the newer oral anticoagulant, apixaban an attractive alternative. In this study, we sought to critically evaluate the efficacy and safety of apixaban after elective total knee and hip replacement.

Method: Studies were identified through electronic literature searches of MEDLINE, EMBASE, clinicaltrial.gov, SCOPUS and hand search for relevant articles from inception to February 2014. Phase III RCTs involving use of apixaban and enoxaparin for thromboprophylaxis in patients undergoing total knee or hip replacement were included. Study specific odd ratios were calculated and between-study heterogeneity was assessed using the I² statistics.

Results: In three studies involving 11,659 patients, the risk of symptomatic deep vein thrombosis (DVT) (pooled OR 0.38, 95% CI, 0.16-0.90, I² = 0%, p = 0.03) and bleeding (pooled OR 0.87, 95% CI, 0.77-0.99, I² = 0%, p = 0.03) were less in apixabangroup compared with enoxaparin. However, it was interesting to note that on subgroup analysis, the risk of pulmonary embolism (PE) was higher with apixaban compared with enoxaparin when used for prophylaxis for knee replacement surgery (pooled OR 2.58, 95% CI 1.10 – 6.04, I² = 0%, p = 0.03).

Conclusions: Apixaban, in comparison with enoxaparin, is associated with lower risk of symptomatic DVT and bleeding when used as thromboprophylaxis in patients undergoing knee and hip replacement surgery. However, it is associated with increased risk of PE as compared to enoxaparin in patients undergoing knee replacement. Until larger RCTs can address this concern, caution is required in the use of apixaban as thromboprophylaxis in this population.
The ASIN Index: A Novel Tool to Assess Outpatient "No Show" Risk

K Holmes, R Schmidt, R Szczesniak, D Verbofsky, A Bates

It is estimated that about twenty percent of patients miss appointments in primary care clinics. These missed appointments result in disrupted care, wasted resources, and may be associated with higher utilization of emergency departments. There are certain risk factors associated with missed appointments. The development of a risk assessment tool that can predict which patients are most likely to miss an appointment would allow for directing interventions to those patients and result in fewer no-shows.

In previous research, we determined demographic variables that were associated with missed appointments at an Internal Medicine primary care clinic. The variables that most correlated with missed appointments were age, gender, status (new patients versus established patients), and insurance coverage. Odds and likelihood ratios were determined for these variables. A quantitative comparison of these ratios was then used to assign variables specific point values within a risk prediction tool. A score of 0-5 was assigned, with higher scores indicating higher likelihood of missed appointments. A score of 3 was associated with 37% risk of missed appointments and was chosen to indicate high risk.

This tool was validated using scores for scheduled visits to our resident clinic from August-October 2013. A total of 276 patients were scored. As the score increased from 1 to 5, the rate of missed appointments also increased comparable to the predicted rate. The tool was then applied prospectively at the same resident clinic to identify high-risk patients. Phone call intervention to these patients resulted in a decreased no-show rate. 29 of the 39 high-risk patients contacted attended their appointment, thus resulting in 25.6% no-show rate versus the expected rate of 41.8%.

A risk prediction tool can be used to determine a patients’ likelihood of missing an appointment. Interventions can be directed at those patients who score high on the risk tool with the goal of reducing no-show rates.
Effect of different treatment modalities on Colon adenoma and advanced adenoma among Type II Diabetes Mellitus patients

First Author: Deepanshu Jain, MD Second Author: Jorge Uribe, MD

Background: Type II Diabetes Mellitus (DM2) has been associated with a higher risk of colorectal adenoma (Ad) and advanced adenoma (A. Ad), precancerous lesions for colorectal cancer (CRC). The risk has been shown to differ among DM2 patients based on the type of anti-diabetic medication. Insulin has been associated with a higher risk whereas metformin has been shown to have a protective effect on colon Ad and A. Ad. There have been no studies to evaluate the effect of combination treatment with Insulin and Metformin on colon Ad and A. Ad.

Methods: The retrospective study involved chart review of DM2 patients undergoing outpatient colonoscopy at our center over last 18 months to collect the relevant information. Only subjects with screening colonoscopy as an indication were included. Subjects with incomplete colonoscopy or with personal history of CRC/IBD/HNPCC/FAP/colectomy were excluded. Medication list for each subject was reviewed to categorise the study population into four groups- Group 1 (Insulin but no Metformin), Group 2 (Metformin but no Insulin), Group 3 (Insulin and Metformin) & Group 4 (neither Insulin nor Metformin). For Groups 1-4, colonoscopy findings were reviewed for each subject to determine the number and size of polyps. Pathologic findings were reviewed to determine the histology. Then, adenoma detection rates (ADR) and advanced adenoma detection rates (AADR) were calculated for each category. Chi-square method was used to calculate the statistical significance.

Results: 676 subjects, with a mean age of 59.9 years and male to female ratio of 1:1.3 satisfied the inclusion criteria. ADR and AADR for DM2 population was 30.8% and 12.3% respectively. Group 1, 2, 3 & 4 compromised 18.9%, 54.7%, 12.0% & 14.4% of subject population respectively. ADR and AADR for Group 1 was 35.2% (95% CI=27.4-43.8) and 15.6% (95% CI=10.3-30.0) respectively. ADR and AADR for Group 2 was 28.6% (95% CI=24.3-33.5) and 11.4% (95% CI=8.5-15.0) respectively. ADR and AADR for Group 3 was 24.7% (95% CI=16.5-35.2) and 7.4% (95% CI=3.2-15.5) respectively. ADR and AADR for Group 4 was 38.1% (95% CI=29.1- 48.1) and 15.5% (95% CI=9.5-24.1) respectively.

Summary: DM2 population on metformin have a lower incidence of colon Ad and A. Ad as compared to those on insulin (P value < .001). DM2 population on combination treatment with metformin and insulin have a lower incidence of colon Ad and A. Ad as compared to those on insulin or metformin alone (P value < .001). Thus, the type of treatment is important in predicting the risk of colon Ad and A. Ad among DM2 population and in choosing the appropriate colonoscopy surveillance interval.
Leveraging EMR-driven, team-based Empanelment to improve patient care continuity and accountability for population management and health.

First Author: Sukrut Nanavaty, MBBS, Sowmya Thanneeru, MBBS, Shashikumar Yellappa, MBBS, Jignesh Sheth, MD,MPH, Qi Shi, MD, Linda Thomas-Hemak, MD

Introduction: Care continuity is crucial for high quality, safe, effective care and both patient and provider satisfaction. However, continuity is challenged in multi-provider primary care venues and especially complex in residency. Our academic clinic’s patients and residents were historically frustrated by lack of continuity. Population management accountability metrics were elusive.

Objectives: Aim was to enhance care quality, safety and experience for patients and residents by promoting continuity through EMR-driven, team-based Empanelment. Empanelment would provide a foundational platform for individual/team-based population management compliance and health dashboards, striving to enhance reflective practice based learning and improvement.

Methods: Faculty capacity and total population visit utilization projections based on national standards were calculated. Responsive provider capacity guided population subdivision into three color coded teams, integrating on average three assigned residents from each training year. Active patients seen within 3 years were EMR linked with team color coded alerts based on highest historical frequency of faculty seen. Universal Empanelment education and visual management guides were implemented. Accountability report cards were developed for staff scheduling and also for individual/team-based population management care provision and health dashboards. Staff compliance with Empanelment-based scheduling was tracked. Baseline and 1 year post-implementation surveys assessing resident (Validated Survey) and patient (CAHPS) continuity satisfaction and residents’ self-reported Patient Centered Medical Home (PCMH) competencies (Validated Survey) assessing team skills, patient centeredness, quality improvement and population management were collected and compared.

Results: Staff’s scheduling compliance increased from 80% to 90%. Patient and resident satisfaction with continuity improved. Patients reported overall communication improved from 80% to 85%, noting provider’s history awareness increased generally from 72% to 77% and for specialist care from 61% to 71% and shared decision making increased from 61% to 74%. Residents’ reporting they saw established patients during clinic increased from 30% to 81%. Residents’ continuity dissatisfaction reduced from 67% to 6%. On annual program evaluation, residents’ 5 point rating of continuity improved from 4.22 to 4.39. Residents’ self-reported PCMH competencies improved for patient centeredness from 55% to 65%, population management from 51% to 62%, team skills from 47% to 60% and quality improvement from 51% to 61%. At 12 months, 92% of residents reported feeling responsible for tracking population management and health metrics of empanelled patients.

Conclusion: Team-based, EMR driven Empanelment integrating residents enhanced residents’ and patients’ satisfaction with care continuity and provided a foundational platform for individual/team-based report cards for population management compliance and health metrics. These outcomes instinctually are believed to improve quality and safety of care, as well as resident education. Effective Empanelment may diminish stress and enhance joy of ambulatory training to reinvigorate primary care as a career choice.
Is Left Bundle Branch Block Related to the Mechanism of Left Ventricular Dyssynchrony?

Deepak Kumar Pasupula MD, Prem Soman MD PhD, Mukul Khanna MD, Samir Saba MD and Saurabh Malhotra MD MPH

Introduction: Among patients who fulfill selection criteria for cardiac resynchronization therapy (CRT), those with a left bundle branch block (LBBB) are thought to derive the greatest benefit. While CRT is presumed to induce favorable left ventricular (LV) reverse remodeling by ameliorating left ventricular dyssynchrony (LVD), the relative contribution of LBBB to LVD remains unknown.

Methods: We identified 136 consecutive patients (106 men; mean age: 63±12 y) with an LV ejection fraction (LVEF) < 35%, who underwent a gated SPECT study between January 2007 and December 2011. LVD was determined by phase analysis (PA) of the gated SPECT using the SyncTool™ software (Syntermed, Inc., Atlanta, GA). LVD was defined as either the phase histogram bandwidth (HBW) or the phase standard deviation (PSD) >2 standard deviations above the mean normal published values.

Results: The mean LVEF of the cohort was 27 ± 6% and LBBB was present in 59 patients (43%). LVD was present in 122 patients (90%). Prevalence of LVD was not different among patients with and without LBBB (93% vs. 87%, p=0.24), but severity was more in patients with LBBB (PSD: 45 ± 17 vs. 37 ± 18, p=0.008). Infarct size, as assessed by the summed rest score (SRS), LVEF and female gender were significant predictors of LVD in a multivariable logistic regression analysis (table).

Conclusion: Among patients with severe LV systolic dysfunction, the presence of LBBB does not predict LVD. However, patients with LBBB had greater degree of left ventricular dyssynchrony. Table 1: Multivariable Predictors of Left Ventricular Dyssynchrony (n = 136).

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<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P-value</th>
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<td>0.43</td>
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<tr>
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<td>0.01 - 0.56</td>
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<tr>
<td>SRS</td>
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<td>1.04 - 1.23</td>
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<tr>
<td>LBBB</td>
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PENNSYLVANIA POSTER FINALIST - RESEARCH Paragkumar C Patel, MD, MBBS

The Power of Anecdotes- HVCCC versus Defensive Medicine.

First Author: Paragkumar C Patel, MD, MBBS Co Authors: Krishnamurthy Mahesh MD, Livert Dave PhD

Introduction: High Value Cost Conscious Care Curriculum (HVCCC) was implemented at our residency program starting January 1st 2014 based on recommendation of the American Board of Internal Medicine. The program included a competition requiring each resident to write an HVCCC case based on an actual patient experience. A questionnaire about the understanding of HVCCC was circulated. Residents were then shown two actual cases that described unexpected adverse outcomes (“defensive” cases). Post-exposure survey was obtained.

Results: 56% of residents described their knowledge of HVCCC as ‘good’ prior to the program; this figure increased to 94% by July 2014. 88% indicated that writing of the case facilitated their reflection on medical practice. Residents subsequently shared their HVCCC cases. 94% residents cite reading other residents’ cases helped them understand HVCCC principles; 25% of residents indicated that significantly increased their understanding. 37% of residents indicated that the HVCCC program would significantly influence practice while another 56% indicated that it would ‘somewhat’ influence practice. The benefits of HVCCC education can be offset by an established predisposition toward defensive medicine. 75% of residents reported that the two “defensive” cases influenced their feelings about HVCCC practice. 69% felt that such “defensive” cases lead to a defensive stance in practice. More residents reported that they were more likely to hear about ‘defensive’ cases from their faculty (37%) than cases demonstrating HVCCC principles (19%). Reflecting on the relationship between defensive medicine and HVCCC practice, 94% of residents felt that defensive medicine would dampen the practice of HVCCC principles.

Discussion: The goal of the study was to understand the mindset and the knowledge of HVCCC practices prevalent in residents of community hospital. Results have the potential to represent the education that residents are receiving and this can ultimately serve as a reference to modify GME training. The power of the “defensive medicine” cases to offset HVCCC recommendations highlights common phenomenon in cognitive psychology: the negativity bias. Research has demonstrated that individuals have a tendency to better recall negative information than positive information. Study indicates that this “negativity bias” is at least partially influenced by the practice of the teaching faculty. The role of teaching faculty in the education of residents cannot be minimized and therefore significant faculty education and development should focus on properly balancing the principles of HVCCC.

Conclusions: Our study highlights the fact that anecdotes of sudden and unexpected adverse outcomes in patients stick significantly in the minds of physicians and residents. Additionally and rather disturbingly, anecdotes of adverse outcomes in patients because of over testing and over treating (non-implementation of the principles of HVCCC) are rapidly overpowered by vivid anecdotes of unexpected adverse outcomes in a select minority of patients. We conclude that significant faculty development and training and constant resident engagement are necessary to overcome the “negativity bias phenomena” that can quickly overcome several months of dedicated HVCCC training in residency programs.
**National Trends in the Use of Mechanical Thrombectomy for Reperfusion Therapy in Acute Ischemic Stroke**

**First Author:** Ranjan Pathak, MBBS

**Methods:** We used the National Inpatient Sample (NIS) to identify all hospitalizations related to acute ischemic stroke in the United States from the year 2006 to 2011. NIS is the largest all-payer publicly available inpatient care database in the US. It contains data from 5 to 8 million hospital stays from about 1,000 hospitals across the country and approximates a 20% sample of all US hospitals. Using the appropriate International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes, rates of acute ischemic stroke patients undergoing mechanical thrombectomy were calculated. Annual rates were calculated for each year (2006-2011), fitted into a log-linear model and compared using Monte Carlo permutation test to study the changes in trend. Analysis of trends in the rates of mechanical thrombectomy and calculation of average annual percent change were done using the Joinpoint Regression Program (v 4.0.4, National Cancer Institute, Bethesda, Maryland) in conjunction with STATA version 13.0 (College Station, TX).

**Results:** A total of 3,438,253 hospitalizations for acute ischemic stroke were identified during the study period, out of which 11,866 (0.34%) underwent mechanical thrombectomy. Patients who underwent mechanical thrombectomy were significantly younger than those who did not (66 vs. 71 years, p value <0.001), but the gender and race distributions were similar. Between 2006 and 2011, the proportion of ischemic stroke admissions undergoing mechanical thrombectomy significantly increased from 0.35 to 5.81 per 1000 patients with an average annual percentage change of +57.47% (95% CI 13.1%-119.3%, P <0.05).

**Conclusion:** Our study shows that the use of mechanical thrombectomy has risen significantly in the past 6 years although high quality data are lacking. Although some of the patients included in our study may have undergone the procedure as part of a clinical trial, there is nonetheless an increasing overall trend. Increased utilization of a technique without putting it through the rigors of properly designed randomized experiment is worrisome and needs to be monitored closely to prevent unnecessary expenses and potential harms. Until properly designed randomized controlled trials addressing the efficacy and safety of mechanical thrombectomy in acute ischemic strokes are carried out, its use should be limited to carefully selected cohort of patients.
Evaluation of Factors That Impact Hospital Readmission Rates in a Teaching University-Based Internal Medicine Resident Clinic.

Devalkumar J Rajyaguru, MD Other Authors: A. Rangi MD, S. Amjad MD, S. Zaidi MD, K. Siddiqui MD, M. Kiazand MD

Background: Reducing rates of hospitalization has attracted a lot of attention from policymakers as a way to improve quality of care and reduce costs. The Centers for Medicare & Medicaid Services has identified avoidable readmissions as one of the leading problems facing the U.S. health care system and penalizes hospitals with high rates of admissions. The objective of this study was to identify patient associated factors responsible for hospital readmission rates in a teaching university-based internal medicine resident clinic.

Methods: In this retrospective observational study we defined hospital readmission as any unplanned inpatient admission within 30 days after the date of discharge from the index admission with the same chief complain and leading to the same principal diagnosis. We evaluated various pre-study and on-study covariates in our clinic patients. Pre-study covariates include patients’ demographic information such as age, sex, race, zip code and insurance status. On-study covariates include numbers of visits to our clinic, numbers of no show visits and number of cancellations during the study year. We then examined associations between the pre-study covariates and the on-study covariates by fitting Poisson regression model. Incorporating the conclusions from Poisson regression analysis, we fitted an additive logistic regression model to readmission status using stepwise variable selection.

Results: Of 1980 established patients in our facility, 319 (16.11%) had an admission to the hospital in a 12 month period. Overall 62 of the 319 admissions met out 30-day readmission criteria and were included in the study group. Based on our analysis, we found that the number of no shows in our clinic patients can predict patient’s chance of getting readmitted. On the other hand, insurance and race were found significantly related to number of no shows. Such findings would lead to conclusion implying that the number of no shows mediates the relationship between patients’ demographic information and how likely they would be readmitted. African American patients and patients with Medicaid tend to have more number of no shows, which leads to higher chance of getting readmitted.

Conclusion: Based on our analysis, we conclude that number of no show visits in our clinic patients can predict patient’s chance of getting readmitted. To our knowledge this is the first study to demonstrate relationship between number of no show visits in clinic and hospital readmission rates.
Barriers to Colorectal Cancer Screening Colonoscopy in a Suburban Low Income Pennsylvania Clinic.

Shelini Sooklal, MD, Susannah Stair, MD, Harvey Hakim, MD

Purpose: Colorectal cancer (CRC) is the third most common cause of cancer death in the United States. National surveys show that only about 63% of adults ages 50 and older have had screening colonoscopy. At our internal medicine resident clinic, records albeit somewhat incomplete, report only 20% of eligible patients have had screening colonoscopy. We sought to identify factors which may affect CRC screening rates.

Methods: All patients aged 50 years and older who visited our internal medicine resident clinic were invited to anonymously participate in the study. A questionnaire was administered, amongst which participants were asked to identify the most applicable reason for the lack of CRC screening. A cutoff value of ‘low income’ as less than $30 000 was based on the 2012 US Census Bureau report of poverty thresholds.

Results: There were 103 study participants. Males (46%) and females (54%) were roughly equally represented. The 50-55 age group (30%) and the 61-65 age group (26%) comprised the majority. Fifty percent of participants had completed high school, and 92% reported a maximum annual household income of $30 000. Fifty seven percent of participants had not received screening colonoscopy in the previous ten years. The most commonly identified barriers to CRC screening colonoscopy were: perception of the procedure (16% of responders) or procedure preparation (11%) being unpleasant, and lack of medical insurance (12%). Hispanic patients in particular felt that their physician did not adequately stress the need for CRC screening (p=0.036).

Conclusions: Compliance with USPTF guidelines for colorectal cancer screening using colonoscopy was suboptimal in our resident clinic. Residents should aim to dispel misconceptions about the colonoscopy preparation process and basic procedure details, possibly by incorporating simply written educational material. Cost effective alternatives to colonoscopy e.g. fecal occult blood testing may be offered to those who refuse the procedure.
PHARMACOGENETICS-GUIDED INDIVIDUAL WARFARIN DOSING – A PROSPECTIVE OBSERVATORY STUDY

First Author: Yin Wu, MD WuQiang Fan, MD., Bahar Khalighi, Abbas Mirabbasi, Koroush Khalighi MD, FACP, FCCP, FACC, FHRS, CCDS

Background: The VKORC1 is the major target of warfarin inhibition, and CYP2C9 is a key metabolizer of warfarin. Genetic variations of VKORC1 and CYP2C9 affect warfarin sensitivity, clearance and bleeding risk. Variations of the two genes explain about 40% of warfarin dosing variability.

Objectives: To evaluate CYP2C9 and VKORC1 genetic variations and their clinical values for warfarin dosing.

Methods: DNA sequences of CYP2C9 and VKORC1 are analyzed in 304 patients in our clinic. Phenotype-specific warfarin dosing is analyzed and individual dosing recommendation together with follow-up plan are formulated.

Results: Distributions of the three CYP2C9 phenotypes in our patients are: Extensive (normal)-Metabolism (EM):190, Intermediate-Metabolism (IM):104 and Slow-Metabolism (SM):10. Among those patients who are on warfarin (n=64, all have therapeutic INR), average dose (mg/week, mean±SE) in EM group (32.6 ± 2.7, n=37) is significantly higher than that in IM group (22.2±2.1, n=25), P=0.0078. Average dose in SM is 13.1±3.0, n=2.

Distributions of VKORC1 phenotypes are: Low-Warfarin-Sensitivity (LWS):109, Intermediate-WS (IMWS):145 and High-WS (HWS):50. Average warfarin dose of each phenotype are: LWS, 34.3±4.3, n=20; IMWS, 25.5±2.0, n=36; and HWS, 23.0 ±3.8, n=8, respectively. Although not statistically significant (p=0.07), a trend towards higher dose in LWS is evident.

“Coumadin caution” is taken for those who have high-risk phenotype: CYP2C9-IM/SM, VKORC1-HWS or high-risk combo: VKORC1-HWS+CYP2C9-IM(n=17) and VKORC1-HWS+CYP2C9-IM(n=1). The patients are then followed up for one year looking at 1) thrombotic event, 2) major bleeding event and 3) INR>5 event.

Conclusions/Discussion: Our data suggests that CYP2C9-IM phenotype need only 2/3 dose of warfarin as compared to EM. Similarly, VKORC1-HWS phenotype needs only 2/3 dose as compared to LWS patient. Testing for CYP2C9 and VKORC1 helps to estimate individual warfarin maintenance dosages, and to identify those who require low dose. This approach should help to lower bleeding events without compromising clinical efficacy.
Physician Advocacy: What Do Housestaff Know (and Care) About?

Megha Garg, Zoe Tseng, Pamela Egan, Grayson Baird, Kelly McGarry

**Introduction:** Physician advocacy is becoming increasingly recognized as an important component of medical education. A number of residency programs have implemented advocacy curricula, but little is known about resident/fellow experiences with and perceptions of physician advocacy.

**Methods:** We performed a cross-sectional electronic survey of all residents and fellows at Lifespan Hospitals, the primary teaching affiliate of Brown Alpert Medical School (n = 567). The survey was distributed through the Graduate Medical Education listserv from September to October 2014 over an 8-week period, with email reminders sent at weeks three and six.

**Results:** A total of 134 responses were received (response rate 24%), with 101 residents (77%) and 30 fellows (23%). Twenty (15%) were from surgical subspecialties. Eighty percent of respondents said they keep up with current events. Eighty-one percent are registered to vote, and of those registered, 88% voted in the 2012 presidential election. The vast majority of respondents have little experience with advocacy activities – 87% had never called an elected official or written a letter to the editor or op-ed. Only 24% feel comfortable explaining the Affordable Care Act (ACA), while 34% agree that they can help their patients navigate the health care system. Ninety-four percent agree that physicians have a duty to be advocates for their patients. A minority feel they received adequate training in medical school or residency (17% and 12%, respectively), while 73% of respondents agree that advocacy training should be a part of residency education. Significant differences were noted between PGY-1 interns and senior residents and fellows; interns felt less comfortable navigating the healthcare system and explaining the ACA, but were more likely to plan to be involved with physician advocacy efforts of professional societies and to teach others about physician advocacy. The biggest barriers to involvement in advocacy were time (60%), knowledge (17%) and motivation (13%).

**Conclusion:** Residents and fellows feel that physicians have a duty to advocate, but have limited experience with advocacy activities. Interns are less comfortable with the ACA, have more plans to be involved in future advocacy activities than senior residents and fellows. The majority agree that physician advocacy should be a part of residency training, and that time is the biggest barrier to participation in physician advocacy.
Cerebral Hyperperfusion Syndrome after Intravenous Thrombolysis for Acute Ischemic Stroke

First Author: Mayank Dalakoti, MBBS

Background & Purpose: Cerebral hyperperfusion syndrome (CHS) is a recognised complication after surgical/endovascular revascularization of chronic atherosclerotic carotid arterial disease. More recently, the syndrome has also been described in patients following successful thrombolysis in acute ischemic stroke (AIS), attributed to impaired auto-regulation and increased blood flow into ischemic brain tissue following restoration of cerebral blood flow. This study sought to investigate the occurrence and outcomes of CHS in AIS patients treated with thrombolysis.

Subjects & Methods: In this study, serial AIS patients at The National University Hospital treated with intravenous-tissue plasminogen activator (tPA) within 4.5 hours of symptom onset were included, from January 2012 to June 2013.

Patients in whom the Internal Carotid Artery or Middle Cerebral Artery occlusion showed recanalization in the day 2 CT-Angiogram were observed for any new neuropsychiatric symptoms/signs that were considered unexpected by the treating stroke neurologist. These included persistent drowsiness or new affective disturbance. Patients with considerable mismatch between clinical and neuroimaging findings were also included. CHS was deemed to have occurred if the unexpected neuropsychiatric signs corresponded with Trans-cranial Doppler (TCD) flow velocity >100% of the contralateral vessel, Electroencephalogram (EEG) showed abnormal activity and/or CT-Perfusion scan showed markedly increased cerebral perfusion compared to the contralateral side. Upon diagnosis, measures were then taken to prevent complications of CHS.

Results: A total of 155 patients treated with IV-tPA were included in the study. Out of those, 9 (5.8%) patients fulfilled our definition of CHS. All 9 patients developed the unexpected symptoms 2-3 days after intravenous thrombolysis. 8 of the 9 patients were diagnosed based on TCD, EEG and CT-Perfusion findings, 1 of 9 based on CT-Perfusion alone.

Upright posture, fluid restriction and aggressive blood pressure control was instituted in CHS patients. This resulted in rapid resolution of abnormal neurological features in all affected cases within a week. All 9 of the patients achieved a good functional outcome, with a score of 0 or 1 on the Modified Rankin Scale at 3 months.

Conclusion: Cerebral hyperperfusion syndrome after intravenous thrombolysis in acute ischemic stroke should be suspected in patients that achieve arterial recanalization and develop new neuropsychiatric manifestations unexplained by territorial ischemia. Early diagnosis and appropriate management is crucial in preventing the dreaded hemorrhagic complications and achieving good functional outcomes in CHS.
A Novel Evaluation of the Positive Predictive Value of the Platelet Factor 4 ELISA in Bacteremia.

Gabriel McCoy, DO James McClain, MD Anna Cass, PhD Cory Mitchell, MD

**Purpose:** In prolonged hospital stays, heparin induced thrombocytopenia (HIT) is frequently sought as a diagnosis in the patient who develops thrombocytopenia. Anti-Platelet factor 4 (PF4) ELISA assays are ordered frequently to ensure this preventable cause can be avoided. These tests lead to frequent false positives and thus superfluous treatments and supplemental labs and imaging. Evidence has shown that some gram-negative bacteria are able to cause cross reactive antibodies to platelet factor 4 by way of bacterial LPS mimicry of heparin molecules. We seek to better define to what degree that bacteria affect the positive predictive value of the anti-PF4 ELISA assay.

**Methods:** A cross-sectional study was conducted of all patients hospitalized between January 2012 - December 2013 and meeting the following criteria: anti-PF4 ELISA assay positive result (optical density (OD value) > 0.4), serotonin release assay confirmation result, and blood culture results. Patients were separated into two groups: no bacterial growth, and bacterial growth. Positive predictive values were calculated for each group. Additionally, the average optical density values of each group were compared.

**Results:** For those patients with anti-PF4 ELISA and confirmation serotonin release assay (N= 151), only 76 patients had blood culture results (growth N=13, no growth N= 63). The PPV of patients with bacterial growth was 8.3% (95%CI of 0.02-0.38), for no bacterial growth PPV= 17.1% (95% CI of 0.07-0.32). The OD values for the growth population, no growth population and overall populations were, 1.03, 0.68, and 0.74 respectively. When comparing true positive and false positive anti-PF4 ELISA results, there were a higher percentage of patients with bacterial growth in the false positive group (12.4% vs 24.0%).

**Conclusions:** These results represent a novel pilot study examining the use of PF4 ELISA tests in bacteremic patients. Despite the small sample size and the lack of power for statistical testing, data from this pilot study suggest a need for future research to further investigate a potential association between bacterial growth in the blood and decreased PPV of the ELISA test. This is further supported by the variation observed in optical density values by bacterial growth status. Also, a higher proportion of false negatives had positive blood cultures and may need further investigation with a prospective trial. Interestingly, a number of patients with negative screening ELISA tests were found to have been confirmed with only 1 of 23 patients being positive. This has led to a quality control initiative in the hospital laboratory targeting cost of delivery of care.
Resident Engagement in Patient Safety

Kazeen Abdullah, Jeong-hee Ku, Rajeev Singh, Salahuddin Kazi, Kara Prescott.

Background: Incident reporting is critical to developing a culture of safety. At Parkland Hospital, safety incident reports are reviewed by a multidisciplinary team on a weekly basis at the Medicine Adverse Event (MAE) meeting but there has been little resident involvement in safety incident reporting and adverse event investigations.

Objective: We sought to understand resident knowledge and perception of safety incident reporting and to ultimately improve resident engagement in incident reporting and adverse event investigations.

Methods: In July 2014, PGY-1, PGY-2, and PGY-3 residents were surveyed on incident reporting. Residents answered questions regarding various aspects of incident reporting.

Results: 29 residents responded to the survey. The majority of residents knew what a safety incident report was. 28.6% of residents filed one or more incident reports in the last year. 75% of residents reported having incidents that they wanted to report but didn’t. The most common reasons for not reporting was – not knowing how to file report (76.2%), not having time (66.7%) and attempting but discontinuing as it was too long or complicated (23.8% and 28.6%, respectively). 19% of residents also feared reporting may cause trouble for staff involved in an incident. In August 2014, the Quality Improvement/Patient Safety (QI/PS) rotation was established. Detailed instructions on how to file incident reports were emailed to all residents. Residents rotated with the Chief Resident for Quality and Safety for 4 weeks and attended weekly MAE meetings. Residents selected cases for in-depth investigations using an adverse event investigation tool, process mapping, and fishbone diagrams. During their investigations, they interviewed all healthcare workers who were involved and routinely found systems issues that needed improvement. Residents reported back to MAE committee with a final report and recommendations for process improvements. Residents also presented to their peers at morning report with a focus on incident reporting, investigation process of adverse events, and lessons learned. Selected cases were presented by the residents during morbidity and mortality conference. A repeat survey will be sent out one year after creation of the QI/PS rotation to assess changes on resident attitudes and awareness of incident reporting.

Conclusions: Incident reporting, adverse event investigations, and follow-up is crucial to detecting patient safety issues and improving processes to prevent harm to patients and health care workers. Using the QI/PS rotation and the MAE meetings, we were able to successfully integrate residents into the patient safety process, encourage resident driven investigations, increase follow-up, and promote peer-to-peer education. This same approach could be used in other residency programs to improve resident engagement in adverse event investigations and follow up. Data collection is ongoing.
Reducing Congestive Heart Failure Readmissions: Success through Collaboration at Methodist Dallas Medical Center.

First Author: Joyce Alencherril, DO Second Author: Leslie Cler, MD, Melanie Powell, MD

Introduction: In 2012, the Affordable Care Act established the Hospital Readmissions Reduction Program (HRRP), which placed financial penalties on hospitals that had readmissions above a national average. Consequently, many hospitals, including Methodist Dallas Medical Center (MDMC), developed strategies to reduce readmissions for the specific diagnoses that the HRRP focused on. Our performance improvement project utilized a multifaceted approach in an effort to reduce congestive heart failure (CHF) readmissions by 5% annually for Medicare patients on both private and resident services.

Methods: Our intervention took place on the general medicine floors at MDMC and involved the development of a CHF readmission reduction committee. This committee included cardiologists, hospitalists, residents, nurses, case managers, social workers, and pharmacists, all of whom had specific responsibilities. Tools utilized by the committee included a discharge checklist, a post-discharge questionnaire, and a systematic review of readmissions. Data regarding CHF readmissions for Medicare patients from October 2012 through September 2013 (pre-intervention) was compared to readmission data for the post-intervention period, i.e. October 2013 through September 2014.

Results: Since the initiation of our intervention, CHF readmission rates have been declining overall. Comparing pre- and post-intervention periods, readmission rates have, on average, decreased from 14.35% to 7.34%, a difference of 7.01% for our private attendings’ service and from 17.66% to 9.16%, a difference of 8.5% for our private and resident services combined. Thus, our collaborative intervention has decreased CHF readmission rates for Medicare patients by almost 50%.

Conclusion: Successfully reducing hospital readmissions is a complex problem that requires the collaboration and coordination of multiple members involved in patient care.
Resident-driven quality improvement project to reduce diagnostic errors by the application of debiasing strategies

First Author: Alexander L Bullen Clarke, MD Manuel Lopez Vasquez, MD James F. Hanley MD, FACP

Introduction A major cause of diagnostic errors is thought to be cognitive failure, often because of cognitive biases. We speculate that these errors could potentially be reduced by incorporating mindfulness and utilizing specific debiasing strategies.

Methods: We performed an observational prospective study. During the night float rotation, information was provided on diagnostic errors with a strategy to incorporate mindfulness into their clinical encounters and on debiasing techniques. We emphasized that each resident must do a complete history/physical and develop a comprehensive differential diagnosis and plan. Each resident completed a survey with five cognitive debiasing techniques after each admission and recorded potential cognitive biases and diagnostic disagreement from the ED to resident handoff. These findings were discussed at our facilitated check-in rounds.

Each Resident was given a Diagnostic Therapeutic Index (DTI), a measure of diagnostic robustness, before the rotation and six weeks after the rotation to assess whether learning these techniques would change the resident DTI.

Results: There were 135 survey responses, in all of the cases; the Residents did their own history and physical examination. In 79.2% cases, Residents developed a differential diagnosis.

In 56.2% of the cases, Residents agreed with the ED physician diagnosis. In 43.7% of the cases there was disagreement with 84.7% cases due to different history and physical examination findings.

Cognitive biases were identified in 62.2% of the cases, the most common being premature closure in 23.8% and anchoring in 27.4%. The mean overall score of the DTI improved from was 167.12 to 175.25, with flexibility improving from 83.5 to 89.88.

Conclusions: Disagreement between the ED handoff and Resident diagnosis were common, most identified by an independent history and physical. In most cases the final diagnosis was consistent with the Resident. Cognitive biases were recognized in 62.2 % of the admissions with premature closure and anchoring most identified.

These techniques were associated with an increase in diagnostic index by 8.13 points with flexibility in thinking increasing by 6.38 points. This last parameter is thought to be a measure of a variety of thinking means or processes that can be applied during the diagnostic process, a form of type 2 thinking associated with less diagnostic errors. We believe these changes are meaningful.

Our data from the study suggest that Residents can become more mindful and are able to both improve their diagnostic accuracy and appropriately identify cognitive biases. It is important to acknowledge diagnostic
errors in patient safety and it is an imperative that training programs develop methods to teach and recognize these cognitive biases.
Gastric Electrical Stimulator and its Impact on Symptom Reduction among Gastroparesis Patients with Prior Cholecystectomy

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Introduction: Gastroparesis is a chronic condition of gastric dysmotility with delay in gastric emptying in the absence of mechanical obstruction. Patients present with chronic nausea, vomiting, abdominal pain and malnutrition. Gastric Electrical Stimulation (GES) is an FDA approved therapy for patients with medically refractory gastroparesis. Many patients with gastroparesis have had their gallbladder removed.

Aim: To determine if long term clinical response of gastric electrical stimulation (GES) differs among gastroparesis patients with prior cholecystectomy compared to patients who have not had their gallbladder removed.

Methods: Gastroparesis patients (n=52, diabetic=33, idiopathic=15 and post-surgical=4) treated with gastric electrical stimulation (GES) therapy were retrospectively evaluated. Patients were seen at baseline and approximately every 3 months, and symptoms were assessed by a modified Gastroparesis Cardinal Symptom Index (GCSI) score on a scale of 0-4 that inquired about vomiting, nausea, early satiety, bloating and post-prandial fullness. Abdominal pain, epigastric burning and need for pharmacotherapy were also assessed at baseline and at 1 and 2 years after GES therapy.

Results: Of 52 patients with diabetic or idiopathic gastroparesis, 31 (60%) had prior cholecystectomy; 21/31 (68%) laparoscopic and 10/31 (32%) open. At 1 year, modified GCSI score, vomiting, early satiety and post prandial fullness improved significantly in both subgroups; cholecystectomy and no cholecystectomy (p=0.006 and 0.016, p=0.02 and p=0.03, p=0.05 and p=0.01, p=0.002 and p=0.001), respectively. Among patients with prior cholecystectomy, the decrease in nausea and abdominal pain was statistically significantly at 1 year after GES (p=0.05 and p=0.008), respectively. Among patients with no history of cholecystectomy, nausea and abdominal pain improved significantly at 2 years post implant (p=0.02 and p=0.03), respectively. Epigastric burning and bloating decreased significantly in patients with prior cholecystectomy at 1 and 2 years (p=0.0002 and p=0.03), respectively. In both subgroups, the need for pharmacotherapy decreased at 1 and 2 years from baseline.

Conclusion: GES therapy significantly improves GCSI score, vomiting, nausea, early satiety, bloating, post prandial fullness, abdominal pain, epigastric burning and need for pharmacotherapy in patients with severe gastroparesis at 1- and 2-year intervals from baseline. Symptom improvement is similar in patients with and without prior cholecystectomy.
Reduction of Time to Treatment, Emergency Department Dwell times, and Cost of Treatment for Acutely Decompensated Heart Failure using Observation Units and Six Sigma Methodology

First Author: Rajeev Singh, MD Kazeen Abdullah Ambarish Pandey Mani Alavi Suzanne Daigle John Pease Sandeep Das

Introduction: Acutely Decompensated Heart Failure (ADHF) is a condition associated with substantial morbidity and mortality, with approximately 800,000 patients admitted from the Emergency Department to hospital each year. To date, application of formalized Quality Improvement (QI) initiatives is sparse with a relative paucity of published data.

Methods: A protocol was made at Parkland Hospital as a primary intervention to stratify ADHF into high-risk or low-risk based on the Society Chest of Pain 2008 recommendations for short-stay diuresis at Parkland Hospital Emergency Observation (ED-OBS) under DMAIC (Description, Measure, Analysis, Intervention, and Control) Six Sigma Methodology. Patients were admitted to ED-OBS one of three ways: Emergency Department to ED-OBS (Pathway 1); Cardiology Clinic to Emergency Department to ED-OBS (Pathway 2); Clinic directly to ED-OBS (Pathway 3). Pathway 3 was created by the protocol. Data, including 30 day readmission rate, 30 day mortality rates, time to first dose Lasix, and ED dwell time was collected from 04/1/2014–06/01/2014. Cost analysis comparing patients treated through the different pathways and comparing ED-OBS to inpatient admission is ongoing.

Results: 58 patients diuresed at the ED-OBS from 04/1/2014 – 06/01/2014. 45 (78%) patients were admitted from Emergency Department; 4 (7%) patients were admitted from Clinic to Emergency Department to ED-OBS; and 9 (15%) were admitted from Clinic directly to ED-OBS. 14 (24%) were admitted from ED-OBS to inpatient conversion. 44 patients were treated without inpatient admission (76%) with 14 patients having to be converted to inpatient admission (24%).

For Pathway 1, the median dwell time in ED before ED-OBS treatment was 421 minutes with median time to first dose Lasix was 368.5 minutes (n = 45). For Pathway 2, the median time spent in ED before ED-OBS admit was 356 minutes with median time to first dose Lasix was 304 minutes (n = 5). For Pathway 3, the median time spent in ED before ED-OBS admit was 0 minutes with median time to first dose Lasix was 202 minutes (n = 8). The creation of a direct route to ED-OBS from Clinic decreased ED dwell time for Clinic patients by approximately 360 minutes and time to treatment by 100 minutes. Applying cost data from previously published models with a cost-savings of $3600 per patient with ED-OBS compared to inpatient admission, ED-OBS treatment resulted in a net cost-savings of $158,400.

Conclusions: The implementation of a protocol to stratify ADHF into low risk and high risk groups resulted in quicker treatment and decreased Emergency Department dwell times with a projected cost-savings of $158,400 over two months. Further research is needed as to whether these improved process metrics translate to improvements in other relevant endpoints such as hospital admission rates, bed utilization, return ED visits, and cost.
A Multifaceted Approach To Reduce Heart Failure (HF) Readmissions

Rumit Thakkar DO (Internal Medicine Resident), Hafiz Abdul Moiz Fakih MD (Internal Medicine Resident), Adrian Nedelcut MD (Quality Lead, Emmanuel Elueze MD, PhD, Internal Medicine Residency Program Director)

Introduction: In 2012, the 30-day-readmission rate for heart failure (HF) at our hospital was 24% compared to the national average of 22.3%. Approximately, half of our overall readmissions were because of heart failure. We saw an opportunity for improvement to reduce HF readmissions and a project was thus initiated to achieve this goal.

Discussion: We began project with creation of committee involving Internal Medicine Residents, Quality Department at Good Shepherd Medical Center, Case Management, Social worker, and Nursing leadership. We met every two weeks to review why our rate of readmission was higher than national average. We reviewed several charts to determine review our discharge process. After reviewing multiple charts, we decided to intervene at multiple levels. First we started to screen patient for high risk of readmission. A tool was developed by our committee to screen patient for readmission. This tool was used to see if the tool that was created was correlated with high risk of readmission. This tool showed moderate correlation. Later it was refined by reviewing each category to increase to high correlation. Committee worked together to standardize the discharge process for Heart Failure patients. Literature was created for patient education. Cardiac rehab started to see patient while they were admitted to hospital, educated patient regarding CHF with further follow up after getting discharged from hospital. Cardiac Rehab provided them with literature on CHF and educated them while they were admitted to hospital. Heart Failure clinic was started and patients who were discharged with CHF were seen within 72 hours post discharge with second follow up visit in seven to ten days. Heart Failure clinic coordinator called patient confirming their follow up appointment. Heart failure order sets in the hospital were revised to improve and standardize quality of care provided in the hospital. With collective effort involving multiple departments, we were able to meet our goal to reduce hospital readmission for our CHF patients. Our readmission for CHF patient started show improvement and our rate of readmission was 14.28% in June of 2014 which is well below national average.

Conclusion: Hospitals across the country are facing national challenge to reduce readmission. It requires collective effort from everyone. At our hospital, quality department, physician, case manager, social worker, nursing department worked as team and we were able to reduce hospital readmission. Our goal is to continue our collective effort to reduce hospital readmission, improve quality of care and improve patient satisfaction.
TEXAS POSTER FINALIST - RESEARCH Jesus Vera-Aguilera, MD

Combined parasite derived peptide GK1 and Programmed Death antibody (anti-PD-L1) therapy increased survival in a melanoma mouse model.

First Author: Jesus Vera-Aguilera, MD Diego Beltran-Melgarejo MD Cynthia Villanueva-Ramos MD Raul Martinez-Zaguilan PhD,M.sci Souad Sennoune PhD. Gary Ventolini MD.

INTRODUCTION Melanoma is the most malignant form of skin cancer, and the incidence of this disease is rising rapidly, especially in the Caucasian population. With the recent discovery of checkpoint receptor inhibitors such as Cytotoxic T LymphocyteAntigen-4 (CTLA-4) and more recently Programmed death-1 receptor (PD1) and its ligand (PD-L1) the immunotherapy of cancer entered the new era. The Programmed Death-1 pathway is now recognized to be a major mechanism by which tumors suppress T-cell mediated antitumor immune responses. Studies regarding the PD1/PDL1 pathway suggest that combining therapies targeting tumor mechanisms of immune evasion with activation of normal immune cell may provide optimal treatment strategy. Previous studies in mice have shown that GK1, an 18-aminoacid peptide derived from Taenia crassiceps cysticerci, has the potential to be used as a primary or adjuvant component of chemotherapeutic or immunotherapy cocktails for the treatment of human cancers by stimulation of the proinflammatory cytokines IFN-gamma, TNF-a and the inflammatory chemokine CCL2 (MCP-1) in dose-dependent manners. In this study, the efficacy for GK1 in combination with Anti-PD-L1 as an adjuvant treatment in a melanoma mouse model was evaluated.

MATERIALS AND METHODS Forty mice, 6- to 8-week-old C57BL/6 were injected with 2 X105 B16-F10-luc2. Tumor-bearing mice 20mm3 were separated in four different groups: GK1, Anti-PDL-1, GK1/anti-PDL-1, and control, (10 mice per group). GK1-treated peritumorally until sacrifice day. The anti–PD-L1 treated group injected intraperitoneally (IP) with anti-PD-L1 antibody until sacrifice day. The combined immunotherapy group injected with an antiseptic peritumoral injection of GK1 and anti-PDL-1 until sacrifice day and the control group injected with peritumoral or IP sterile saline. Mice were sacrificed when moribund or lethargic or when they fail to respond to gentle stimuli, and day of death was recorded. All experimental procedures comply with the "Principles of Laboratory Animal Care" and the Guide for the Care and Use of Laboratory Animals (NIH publication No. 80-23, revised 1985) and by the University Laboratory Animal Care Committee at Texas Tech University Health Sciences Center. RESULTS The GK1 peptide in combination with Anti-PD-L1 demonstrated therapeutic properties in a mouse melanoma model, as treatment resulted in a significant increase in the mean survival time of the treated group of 34 days compared to 23 days in the control group (P< 0.01). Moreover, the combination group demonstrated statistically significant increase of survival compared to GK1 or Anti-PD-L1 alone (P< 0.01). The potential for GK1 to be used as a primary or adjuvant component of chemotherapeutic cocktails for the treatment of experimental melanoma was demonstrated in this study for the first time. Further studies to evaluate the direct translational bench-to bed-side translational potential are being performed by our group.
Presence of Vitamin B12 Deficiency and Anti-Gastric Parietal Cell Antibodies in Patients with Rheumatoid Arthritis

First Author: CAPT Cassandra L Craig Christopher Tessier, Major, USAF, MC, ACP Fellow Matthew B. Carroll, Col, USAF, MC, FACP, ACP Fellow

Introduction: Multiple studies over the last few decades have established a prevalence of an anti-Gastric Parietal Cell (anti-GPC) antibody in Rheumatoid Arthritis (RA) patients ranging from 5% to 28%. Other studies have reported the prevalence of vitamin B12 deficiency in RA patients ranging from 24% to 29%. Recent studies have not assessed the presence of both the anti-GPC antibody and concurrent vitamin B12 deficiency in RA patients since implementation of more aggressive disease modifying therapy.

Methods: This observational study recruited patients from June 2013 to October 2014. Patients were recruited in one of three arms: those with RA, autoimmune thyroid disease (AITD), and no known autoimmune disorder (controls). Subjects excluded if they had a known medical or surgical disorder which impaired vitamin B12 absorption, symptoms suspicious for vitamin B12 deficiency, or history of vitamin B12 deficiency. All patients completed a 1 page questionnaire asking about proton pump inhibitor use, metformin use, and vitamin use. A one-time serum assessment of vitamin B12 level, methylmalonic acid, and anti-GPC antibody level was performed.

Results: Forty-five subjects enrolled in the RA arm, 36 in the AITD arm, and 44 in the control arm (total 125 subjects). No statistically significant differences in age, gender, or ethnicity were observed among groups. Serum vitamin B12 levels were not statistically different across the three groups. Only 2 subjects were vitamin B12 deficient requiring therapy, none in the RA arm. Levels of anti-GPC antibodies were not statistically different across the three groups. Subjects taking a vitamin supplement were more likely to have a higher vitamin B12 level (842.7 ± 376.4 vs 606.7 ± 316.2 pg/mL, p = 0.001).

Conclusion: While no differences were observed in serum vitamin B12 or anti-GPC antibody levels amongst the three arms in this trial, and the prevalence of vitamin B12 deficiency appears to be very small (0% for RA subjects, 1.6% for all subjects), the use of vitamin supplements generated a large effect size that made detecting meaningful differences in the arms challenging.
Chapter Winning Abstract

Christin Laufer

**Introduction:** In 2012 the Centers for Disease Control (CDC) recommended Hepatitis C virus (HCV) infection screening for those born between 1945 and 1965. Prior recommendations endorsed screening based on risk factors. Because military retirees have access to free comprehensive health care, underwent routine drug screening, had mandatory physical fitness tests and periodic health assessments for over 20 years during service, we hypothesized that the prevalence of HCV in military retirees would be significantly lower than the national average. Thus the new CDC screening guidelines may not be applicable.

**Methods:** A quality improvement (QI) initiative from January 2013 to April 2014 implemented the new birth-cohort CDC screening guidelines for the Internal Medicine (IM) clinic of our hospital (QI group). An age-matched group from the same IM clinic, screened based on risk factors for HCV infection from September 2012 to December 2013, served as the comparator (RF group). The prevalence of the anti-HCV antibody and chronic infection were determined and compared. Results: In the QI and RF groups, 478 and 221 subjects were screened, respectively. Demographics of the two groups were statistically similar with the exception of the age and ratio of retirees to dependents. The prevalence of anti-HCV antibody positivity was 2.1% and 2.3% in the QI and RF groups, respectively (Odds Ratio (OR) 1.08, 95% CI: 0.37, 3.21, p = 1.000). The prevalence of chronic infection detected by PCR was 0.4% and 1.8% in the QI and RF groups, respectively (OR 4.39, CI: 0.80, 24.13, p = 0.083). The OR comparing the anti-HCV antibody in the QI and RF groups to NHANES data showed no statistical differences. However there was a statistically significant difference between chronic infection in the QI group and NHANES population.

**Conclusion:** The military retiree population did not have a lower prevalence of the anti-HCV antibody than the American populace, but did have increased viral clearance amongst those screened by birth year. In the QI group, higher viral clearance and subsequent lower prevalence of chronic infection may be explained by a paucity of concurrent risk factors; however there were no statistical gender or racial differences between cohorts. Although the power to detect a difference in the HCV antibody prevalence between the cohorts was low, the power to detect a difference in the prevalence of chronic infection was adequate. The CDC guidelines are thus applicable to the military retiree population.
KETAMINE BY CONTINUOUS INFUSION FOR SEDATION IN SEPTIC SHOCK

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Introduction: Sedating mechanically ventilated shock patients presents a management challenge. Most routinely used sedatives can cause hypotension, they do not have analgesic properties and many analgesics can also worsen hypotension. Ketamine is an NMDA receptor antagonist that acts as a dissociative sedative, providing analgesia and amnesia. Two additional effects of ketamine infusion are hypertension and bronchodilation. We hypothesized that use of ketamine as a sole sedative agent in adult patients in septic shock would decrease the required dose of vasopressor medication needed to maintain adequate perfusing mean arterial pressure.

Methods: This is a prospective, observational pilot study of adult septic shock patients requiring mechanical ventilation and sedation, admitted to the ICU from January 2012 until September 2014. Patients were started on a ketamine infusion at the time of enrollment and ketamine was continued for 48 hours or until the patient no longer required mechanical ventilation. The primary outcome was vasopressor dose over the first 96 hours of enrollment. Data on additional sedative and analgesic agents, APACHE II scores, use of corticosteroids and mortality was also collected.

Results: We conducted an interim analysis of data from 16 patients, compared with a retrospective cohort of 35 patients admitted for septic shock requiring mechanical ventilation who received usual sedation care. The average total dose of vasopressors in the control group at 48 hours was 20.5mg norepineprine versus 10.8mg norepinephrine in the ketamine group (p = 0.09). There was a trend towards significance in the amount of norepinephrine needed at all time periods measured and less use of a secondary pressor agent (vasopressin). Furthermore, the study group was older and sicker, based on APACHE II scores.

Conclusions: The interim results of this pilot study are inconclusive but the trend towards septic shock patients requiring less vasopressor dosing when ketamine is used as the sole sedative is promising. The higher age and illness severity scores in the ketamine group also lend strength to the hypothesis. To our knowledge, this is the first report of ketamine use for sedation in adult septic shock and mechanical ventilation. The preliminary results of this pilot study show a trend that could be further explored in a large, randomized, multi-centered trial. Sedation of septic shock patients in the ICU is challenging to manage, and ketamine could be another medication to add to the limited arsenal.
Chapter Winning Abstract

Ian Grasso, MD, Mark Haigney, MD, Jacob Collen, MD, Jordanna Hostler, MD, and William Kelly, MD

**Background:** ECG Derived Respiration (EDR) is a technique for determining breathing patterns algorithmically using the root mean square of a filtered ECG signal obtained using high sensitivity 24 hour (Holter) ECG Monitoring. Once thought to be only an interesting observation, this can detect central and obstructive apneic episodes and Cheyne-Stokes breathing, and is being studied as one of several home-based alternatives to traditional sleep studies (polysomnography). But there is little known about confounding factors that could lead to errors in diagnosis, such as sedative-hypnotic agents, which are used by nine million Americans. Sedative-hypnotic agents are frequently given to improve the quality of polysomnograms, providing an opportunity for study.

**Methods:** This is a subgroup analysis of our pilot study comparing EDR techniques and an algorithm known as Holter Derived Apnea Hypopnea Index (HDAHI) with the gold standard for sleep apnea diagnosis, polysomnography (Apnea-hypopnea index, AHI). After approval by the Walter Reed Institutional Review Board, a Mortara H12 Holter monitor was worn simultaneously during standard overnight polysomnogram. The ECG Holter output was analyzed by a board certified electrophysiologist while polysomnograms were independently analyzed for sleep apnea. Findings from these were compared using the Spearman correlation coefficient and a ROC curve was developed to determine the most sensitive HDAHI score in comparison with AHI. Subgroup analysis was conducted of patients who had been pre-medicated with standard doses of non-benzodiazepine sleep agents and those who were not using the t-test two sample assuming unequal variances. The total arousal index (TAI), which is a measure of arousal overnight, was compared in the two groups using the z-test.

**Results:** Thirty subjects were enrolled. Those that had received a hypnotic agent (n=13) had a mean difference between HDAHI and AHI of 16.66, compared to those who did not receive a sleep aid, mean difference of 3.72 (P=0.047). TAI was 18.43 in the medicated group vs 9.79 in the non-medicated group (p=0.11). Variance between the two groups was confirmed using the F-test for variance which showed a variance of 654 for the medication group and 8.06 for the non-medicated group (p<0.05).

**Conclusion:** ECG Derived Respiration may be less sensitive as compared to polysomnography at detecting sleep apnea in patients given sedative hypnotics. This may be due to the decrease in magnitude of the arousal as captured by the ECG signal. While sleep aids may not be needed for the well tolerated, at home ECG holter-based testing, physicians used holter-based screening should query if their patients are taking them chronically.
UTAH POSTER FINALIST - RESEARCH Sonja Raaum, MD

U.S. resident physician use of smartphones in clinical care

Sonja Raaum MD, Andres Patino MD, Christian Arbelaez MD MPH, Caroline Milne MD

Introduction: Smartphone use in clinical care has dramatically increased over the last decade. Smartphone use provides a potential opportunity for clinicians to improve care through efficiency and enhanced access to resources. Current use by clinicians is unregulated and there are few studies identifying patterns of use. Residents and trainees are likely early adapters of this technology.

Objective: Describe the current patterns of smartphone use by resident physicians in primary care specialties in the U.S.

Methods: Using current literature, survey was designed and piloted in fall 2013. Study was approved by local IRB. Survey was distributed online and anonymously to residents in University of Utah programs for Internal Medicine, Emergency Medicine, General Surgery and Family Medicine; and residents in Brigham and Women’s programs for Internal Medicine and Emergency Medicine. Data collected included demographics, smartphone ownership, frequency and patterns of use, barriers to use and perceived benefits of use.

Results: A total of 259 respondents replied to survey. Majority were affiliated with University of Utah, 63% (n=163); almost all between age of 25-34 (n=238, 93%) but evenly distributed between level of training with 32% PGY1, 28% PGY2 and 31% PGY3. Internal medicine comprised the largest specialty group with 55% of respondents (n=142). Almost all residents owned smartphones, 97% (n=251) and of owners 98% (n=246) used them in clinical care. Few residents, 12% (n=32), attended a medical school that required or provided smartphones in training, and only 19% (n=50) have received formal education regarding smartphone use; and 50% (n=127) of respondents desired more training. The most commonly used functions included e-mail and internet access as well as text messaging other providers; the least commonly used functions included physician order entry, video recordings of patient findings, and patient education. Reported barriers to use included not enough time and cost of applications. An overwhelming majority, 93% (n=238), of respondents believe smartphone use positively impacts patient care specifically in areas of diagnostic assistance, quality of care and patient safety.

Discussion: Our survey highlights an increase in adoption rate of this technology since last survey performed in 2011. We highlight that there is a paucity of education around use and that residents desire more training. In addition, the most commonly reported uses are not necessarily congruent with the perceived benefits on patient care and warrant future investigation. Barriers to use can be addressed through education, including increased awareness of free resources to trainees. Finally, overwhelming positive perception suggests this technology will continue to be used frequently.
From Past to Present: Continuity of Care in a Resident Clinic after a 4 + 1 Block Schedule Implementation

First Author: Charita Vadlamudi, MD MPH Second Author: Halle Sobel, MD

Objectives: Continuity of care is an important component of providing good clinical care in the outpatient setting. During residency training, there are many barriers that challenge resident and patient continuity in ambulatory clinics. Leaders in Internal Medicine have called for ambulatory redesign with block scheduling models and clinics are now in a position to evaluate the impact of these innovations. The Internal Medicine program at the University of Vermont Medical Center (UVMMC) was restructured in July 2012 from a traditional ½ day a week ambulatory clinic model to a 4+1 system in which resident physicians alternated with 4-week blocks of inpatient and elective rotations and a 1-week block of dedicated ambulatory care. Our study will determine if continuity of care has improved, stayed the same or declined between the resident physician and patient with the new block model.

Setting: The UVMC Internal Medicine Residency program consists of 35-41 categorical residents each year who were all included in this study. Residents attend one continuity clinic site at the University Health Center Given Clinic.

Methods: Each resident had an assigned panel of patients that averaged from 50 to 80 patients. During the clinic week, time was divided into continuity clinic, didactic, and subspecialty clinic sessions. During the continuity clinic sessions, residents saw patients from their own panel as well as acute visits for patients assigned to a different resident or attending PCP.

In this study, continuity of care was measured for each patient who attended the resident clinic with an assigned resident PCP.

Data were collected on patient visits only if the patient had an assigned resident physician as their PCP. For each of the patients, the total numbers of visits to the clinic and visits to their assigned resident PCP were collected for the three periods of time: July 2011-June 2012, July 2012-June 2013, and July 2013-June 2014.

Results: A total of 199 patients met criteria for the study. The Usual Provider of Continuity Index (UPC) is a measure of continuity that is calculated by dividing the number of visits to the same provider by the total number of visits to the clinic. For July 2011-June 2012: UPC 0.0059, July 2012-June 2013: UPC 0.0942, and July 2013-June 2014: UPC 0.4045

Impact: The results from our study show that the continuity of care improved in the 4+1 system when compared to the traditional system. Furthermore, there was large improvement in continuity during the 2nd year of the 4+1 system from the 1st year. These results are exciting as the structure of the ambulatory week evolves and allows faculty to train residents in ambulatory population management.
This provides areas for future research including whether or not improved continuity improves patient care outcomes and number of residents entering the field of ambulatory medicine.
WEST VIRGINIA POSTER FINALIST - RESEARCH Colleen Pettrey, MD

PULMONARY FUNCTION TESTING IN PATIENTS WITH COPD IN THE CAMC OUTPATIENT CARE CENTER

Colleen Pettrey, MD, Christopher Schirtzinger, MD, Muhammad Afzal, MD, Shelda Martin, MD and Mary Ann Riley, DO

Background: Chronic obstructive pulmonary disease (COPD) is one of the most common lung diseases and was the third leading cause of death in 2010. Many patients are diagnosed with COPD simply for having a history of smoking and a symptom of chronic cough or dyspnea. Misdiagnosis leads to increased cost and exposes patients to unnecessary medications. The Pulmonary Function Test (PFT) is the gold standard of diagnosing COPD. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) aids clinicians in diagnosing and staging COPD severity based on PFT findings and provides severity-based treatment recommendations. The goal of this study is to examine the percentage of patients diagnosed with COPD in the CAMC Outpatient Care Center who received a confirmatory PFT and to determine if those patients are receiving guideline-recommended treatment based on GOLD.

Methods: This is a retrospective chart review of 252 patients of the CAMC Outpatient Care Center identified by COPD ICD-9 diagnosis codes who visited the clinic at least once in 2011. Each chart is reviewed to confirm a documented diagnosis of COPD, determine if there was a PFT to support this diagnosis, examine risk factors (smoking), identify pharmacologic management implemented and evaluate its appropriateness based on disease severity and GOLD guidelines.

Results: A total of 252 consecutively selected charts were reviewed. Of these, 183 patient records met full inclusion criteria and were analyzed. 97.3% of the patients had a smoking history. Our study revealed that only 81, or 44.3%, of charts analyzed had PFTs available in the chart. The mean FEV1/FVC = 64.6 (SD = 14.7), with mean FEV1 = 68.5 (SD = 21.9). Based on GOLD criteria, 31 patients (38.3%) did not meet criteria for COPD diagnosis. Nine patients (11.1%) met criteria for Stage I COPD, 22 patients (27.2%) for Stage II, 18 patients (22.2%) for Stage III, and 1 patient (1.2%) for Stage IV. When pharmacological management was investigated, it was found that only 16 patients (19.8%) were being correctly treated, based on their disease severity, according to GOLD recommendations. Twenty-eight patients (34.6%) were being treated with medications despite their PFTs revealing that they did not have COPD; additionally, 98 patients (53.6% of the full study analysis) were prescribed medications without ever having received PFTs.

Conclusion: This study indicates that physicians in our outpatient clinic lack compliance with current practice standards for COPD diagnosis and treatment. While the number of patients with PFTs available (44.3%) surpassed our initial suspicion, this value remains far below our goal as primary care providers to practice guideline- and evidence-based medicine. PFTs are an imperative tool in the diagnosis and appropriate treatment of COPD and are clearly being underutilized in our outpatient care facility.
Left Ventricular Ejection Fraction Assessment: Comparison between Single Photon Emission Computed Tomography and Echocardiography

First Author: Muhammad Shabbir Rawala, MD Zachary Brewer, MD; Rizwan Ali, MD; Malik Hamdan, MD; Cy Mozino, MSIV; Cecilia Velarde, MD; Suzanne Kemper, MPH; William H. Carter, MD

Introduction: Left ventricular ejection fraction (LVEF) is a major determinant in choosing which medical and device treatments are selected for management of heart failure. In clinical practice the measurement of LVEF is most usually performed by either echocardiography (ECHO), single photon emission computed tomography (SPECT) or left ventriculogram if biplane technique is used. A number of studies have evaluated the agreement between ECHO and SPECT in the measurement of LVEF with varying degree of correlation, however very few test subjects were taken with LVEF between 25% - 50%.

Objective: To compare LVEF values obtained via ECHO versus SPECT in all patients with a focus on those with an LVEF by either technique between 25% and 50%.

Methodology: This was a retrospective chart review of 235 randomly selected patients who had undergone both ECHO and SPECT from 2012 to 2014. The records were retrieved from Charleston Area Medical Center’s patients’ record database. Exclusion criteria included patients with acute coronary syndrome, decompensated heart failure or any revascularization done within 30 days of ECHO or SPECT.

Results: Left ventricular imaging by ECHO or SPECT was performed on 235 patients (129 males and 106 females) within a 72 hour period. The average age was 62±14 years. For ECHO, the mean LVEF was 51.0±12 and SPECT it was 57.7±14. When comparing measurements of LVEF for all patients by ECHO and SPECT a moderate correlation was shown with a correlation coefficient of 0.76. However, the correlation coefficient decreased even more to 0.52 in patients with an LVEF <50% by at least one of the two techniques. This does signify the fact that further studies, such as contrast ECHO, biplane left ventricular gram or magnetic resonance may be needed to assess LVEF when the results are discordant in areas affecting treatment decisions such as ACE inhibitors, beta blockers and/or devices (biventricular pacing or implantable cardiac defibrillator).

Conclusion: The correlation of LVEF by ECHO and SPECT is poor when patients have a modestly decreased LVEF.
Repeat Lipopolysaccharide Exposure is Sufficient to Impair Viral Induced Pro-atopic CD49d Expressing Neutrophil Recruitment to the Lung

Wei An, MD, Jennifer Hass, Erika Buell, Desire Hunter, Dorothy Cheung, MD, Mitchell Grayson, MD

Rationale: Severe respiratory viral infections increase the risk of developing asthma and atopic disease. In the Sendai virus (SeV) mouse model, we demonstrated this risk depends upon the early recruitment of CD49d expressing neutrophils to the lung. We also demonstrated that single intranasal (i.n.) dose of lipopolysaccharide (LPS) prior to SeV infection significantly reduced CD49d+ neutrophils in the bronchoalveolar lavage (BAL). The hygiene hypothesis suggests chronic microbial exposure prevents development of atopic disease. Our study investigated whether chronic LPS exposure would reduce SeV mediated CD49d+ neutrophil recruitment to the lung and BAL.

Methods: C57BL6 mice were treated with daily LPS (3 µg) i.n. starting 3 or 1 days before or with SeV infection (day 0). On day 3 post SeV, the BAL and lung were isolated and the frequency of CD49d+ neutrophils determined by flow cytometry.

Results: In the BAL, CD49d+ neutrophils were reduced most significantly when LPS exposure was started one day prior to or the day of SeV infection (23.6±1.8%, 10.2±1.6% [0.0002], 10.5±2.2% [0.0037], 17.4±3.6% [0.11]; mean±sem percent CD49d+ neutrophils [p value versus PBS] for PBS, LPS starting on day 0, -1, or -3; n=3). In the lung, CD49d+ neutrophils decreased regardless of LPS starting day (42.9±3.7%, 18.7±2.0% [0.0003], 22.6±1.0% [0.013], 24.9±2.0% [0.0052]; n=3).

Discussion: Chronic LPS exposure reduces SeV mediated CD49d+ neutrophil accumulation in the lung and the BAL, suggesting an interaction between the viral and hygiene hypotheses in driving atopic risk. Future studies will explore whether chronic LPS exposure is sufficient to prevent the development of postviral atopic disease.
RESIDENT FELLOW PODIUM PRESENTATIONS
COLORADO PODIUM PRESENTATION - RESEARCH Ryan Daniel Murphy, MD

IMPLEMENTATION OF A “FOUR C'S” REAL-TIME FEEDBACK TOOL TO ASSESS PATIENT SATISFACTION AND PROVIDER COMMUNICATION

First Authors: Michelle Templeton Barron MD, Tyler M Miller MD, Ryan Daniel Murphy MD. Additional authors: Patrick P Kneeland MD.

Introduction: Under Medicare Value Based Purchasing incentives, patient satisfaction scores comprise about one-third of a hospital’s total performance score. Current metrics used to assess patient satisfaction include the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) and Press Ganey surveys. These tools are impractical for providing actionable feedback regarding patient satisfaction to individual physicians for several reasons. First, the time lag between an episode of care and physician receipt of survey data is often several months. Second, current methods fail to attribute satisfaction to specific physicians or physician teams. Lastly, these methods do not inquire about specific elements that contribute to high or low ratings, precluding a more precise analysis of current practice patterns.

Methods: To address these shortcomings in current tools, we developed a four-question bedside survey instrument that could provide immediate, actionable feedback to providers. Each survey item corresponds to one of the “Four C’s” of patient satisfaction – caring, confidence, communication, and coordination – and requests qualitative feedback for each item. The “Four C” items correspond to Society of Hospital Medicine guidelines for assessing patient satisfaction and have been validated in the inpatient setting. Sixty patients on three different inpatient hospitalist services were surveyed utilizing a ten-point quantitative net promoter methodology followed by qualitative evaluation. The de-identified composite results were immediately shared with teams, and providers were surveyed on the utility of the data on informing practice.

Results: Twenty-one patients refused to participate or were unable due to barriers in cognition (e.g. delirium or dementia). The remaining respondents rated physicians in the “Four C” aspects of patient satisfaction, with average scores ranging from 8.8 to 9.3. Most patients offered commentary on how to improve or maintain their reported scores. Sixteen providers were surveyed before and after presentation of service-specific patient survey results. While thirteen stated that patient feedback on communication is important to them, only two reported receiving any in the preceding six months. Half believe that the feedback they received through our initial survey changed their current practice, and the majority (75%) believes it will influence future practice.

Conclusions: These results confirm a lack of feedback to physicians regarding patient communication and satisfaction despite the increasing incorporation of such metrics into reimbursement nationwide. Our results suggest that a system to provide feedback anonymously and in a timely manner is feasible and would be welcomed by physicians. We identified numerous obstacles to routine implementation of such a system including barriers related to patient cognitive status and language. Future innovation cycles will focus on streamlining real-time provision of feedback to providers in combination with specific information on strategies for improvement.


Vascular Closure Device Malfunction: What are we missing?

Abdalla Hassan, MD Lloyd W. Klein, MD

Background: Vascular closure devices (VCD) are routinely used for vascular closure and hemostasis after cardiac catheterization and interventions. They effectively reduce hemostasis time and hospital stay, while increasing patient satisfaction. The purpose of this study was to identify angiographic findings on the femoral angiogram in patients with presumed VCD malfunction and vascular occlusion.

Methods: We queried the NCDR database at our institution to identify patients undergoing femoral angiography who had VCD malfunction requiring subsequent surgical or interventional procedures. All diagnostic and interventional procedures in 2011-2014 were evaluated. Four patients met these criteria. All were females aged 60-65; 3 had peripheral vascular disease, and 2 were obese (BMI>30). Two patients developed leg pain several hours post-VCD, one developed leg pain one day later, and one lost pulse after manual compression for mild superficial bleeding. Three patients required emergency surgical repair and one needed an interventional procedure for loss of pulse in the affected limb. Angiograms were reviewed blinded to the catheterization reports and findings of other modalities i.e. CT scan, or surgical findings.

Results: All cases had insertion of the sheath in the “safe” zone. There were material findings on the femoral angiogram in all cases prior to VCD deployment suggesting possible hazard. These included: apparent femoral and iliac artery dissection, plaque disruption at the insertion site, diminished flow distally, and/or significant arterial vascular atherosclerosis of ~ 50% occlusion. None of these findings were recognized at the time of the decision to deploy VCD.

Conclusion: Many cases with lost pulses after VCD are ascribed to device malfunction, but are consequent to undiagnosed access problems. In addition to evaluating femoral sheath insertion location, operators making decisions about the advisability of VCD should evaluate all information available from the angiogram, especially in female patients with history of peripheral vascular disease.
MICHIGAN PODIUM PRESENTATION - RESEARCH Daniel E Ezekwudo, MD

**Methyl Jasmonate: A plant stress hormone that enhances radio-sensitivity of hormone refractory prostate cancer cells.**

First Author: Daniel E Ezekwudo, MD, Ph.D; Periasamy Selvaraj Ph.D; Ravi Palaniappan Ph.D.

**Introduction:** Prostate cancer is the second leading cause of cancer death among men in USA. Radiotherapy remains the treatment for unresectable hormone-refractory prostate cancers (PC-3s'). PC-3s' have been shown to be radioresistant owing to induction of anti-apoptotic proteins (Bcl-2 family). Jasmonates are phytochemicals that have been shown to exhibit anti-apoptotic properties. We hypothesized that inhibition of these anti-apoptotic proteins with jasmonates will enhance PC-3s' radiosensitivity.

**Methods:** We studied the effect of nano-encapsulated-Methyl Jasmonate (MJon) on irradiated PC-3s'. Briefly, PC-3s' were exposed to varying doses of gamma radiation alone and with differing concentrations of MJon. The efficacy of the combined treatment was analyzed using Western blotting and flow cytometry. Annexin V-FITC/PI dual staining was used to determine the mechanism of cell death.

**Results:** A significant (p<0.05) increase in cytotoxicity in the combined treatment group occurred, compared to single treatment with MJon, gamma-radiation or control. Western blotting showed that treatment of irradiated PC-3 cells with MJon caused suppression of Bcl-2 protein. Flow cytometric analysis showed no significant difference in % apoptosis between irradiated PC-3 cells (14.36%) and the control group (10.07%). However, apoptosis was significantly increased by 2.0mM MJon treatment of irradiated PC-3 cells with (38.64%) compared to the controls (14.36%, p<0.05). Using Annexin V-FITC/PI dual staining we confirmed that the mechanism of cell death was via apoptosis.

**Conclusion:** MJon suppressed Bcl-2 expression and enhanced the radiosensitivity of human PC-3 cells. This approach may conceptually be applied to all radioresistant cancers that employ anti-apoptotic protein induction as their mechanism of resistance ultimately resulting in the use of radiotherapy at lower doses to achieve higher efficacies. Nevertheless, issues of vascular mimicry in human cancers will have to be addressed before this system can be adopted clinically.
Positive airway pressure affects cardiac remodeling in hypertrophic cardiomyopathy patients with obstructive sleep apnea

First Author: Suwen Kumar Second Author: Benjamin Ebner Third Author: Jennifer Bragg-Gresham Fourth Author: Peter M. Farrehi Fifth Author: Sharlene M. Day

Introduction: Obstructive sleep apnea (OSA) is highly prevalent in patients with Hypertrophic Cardiomyopathy (HCM) and may lead to adverse cardiovascular outcomes. Treatment of OSA with positive airway pressure (PAP) has been shown to have favorable results in non-HCM patients and may have similar benefits in HCM but the evidence is lacking. We propose that PAP therapy in HCM patients with OSA may affect cardiac remodeling.

Methods: Existing HCM registry at our institution was used to identify adult patients (>18 years) with HCM. Information on PAP use was collected directly from the patients. HCM patients with diagnosed OSA based on standard polysomnography (PSG) were selected and divided into two groups: PAP compliant and PAP noncompliant. Patients consistently using PAP >4 hours nightly were considered PAP compliant. Demographics and clinical characteristics were extracted from the registry. Prevalence and means were compared between the two groups using Chi-square and t-tests. Differences between the groups were adjusted for age, sex, and BMI using linear mixed models for continuous measures and logistic regression for dichotomous measures.

Results: 51 patients were identified with known OSA. Of those, 32 (62.7%) were PAP compliant and were relatively older (mean: 60.7 years vs. 53.6 years, p<0.047). PAP compliant group had significantly lower left ventricular (LV) mass index (mean: 62 g/m² vs. 98.7 g/m², p<0.01) based on cardiac magnetic resonance imaging. The difference in LV mass index remained significant even after adjusted comparisons for age, gender and body mass index (mean: 63.8 g/m² [PAP compliant] vs. 96.3 g/m² [PAP noncompliant], p<0.01).

Conclusion: OSA is a highly prevalent and potentially harmful, but a treatable comorbidity in HCM. Adherent PAP therapy in HCM patients with OSA may affect cardiac remodeling by attenuating LV mass. Data is still preliminary and randomized controlled trials are warranted to further investigate this association.
NEW JERSEY PODIUM PRESENTATION - RESEARCH Martin Miguel I Amor, MD

IMPROVED EFFICIENCY AND COST SAVINGS FROM TRIAGING SELECTED TRANSIENT ISCHEMIC ATTACK PATIENTS TO OUTPATIENT URGENT CARE

First Author: Martin Miguel I Amor, MD Michael Edward Chan MD, Nagakrishnal Nachimuthu MD, Florence Armour MS, Shirley Hwang MS, Neil Holland MBBS

BACKGROUND: Although most patients presenting with suspected transient ischemic attack (TIA) in the United States are currently hospitalized for urgent evaluation, many are later found to have alternate diagnoses, and it is not clear that hospital admission is either necessary or cost effective in all cases.

OBJECTIVE: To report the outcomes, diagnostic efficiency and cost savings from triaging selected transient ischemic attack (TIA) patients with lower expected stroke risks into an outpatient TIA rapid evaluation center (TREC) to avoid hospitalization.

METHODS: We started an open-access ABCD2 score-based outpatient TIA Rapid Evaluation Center (TREC). Patients referred to the TREC are seen on the next weekday and undergo a diagnostic evaluation then consultation with a stroke neurologist. We collected prospective data from all TREC patients seen during its first year, and compared them to the patients who were still admitted to the hospital with a primary diagnosis of TIA during the same period.

RESULTS: We saw 74 TREC patients within an average of 1.25 days of referral during its first year of operation (56 from the emergency room and 18 from physician offices). Only 2 TREC patients needed admission to the hospital, the remainder completed their evaluation as out-patients. Only 1 TREC patient had a follow-up cerebrovascular event. Patients referred to the TREC had lower ABCD2 scores (1.8 vs. 3.8, p <0.001) and were less likely to have a final diagnosis of TIA (19% vs. 77%, p<0.001). Nearly all patients underwent CT scan, lipid panel and EKG. However, TREC patients were more likely to undergo carotid ultrasound (99% vs. 84%, p=0.001) and MRI of the brain (89% vs. 68%, p=0.001). Based from our financial analysis, TREC patients were evaluated at significant cost savings. Both average hospital charges ($2,270 vs. $6,232, p=0.03) and average hospital costs ($666 vs. $6,523, p<0.00001) were significantly lower in TREC patients compared to hospitalized patients. In its first year, institution of the TREC resulted in average cost savings of $340,000 at our community medical center.

CONCLUSION: Our TREC program allowed us to avoid hospitalization for selected TIA patients, and still offer timely and efficient diagnostic evaluations at significant cost savings.
OHIO PODIUM PRESENTATION - RESEARCH Mahesh Bavineni, MD

“NOTE BLOAT SYNDROME”: AN EPIDEMIC AFFECTING ELECTRONIC HEALTH RECORDS, HIGH TIME TO CHANGE SOAP NOTE TO APSO NOTE.

First Author: Mahesh Bavineni, MD Second Author: Sreelakshmi Ravula Third Author: Vijay Mahajan

INTRODUCTION: Electronic health records (EHRs) have become integral to improving the quality and efficiency of the health care system. A key patient safety factor supporting (EHRs) has been to make physician notes legible. Unfortunately, they’ve also allowed doctors to produce a staggering amount of auto-generated data that can render physician notes close to useless. “Note Bloat” and other electronic documentation hazards like copy and paste, and copy forward, threaten both patient safety and physician liability.

METHODS: We undertook a resident driven quality improvement project where we surveyed about 200 physicians about the traditional SOAP note (Subjective, Objective, Assessment, Plan), and also introduced them to our modified version called APSO note (Assessment, Plan, Subjective, Objective). Typically, providers first look for the assessment and plan portion of the note. APSO places them at the beginning of the note, making provider search faster. The new template also deliberately eliminates the auto-population of the problem list, which usually occupies the assessment portion. This prompts physicians to think about the problems actually being addressed in that particular clinical encounter.

RESULTS: We surveyed all participating physicians 3 months after using the new modified template. Outcomes were measured using survey data and the mean time spent scrolling through the note as recorded in the EHR that included time spent reading through the physician notes and the usefulness of other consultant’s notes for opinion. The mean time spent reading the notes was significantly reduced to 60 seconds in the APSO format compared to 100 seconds in SOAP format. Approximately 85% respondents opined that modifying the template also reduced the unnecessary auto generated data which made the note shorter and enabled the physicians to spend more time communicating with the patients as compared to time spent for documentation.

CONCLUSIONS: “Note Bloat”, expansion of a note’s length and complexity due to a marked increase in copied content, introduces the risk of misinterpreting key clinical data with potentially negative consequences for patient safety and provider workflow. APSO presents the information generally most relevant to ongoing care at the beginning of the note, where it can be most quickly found, shortening the time required for the clinician to find each colleague’s Assessment and Plan. Having the Assessment and Plan at the beginning of the document stresses its importance, and may induce a greater effort to provide a complete, clear, and concise representation of diagnostic and therapeutic thoughts.
Electrocardiographic Changes Consistent with Atrial Infarction are an Independent Predictor of 30 Day and 1 Year Mortality in Patients with Acute ST-Elevation Myocardial Infarction

First Author: Marvin Louis Roy Lu, MD, Chinualumogu Nwakile, MD, Anastasios Dimou, MD, Toni De Venecia, MD, Mahek Shah, MD, Vincent M. Figueredo, MD

Introduction: Atrial Infarction is an uncommonly diagnosed disease and data on its significance are limited. Its incidence in STEMI patients reportedly ranges from 0.7-52%. Certain Atrial ECG changes such as abnormal p wave morphology have been associated with 90-day mortality after STEMI. However, whether these changes are associated with short-term (30 day) or long-term (1 year) mortality have not been studied.

Methods: We examined index electrocardiograms of 250 STEMI patients at Einstein Medical Center Philadelphia. Demographics, clinical variables, peak troponin, ejection fraction, and angiographic data were collected. Atrial ECG patterns were examined and correlated with mortality.

Results: Age, sex, cardiovascular risk factors, infarct size and ejection fraction were similar in STEMI patients with and without abnormal P wave morphology or PR displacement. P wave notching in any lead was associated with higher 30 day (OR 3.09 (1.35-7.05) and 1 year mortality (OR 5.33 (2.74-10.36). PR displacement in any lead was also associated with increased 30 day (OR 2.33 (1.03-5.28) and 1 year mortality (OR 6.56 (3.34-12.86). Notched P wave, PR depression in II III and AVF and elevation in AVR/AVL was associated with increased 1 year mortality (OR 12.49 (5.2-30.0) as well as if PR depression was found in precordial leads (OR 21.65 (6.82-68.66). After adjusting for age; ejection fraction; peak troponin level; and left main disease, PR displacement in any lead was associated with increased 1 year mortality (adjusted OR 6.22 (2.33-18.64). Length of stay was longer in patients with notched P waves (p 0.008) or PR displacement in any lead (p 0.003). Left main coronary disease was more prevalent in patients with a notched P wave (p 0.045).

Conclusion: Notched P wave morphology is associated with increased 30 day and 1 year mortality after STEMI. PR displacement consistent with atrial infarction is associated and independently predicts 1 year mortality in STEMI patients.
Proton Pump Inhibitors and Hypomagnesemia in Patients with Arrhythmias

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Introduction: Proton pump inhibitors (PPIs) are among the most widely used prescription drugs in the United States. In 2011, the FDA released a Drug Safety Communication informing the public that long term PPI use may be associated with hypomagnesemia. Hypomagnesemia is known to be associated with the development of cardiac arrhythmias, particularly atrial fibrillation. The purpose of this study is to describe a potential class effect of PPI use on magnesium levels of patients admitted to the hospital with an arrhythmia.

Methods: We conducted a retrospective review of the electronic health record in which we identified 999 consecutive patients above the age of 18 years admitted to a single tertiary care hospital between January 1, 2011 and December 31, 2012 with admission diagnoses of cardiac arrhythmias, identified by International Classification of Diseases (ICD 9) codes. Only patients with duration of hospitalization less than 20 days were included. Of these patients, 372 were excluded from the analysis due to lack of availability of serum magnesium level on admission, leaving a study population of 672 patients. Within the study population, we identified 177 (27.2%) patients who were taking a proton pump inhibitors prior to admission. Hypomagnesemia was defined as serum magnesium <1.3mEq/L (0.65mmol/L).

Results: Overall, hypomagnesemia occurred in 26 (4.1%) patients. There was no significant difference in magnesium level between patients taking PPI (1.63±0.23mEq/L) and not taking PPI (1.64±0.21mEq/L), p= 0.73. In patients taking PPI on admission, the odds ratio for hypomagnesemia was 1.10 (95% confidence interval 0.47 to 2.58, p=0.83). In the subgroup of patients admitted for atrial fibrillation, the odds ratio for hypomagnesemia was 1.16 (95% confidence interval 0.45-2.98, p=0.81).

Conclusions: In a cohort of patients admitted for cardiac arrhythmias, the incidence of hypomagnesemia at the time of admission was low. Our data did not find a significant association between PPI use and hypomagnesaemia among patients admitted for arrhythmias, including atrial fibrillation. Given the current FDA drug safety communication with regards to PPI induced hypomagnesemia, further studies should be considered given the effectiveness of PPIs in treating peptic ulcer disease.
QUEBEC PODIUM PRESENTATION - RESEARCH Catherine Matte, MD

Improving Prescribing Practices on Clinical Teaching Units: Glucocorticoid Use in Chronic Obstructive Pulmonary Disease Exacerbations

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**Introduction:** Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death in the United States. COPD exacerbations (COPDE) are an important risk factor for progression of this disease. Systemic glucocorticoids (GCs) use in COPDE has been shown to reduce hospital stay, treatment failure, and relapses. Nevertheless, poor adherence to best practice guidelines, both in terms of over- and under-prescribing are documented. A recent study demonstrated that a 5 day course of GCs in COPDE was as effective as 14 days, (Reduce trial, JAMA June 2013) this provided an opportunity to evaluate its effect on prescribing practices of physicians on medical Clinical Teaching Units (CTUs). We aimed to determine if prescribing practices of GCs in COPDE improved following implementation of a targeted, multidisciplinary educational intervention.

**Methods:** We used a before-after study design with concurrent control. An educational power-point presentation was developed for the treatment of COPDE and presented at the beginning of every 4-week internal medicine CTU rotation at one of two large teaching institutions (CTU-I) for a period of 12 months, beginning March 2014. The other institution served as the control institution (CTU-C). Retrospective chart review was conducted pre-implementation (June 2013 – February 2014) and post-implementation (March 2014-Nov 2014) on all patients (over age 40) admitted for a COPDE to the CTUs at the intervention and control hospital. *Exclusion criteria* were patients with asthma or pregnancy. Our primary outcome was the difference in optimal GC use (5 days) in the post-implementation as compared to the pre-implementation population in both hospitals. Secondary outcomes include: dose and route of administration of GC, readmission rates and concomitant antibiotic use. Comparisons were analyzed with student T-tests.

**Results:** In the 9 months prior to implementation, we identified 101 consecutive patients (50.5% female, mean age 74 SD 10.5, 57% pneumonia) and 68 patients, 9 months post-implementation (54% female, mean age 73 SD 11.3, 50% pneumonia) 39.4% of patients received the optimum duration of therapy (5 days) pre-intervention versus 69.5% of patients post-intervention. (P-Value of <0.01 for Before vs After at CTU-I) Preliminary data from our control CTU-C did not identify any changes in prescribing practices. (4/26 patients pre-intervention vs 3/20 post-intervention received optimal duration of GC)

**Conclusion:** There is an important gap between adoption of guidelines and current practice on medical CTUs. Our educational intervention has led to a significant improvement in prescribing practices on the CTUs concerning COPDE and continued promotion of evidence-based practice through short directed educational presentations. Such educational interventions that target a specific care gap can help translate knowledge into better patient care.
In-hospital cost analysis of Prostate Artery Embolization (PAE) and Transurethral Resection of the Prostate (TURP) in the treatment of Benign Prostatic Hyperplasia.

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Introduction: Transurethral resection of the prostate (TURP) has long been the gold standard intervention for patients with benign prostatic hyperplasia (BPH). Recently, prostatic arterial embolization (PAE) has emerged as a minimally invasive alternative to TURP with fewer complications and shorter recovery time. The purpose of this study was to compare in-hospital direct costs of elective PAE and TURP in a community hospital setting.

Materials and Methods: This was an Institutional Review Board approved retrospective financial data review of patients undergoing PAE and TURP from January to July 2014. Only patients undergoing elective ambulatory procedures were included. Direct costs were categorized in to the following 6 categories: nursing and/or staffing, operating room or interventional supply costs, anesthesia supplies, room/boarding, radiology and laboratory costs. In-direct hospital costs (i.e. electrical, housekeeping, security, medical records, pathology) and professional physician costs (i.e. anesthesiology, radiology, urology) were excluded. Data was analyzed with the use of student t test and a probability value of <0.05 was considered statistically significant.

Results: Average age of TURP (n=36) patients was 73.9 years and PAE was 64.5 (n=30, p<0.0001). Intra-procedural supplies for PAE ($1554.19, SD $437.79) were significantly more costly than TURP ($1124.61, SD $606.44, p=0.0019). However, total intra-procedural costs including anesthesia supplies and nursing/staffing were significantly more expensive with TURP than with PAE (TURP: $2246.38, PAE: $1765.69, p=0.01). The average length of stay for the TURP group was longer at 40.6 hours (range <1-5 days) versus 3 hours for the PAE group, with room costs incurred only by the TURP group ($2334.27, SD $1523.84). Total in-hospital costs for the TURP group ($5191.90, SD $3232.56) were significantly higher than for PAE ($1791.46, SD $458.19, p<0.0001).

Conclusion: Compared with PAE, TURP is associated with significantly more in-hospital direct costs. The difference in cost is largely related to length of hospital stay, as well as associated costs of labs and imaging. PAE offers a safe and efficacious therapy for BPH, however, overall less cost for the average patient. Future studies aimed at comparative cost effectiveness as it relates to clinical outcome, complications, and recurrences are warranted.
RESIDENT FELLOW POSTER FINALISTS
Innovations in Patient Safety Education of Internal Medicine Residents

Bisi Alli, DO, MS, Jordan Coulston, MD, Hamed Abbaszadegan, MD, MBA, LeAnn Cox, MD,

Event reporting of adverse events and near misses is critical to patient safety and is the recent focus of the ACGME-CLER objectives. However, the ACGME is not prescriptive about how to satisfy these milestones. While informal curricula are more common in residencies, continued barriers exist in engaging residents in system-level reporting and interventions.

To start, we conducted a needs assessment survey of internal medicine residents, which reflected the ACGME-CLER objectives and asked residents about their personal experiences over the past twelve months (Figures 1 & 2). Less than half (44%) of the residents reported observing unsafe conditions, adverse events and/or near misses on a monthly basis. Similarly, there was poor resident involvement in event reporting (36%) and participation (18%) in processes to promote and enhance safe care (Figure 1). Limitations in time and familiarity with the hospital event reporting system were common barriers identified by the residents (Figure 2).

In response, we created a formal, resident-led patient safety education curriculum to educate internal medicine residents. Directed by the Chief Resident in Quality and Safety (CRQS), curricular elements include formalized training in core concepts of patient safety, demonstration of event reporting, interprofessional patient safety conferences (PSC), and the launch of the patient safety consultative service (PSCS). Furthermore, monthly patient safety conferences serve as a hospital-wide forum to reinforce core concepts such as: identification of healthcare errors; promotion of just culture, high yield communication, and quality improvement science. After curriculum initiation, early data demonstrates an increase in resident-submitted error reports (Figure 3) with several subsequent system-level interventions (data shown).

Ultimately, our patient safety education curriculum has proven to be an effective approach to resident education by increasing error reporting, real-time evaluation of errors, and useful system-level interventions. Ongoing focus is to sustain these interventions, to assess resident educational outcomes, and to further translate this culture change to our other residency hospital site.
Simplified Pulmonary Embolism Severity Index Accurately Reflects Length of Stay, Readmission and Death in a California Cohort.

First Author: Alan Beneze Second Author: Jill Waalen Third Author: Dan Dworsky Fourth Author: Darlene Elias

Introduction: The Simplified Pulmonary Embolism Severity Index (sPESI) is a validated, bedside clinical prediction model used to predict all cause mortality following pulmonary embolism. The sPESI utilizes a binary scoring system in which a score of 0 is considered low risk and a score of 1 is high risk. Six prognostic variables include age, presence of congestive heart failure, chronic respiratory disease or malignancy, tachycardia, hypoxia and hypotension are included in the sPESI. The sPESI has been used to risk stratify patients for outpatient treatment in recent studies.

Methods: A retrospective chart review was performed of all patients discharged with a diagnosis of PE in 2012-2013 at Scripps Green Hospital. Various quality outcomes at three months, including recurrent VTE, major bleed, death and readmission as well as length of stay for low and high risk patients using sPESI were analyzed.

Results: A total of 237 patients were hospitalized with a diagnosis of PE at Scripps Green Hospital. The mean age was 65.5 yrs ±17.0 with 52% male sex. The mean length of stay (LOS) was 3.56 ± 4.32 days with a range of 1-33 days. Etiology of PE was idiopathic in 40%, and provoked in 60%. PE was diagnosed with CT angiogram in 89% of patients and anatomic extent of pulmonary embolism was: limited 70 (29.5%), intermediate 77 (32.5%) and extensive 60 (22.5%). Ninety-one (38.4%) patients had a low risk sPESI score. Death, LOS and readmission were all inversely related to low risk sPESI scores. Recurrent VTE and major bleed was not associated with low risk sPESI scores. Those patients with a low risk sPESI score had an average length of stay of 2.0 ±2.5 (p<0.001). Readmissions occurred in 9.9% of patients with a low risk sPESI compared to 32% of high-risk patients (p<0.001). Twenty patients of the 237 studied had died at three months, of which only 1 had a low risk sPESI (p<0.001).

Conclusion: In this cohort of patients hospitalized with PE over a two year time period, a low risk sPESI score was inversely related to readmission, risk of death and prolonged LOS. The recognition of truly low risk acute PE patients suggests clinicians have the option for partial or complete outpatient treatment. Outpatient treatment for pulmonary embolism can be considered feasible and is expected to improve care of many patients while also having an important impact on healthcare management and costs.
Evaluating the risk of re-emergence of measles in the United States

Introduction: The use of vaccination to eliminate endemic transmission of measles in the United States is a remarkable public health accomplishment. However, past success does not guarantee sustained elimination and a recent surge in the incidence of measles suggests measles may be re-emerging. We use stochastic modeling techniques to quantitatively evaluate the transmission of measles in the United States and to assess the risk of re-emergence.

Methods: We model transmission as a branching process with a negative binomial offspring distribution. This permits us to use maximum likelihood estimation to infer the effective reproduction number and dispersion parameter of measles. These parameters characterize the strength and heterogeneity of measles transmission respectively. Variations of this technique provide insight into how measles transmission has changed with time, how vaccine coverage relates to disease transmission and how characteristics such as age may affect transmission. Data used in our study are acquired from the Centers for Disease Control and the California Department of Public Health.

Results: National data for 2001 to 2011 produce an estimate of 0.52 (95% confidence interval: 0.44 - 0.60) for the effective reproduction number of measles in the United States. Since this value is well below the critical value of one, measles remains eliminated – implying that endemic transmission is not possible. However, we identify an increase trend of measles incidence with time. This trend appears attributable to an increase in the number of disease introductions rather than a change in the transmissibility of measles. We also find that there is a high degree of transmission heterogeneity in measles transmission, which may be caused by age-dependent transmission or clustering of immunity. The control of transmission is extremely sensitive to the level of vaccine coverage as a decrease in coverage by as little as 1% could result in a 70% increase in measles incidence.

Conclusions: Maintaining a low incidence of measles in the United States requires control of geographic importation of cases and maintenance of high vaccine coverage. Vaccination of children in areas where there is a high degree of vaccine refusal appears particularly important. Our general approach of characterizing the case burden of measles is applicable to the epidemiologic assessment of other weakly transmitting or vaccine-controlled pathogens that are either at risk of emerging or on the brink of elimination.
Frequent Premature Atrial Complexes and their Association with Risk of Incident Heart Failure, Stroke, and All-Cause Mortality.

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**Background:** Frequent Premature Atrial Complexes (PACs) have been shown to be associated with higher risk of Atrial Fibrillation (AF).

**Objective:** To examine the association between frequent PACs and a composite end point of known AF complications, namely heart failure (CHF), stroke and all-cause mortality.

**Methods:** For this retrospective cohort study, Holter ECGs obtained between 2000 and 2010 of 1357 patients free of AF at baseline were analyzed for PAC activity. All pertinent data in electronic medical records was reviewed to ascertain baseline characteristics. Holter groups with frequent PACs (>100/day) and infrequent PACs (<100/day) were compared to evaluate for differences in reaching the composite end point on a median follow up of 7.5 years. Multivariate Cox regression analyses was performed to assess the strength of association and to adjust for confounders.

**Results:** Mean age was 64 years with 93% men. Mean BMI, A1c, LDL, left atrial size, and average HR were 31.24 kg/m2, 6.42%, 107.92 mg/dL, 42.56 mm, and 73 bpm, respectively. A predetermined composite end point was reached in 47.3% of those with frequent PACs compared to 26.4% of those with infrequent PACs (HR, 2.11 [95% CI, 1.75-2.53]; P < 0.001). After adjusting for demographics and co-morbidities via Multivariate Cox Regression Analysis, frequent PACs remained independently associated with a higher incidence of the combined end point (HR, 1.31 [95% CI, 1.07-1.60]; P = 0.008). In the subgroup analysis, frequent PACs were independently associated with all-cause mortality (37.4% vs 18.8%, HR, 1.40 [95% CI, 1.12-1.76]; P = 0.004). There was a trend towards more CHF (12.6% vs 8.2%) and stroke (6.8% vs 5%) in patients with frequent PACs.

**Conclusion:** Frequent PACs (>100/day) are associated with higher risk of composite end point of CHF, stroke, and all-cause mortality. This data is predominantly driven by higher mortality in patients with frequent PAC activity.
Cox multivariate curves showing event free survival when plotted against time in cohorts with frequent and infrequent PAC activity.

Graphic representation of incident CHF, stroke and all-cause death in comparison groups.
CALIFORNIA POSTER FINALIST - RESEARCH Heather Hofmann, MD

Teaching on Rounds: Observations, Perceptions, and an Intervention to Increase Bedside Teaching

Everardo Arias, BS, Francisco Espitia, BS, Michael Phelan, PhD, John Boker, PhD, Lloyd Rucker, MD

Introduction: The current inpatient teaching environment, with its emphasis on throughput, technology, electronic records, and limited resident duty hours, has affected the location of rounds, as well as the balance of education versus service for learners. The authors characterized inpatient medicine ward teaching and compared learners’ preferences for rounding sites with their assessment of the quality of their learning. The authors also evaluated an intervention to increase time teaching and time at bedside.

Methods: The authors developed and validated an instrument to assess site and teaching time of medicine ward rounds. Study participants were selected through convenience sampling over a six-month study period and included all internal medicine attendings, residents and medical students on service at the University of California, Irvine Medical Center. Researchers observed attending rounds and recorded the location and activity in time intervals. Attendings were identified as leading predominantly workroom (WR) or bedside (BS) rounds based upon whether they spent the majority of attending rounds in the workroom or at the bedside, respectively. Learners completed a survey about their experiences. Observations and surveys were obtained over the study period, with the intervention introduced after three months: faculty development and whiteboards installed in patient rooms. Authors performed descriptive and inferential analysis on de-identified data.

Results: Ten core teaching behaviors were identified through literature search and expert consensus, Cronbach’s alpha 0.80, and validated during 6.5 hours of joint observations, Kappa = 0.69 (p<0.001, 95% CI [0.524, 0.850]). Workroom-based attendings taught during 41% of time in rounds, bedside-based attendings during 39%. The intervention showed an increase in teaching for bedside-based attendings (39% to 43%), and an increase in time at bedside for workroom-based attendings (23% to 27%). Ninety-six learners completed the evaluation survey pre-intervention (P) and 28 after the intervention (I). Weighted means for key items from the learners survey (1=Strongly Disagree, 5 = Strongly Agree) were 1) Amount of teaching, WRP 3.7, WRI 3.8, BSP 4.3, BSI 4.2; 2) Preference for bedside rounding, WRP 3.1, WRI 3.6, BSP 4.0, BSI 3.5; 3) Would like to work with attending again, WRP 3.8, WRI 3.7, BSP 4.9, BSI 5.0.

Conclusions: Hospitalists spent about 40% of rounding time teaching regardless of site. The intervention increased teaching for bedside attendings and time at bedside for workroom attendings. Learners with attendings who rounded at the bedside felt they received more teaching and preferred bedside teaching and working with bedside-based attendings.
SOLUBLE GUANYLATE CYCLASE AS A NOVEL TREATMENT TARGET FOR OSTEOPOROSIS

Jisha Joshua MD, Gerburg K. Schwaerzer, Hema Kalyanaraman, Esther Cory, Florin Vaida, Gerry Boss MD, Renate Pilz MD.

Introduction: Osteoporosis is a major health problem leading to fractures that cause substantial morbidity and mortality. Current osteoporosis therapies have significant drawbacks, creating a need for novel bone-anabolic agents. We previously showed that the nitric oxide (NO)/cGMP/protein kinase G (PKG) pathway mediates some of the anabolic effects of estrogens and mechanical stimulation in osteoblasts and osteocytes. We tested cinaciguat—a prototype of a novel class of soluble guanylate cyclase activators—in a mouse model of estrogen deficiency-induced osteoporosis and in primary osteoblast cultures.

Materials and methods: 12 week old female C57/B16 mice were divided into 5 groups: Ovariectomized (OVX) + vehicle (0.1% DMSO), OVX + Cinaciguat (10ug/kg/day), OVX + Estrogen (5ug/kg/day), sham operated + vehicle and sham operated + Cinaciguat (n=8-10). Daily i.p injections were started one week post-surgery for 5 weeks. MicroCT, histomorphometry, biochemical marker assays and gene expression analysis were performed at the time of sacrifice. Survival, proliferation and differentiation assays were performed in primary osteoblasts in the presence or absence of Cinaciguat. Statistical analysis was done using two-tailed Student t-test or one-way ANOVA with Bonferroni post-test analysis; p

Results: Compared to sham-operated mice, ovariectomized mice had lower serum cGMP concentrations, which were largely restored to normal by treatment with cinaciguat or low-dose 17ß-estradiol. Treatment with cinaciguat attenuated the ovariectomy-induced trabecular bone loss, improving the BV/TV, trabecular number, and BMC, with effect sizes of d = +1.47, +1.35, and +1.20, respectively, compared to vehicle-treated OVX mice as measured by micro-CT. These effect sizes were comparable to those of estradiol in all parameters (d = +1.45, +0.9, and +1.66 for BV/TV, trabecular number, and BMC, respectively). Cinaciguat reversed ovariectomy-induced osteocyte apoptosis (d = -2.79 and -4.25 for trabecular and cortical bone, respectively) as efficiently as estradiol (d = -3.68 and -4.27 for trabecular and cortical bone, respectively) and significantly enhanced histomorphometric bone formation parameters. Compared to 17ß-estradiol, which completely reversed the ovariectomy-induced increase in osteoclast number, cinaciguat had little effect on osteoclasts. In vitro, Cinaciguat significantly increased cGMP concentrations in osteoblast cultures and enhanced their survival, proliferation and differentiation potential.

Conclusions: Direct guanylate cyclase stimulators have been extremely well tolerated in clinical trials of cardiovascular diseases, and our findings provide proof-of-concept for this new class of drugs as a novel, anabolic treatment strategy for post-menopausal osteoporosis, confirming an important role of NO/cGMP/PKG signaling in bone.
Racial Ethnic Differences in Hip Fracture Incidence and Mortality in Older Men

Lucy Liu MD, Malini Chandra MS, Joel Gonzalez BS, Joan Lo MD

INTRODUCTION: Hip fracture is a major public health concern in older men and women. While men have a lower incidence, they suffer higher rates of mortality, postoperative complication and functional decline. Fracture rates and outcome also differ by race/ethnicity. This study reports the contemporary incidence of hip fracture and subsequent mortality in older men by age and race/ethnicity within a large integrated healthcare delivery system.

METHODS: This retrospective cohort study identified men age 50 years and older in Kaiser Permanente Northern California (KPNC) who experienced a proximal femur fracture during 2000-2010 in the absence of major trauma. Age and self-reported race/ethnicity were obtained from administrative databases. The annual incidence of hip fracture was determined based on the number of eligible KPNC male members per calendar year, with rates adjusted for age according to the 2010 U.S. Census. All-cause mortality was determined at 1, 3, 6, and 12 months following fracture. Chi-square tests and logistic regression analyses (with odds ratio, OR and 95% confidence interval, CI) were used to examine differences by age and race/ethnicity.

RESULTS: There were 6247 men (mean age 79.3 +/- 9.8 years) experiencing hip fracture during 2000-2010; 81.4% were white, 7.5% Hispanic, 3.8% black and 3.9% Asian. The annual age-adjusted incidence of hip fracture ranged from 124 to 145 (mean 132) per 100,000 men. Contemporary (2010) hip fracture incidence was highest for white (146), followed by Hispanic (105) and black (88), and lowest for Asian (44) men per 100,000. Overall mortality rates at 1, 3, 6 and 12 months were 11.1%, 19.8%, 25.4% and 32.9%, respectively. Mortality increased significantly with age, with one-year mortality at 13.4% for men 50-64 years old and 46.6% for men 85 years and older. Post-fracture mortality also differed by race/ethnicity; one-year mortality was similar among white (33.7%), black (32.4%) and Hispanic (31.1%) men, but significantly lower among Asian men (23.1%, p<0.05). Adjusting for age, black (OR 1.05, CI 0.79-1.41) and Hispanic men (OR 0.93, CI 0.76-1.15) had similar odds of mortality at one year when compared to white men, but Asian men had significantly lower odds (OR 0.65, CI 0.47-0.88).

CONCLUSION: The age-adjusted incidence of hip fracture in older men averaged 132 per 100,000 men during 2000-2010 and was highest for white and lowest for Asian men in 2010. Post-fracture mortality increased significantly with age, with one year mortality approaching 50% in men 85 years and older. One-year mortality was similar in whites, blacks and Hispanics but significantly lower in Asians. Future studies should examine factors contributing to racial/ethnic differences in hip fracture incidence and outcome.
Discharge checklists may reduce medical errors.

First Author: Mala C Mandyam MD Gomathi Krishnan PhD, Kambria H. Evans MEd, Lisa Shieh MD PhD

**Background:** Discharge checklists may reduce medical errors. Traditional paper checklists do not fit into the current workflow in centers that utilize electronic medical records (EMRs). In an era where team-based care is becoming widespread, defining each person’s role in discharge practices is increasingly important.

**Objective:** Our aim was to develop and implement a standardized discharge checklist into our university hospital’s EMR that was tailored towards internal medicine housestaff. We sought to analyze utilization of the checklist and compare the effects of its usage on discharge best practice items. As this was a pilot study we also sought out qualitative feedback on the project from participating medicine housestaff.

**Methods:** Using focus groups and published best practices, we selected 5 tasks necessary for safe discharges to include in our checklist: follow-up appointments, medication education, POLST form completion, discharge equipment orders, and timely catheter discontinuation. We created a “dotphrase” in our EMR that could pull the checklist into daily MD progress notes. We randomized each of 5 general medicine ward teams to receive either weekly reminders to use the checklist dotphrase in their daily notes (intervention team) or less frequent reminders to use any existing methods they already had to remember discharge tasks (control team). Over a 5-week period, we collected data on checklist usage, as well as outcomes relating to the checklist tasks across all general medicine teams.

**Results:** The intervention group had 269 (60%) patient encounters and the control group had 179 (40%) encounters during the pilot period. Checklist usage in the intervention group was at 23% (ie, 61 encounters contained the checklist in at least one note entered during the encounter). Patients in both groups were of similar case mix index (p=0.85). Housestaff in the intervention group were more likely to consult discharge pharmacists for medication education than those in the control group (30% vs 14% of encounters; p<0.001). This association was driven by encounters containing the checklist. There were no significant differences in length of stay, follow-up appointment scheduling, or POLST completion in either group.

Overall, housestaff in the intervention group liked seeing and updating the discharge checklist in their daily notes. They wanted more instruction on how to actually complete the discharge tasks. They also wanted to see discharge task reminders earlier in the work day.

**Conclusion:** An EMR based discharge checklist can improve completion of some best practice items such as consulting a discharge pharmacist. Medicine housestaff are willing to use an EMR-based checklist to aid in discharge tasks. There are opportunities to improve actual usage of the checklist and to better tailor it to medicine housestaff workflow.
CALIFORNIA POSTER FINALIST - RESEARCH Sajan Patel, MD

Appropriate Utilization of Telemetry

Sajan Patel, MD Myung Sim, DrPH Erin Dowling, MD Department of Internal Medicine, UCLA Medical Center

Intro: Telemetry is overused in hospitals, likely due to physician uncertainty regarding patient trajectory, unawareness of established indications, and a misconception that telemetry imparts a higher level of care. Inappropriate use leads to increased costs, emergency department backups, unnecessary work up of insignificant arrhythmias, and patient discomfort. We conducted a study to evaluate the use of telemetry at UCLA-Santa Monica Medical Center and the effect of an educational intervention on telemetry utilization.

Methods: We studied the admissions of UCLA Internal Medicine residents rotating through the hospitalist rotation at UCLA-Santa Monica Medical Center from 11/21/14 – 5/7/14 (6 blocks). Data on admissions were collected discretely by post-call nurse practitioners who recorded admission diagnosis, telemetry status, and telemetry indication. For 3 of the 6 blocks, half the residents on the rotations received an educational intervention on telemetry indications and received a pocket card with guidelines. We reviewed all telemetry admissions that had unclear indications and deemed them appropriate or not based on published guidelines. We also conducted a program-wide survey on Internal Medicine resident opinions of telemetry use and comfort with indications.

Results: Data on 642 admissions was collected, and of these admissions, 52% (333/642) were put on telemetry. Of all telemetry admissions, 34% were deemed inappropriate (112/642). With no intervention, 56% of admissions were put on telemetry whereas with intervention, 40% were put on telemetry (p=0.0004). In addition, without intervention, 63% of telemetry admissions were appropriate, whereas with intervention, 79% of admissions were appropriate (p=0.0135). The intervention group was 2.24 times more likely to admit appropriately to telemetry than those that did not receive the intervention (p=0.0151). Of the residents who responded to the survey (74/113), 92% felt that telemetry is overused, and 72% felt they personally overused telemetry.

Conclusions: Our study showed that telemetry was overused by the Internal Medicine residents at UCLA-Santa Monica Medical Center, however a relatively simple and inexpensive educational intervention significantly reduced inappropriate use. These results translate to a significant reduction in cost and waste of resources. In addition these interventions appear to be favorably received by residents based on their survey responses. Future directions include a program-wide telemetry intervention, guideline integration into the electronic health record program, and a telemetry discontinuation study.
Change in Pulse Oximetry Waveform Before and After Hemodialysis and Ultrafiltration in Critically Ill Patients May Reflect Hemodynamics

R. Pillai, S. Chowdhury, E. Kaptein, A. Baydur

Objectives: To assess how pulse O2 saturation waveform changes correlate with volume removal during hemodialysis with UF. Rationale: Pulse oximetry is a non-invasive method for monitoring blood oxygen saturation. Patients undergoing intermittent hemodialysis (HD) with ultrafiltration (UF) frequently experience hypotension which potentially can result in end-organ injury. Prior research has shown that pulse O2 saturation waveform may correlate with intravascular volume status and fluid responsiveness. This study assessed the relationship of the pulse oximetry waveform changes to volume removal in patients before and after UF.

Methods: Pulse O2 saturation waveform were retrieved by telemetry in 46 critically ill patients before and after undergoing UF. Variation in the amplitude of the pulse O2 saturation wave was measured as the difference between end-inspiration and end-expiration as defined by deltaP = (max-min)/{(max+min)/2} during one minute segments before onset and at completion of UF. We also measured the variation in the peak values of the pulse oxygen saturation (SpO2) waveform at end-inspiration and end-expiration defined as deltaS = (peakmax-peakmin)/{(max+min)/2}. The net ultrafiltrate volume removed was plotted against deltaS and deltaP. DeltaS and deltaP values before and after UF were compared with the Wilcoxon rank sum test. The effect of positive pressure ventilation (V) and spontaneous breathing (SB) on deltaS and deltaP were separately assessed. Results: Pulse O2 saturation waveform data were obtained from 46 patients (spontaneously breathing = 14, ventilated = 32). Patients with 0–20 mL/kg and >20 mL/kg ultrafiltration exhibited increased variability in pulse O2 saturation peaks with respiratory variation (deltaS) [35% (p=0.02) and 19% (p=0.001), respectively] as seen in Figure 1. DeltaS did not significantly change in patients without net ultrafiltration (p=0.34). DeltaS increased significantly after UF in patients on mechanical ventilation and breathing spontaneously (p=0.01 and p=0.002 respectively). No significant change in deltaP was found. In spontaneously breathing patients the volume per body weight removed significantly correlated with the difference between median post-HD and pre-HD deltaS values (r= 0.60, p=0.02). There was no significant correlation in ventilated patients.

Conclusions: Pulse oximetry waveform variability reflects the quantity of volume removed by ultrafiltration in critically ill patients. More patients are currently undergoing deltaS and deltaP assessment before and after UF in our institution to assess in greater detail the influence of PPV on these variables. Monitoring these variables has the potential to predict intradialytic hypotension, shock, and end-organ injury.
Health in one touch: Assessing the use of mobile health information by patients of LAC+USC Medical Center Primary Care Clinics

First Author: Veronica Ramirez, MD

Introduction: There is significant potential for mobile health technology, such as smartphone applications and text messaging, to improve health outcomes for patients with chronic diseases. However, there is a need for further development of such mobile health technology, as well as further investigation into the clinical efficacy of such technology in improving the health of patients in lower-income communities. The purpose of this study is to investigate what type of mobile health information our patients at the LAC+USC Resident Primary Care Clinics utilize to educate themselves about managing chronic diseases, such as diabetes mellitus and hypertension.

Methods: 150 subjects, all patients of the resident primary care clinics of LAC+USC Medical Center, completed a 25-question survey June 2014 to August 2014. Surveys were delivered in the patient’s primary language. Demographic information such as age, primary language, ethnicity, annual income, and highest education level were collected. Use of mobile technology and social media, as well as patient interest in using mobile health technology were stratified by annual income and education level.

Results: In terms of demographic information, 73.2% of subjects earned an annual household income of less than $20,000 per year and 67.1% of patients had obtained at least a high school diploma. Ninety percent of subjects owned a cellular phone, with 74.8% of these subjects owning a cellular phone with internet capability. 59.8% of subjects used mobile applications on their cellular phones, but only 27.5% of these individuals used mobile applications related to their health. 87.1% of subjects stated they would be interested in using a cellular phone application to improve their health, with 89.1% of respondents stating they would use this type of application either every day or every week. Patients stated they would find the mobile health application most useful for obtaining general information on medical conditions as well information to improve their nutrition.

Conclusions: Despite the majority of our primary care patients are of lower socioeconomic status, our patients utilize cellular phones with internet and mobile application capabilities to great extent. There was a wide range of education levels despite the majority of our patients meeting the federal poverty guidelines. There is substantial interest amongst our patients in using mobile health technology to both manage and prevent chronic diseases. Given that cultural, educational, and socioeconomic disparities strongly correlate with higher rates of chronic diseases such as diabetes and hypertension, access to culturally-relevant mobile health tools may help to improve health outcomes in these populations.
The MyCare pilot: Improving non-urgent ED utilization and inpatient admission through ambulatory multidisciplinary care

Schuttner, L., Henry, K., Soares, A., and Kuo, A.

Background: Improving hospital readmissions and non-urgent ED utilization are major current quality efforts for many national hospitals. However, few models exist that use an ambulatory-based comprehensive approach to care for chronically ill patients, despite promising potential. We developed a multidisciplinary program with nutrition, pharmacy, behavioral health, and case management to decrease ED utilization and hospital admissions for chronically ill, complex patients.

Methods: Patients were identified from lists of ED utilization and inpatient readmissions from two hospitals, as well as physician referral. Eligible patients were screened and enrolled in the pilot. Patients met with nutrition, behavioral health, pharmacy, and case management at an initial intake appointment, and received ongoing care as needed with each provider or were referred to longer-term resources, as appropriate. The patient’s primary care provider was notified of all recommendations and enrollment status, and continued to provide routine primary medical care. Multidisciplinary intakes and follow-ups occurred at a single ambulatory clinic setting with capacity for enhanced medical services (infusion, IV services, extended hours), with urgent care providers on site if needed during any appointment. For data analysis, the 12-month period prior to enrollment was compared to the 6-month pilot period for 30 of 42 patients (based on enrollment follow-up >30 days), with rates compared in patient-years (PY).

Results: A total of 42 patients were enrolled from 12/5/13 until data analysis on 8/14/14. Data from the first 30 patients was considered based on follow-up period. An additional 59 patients were screened and excluded (primary care provider ineligibility or refusal, n = 16; health condition ineligible, n= 10; patient refusal, n = 10; other, n = 23). Included patients were on average 59 years old, majority female (n = 19), Caucasian (n = 13), lived alone (n = 17), and with an average per patient of 15 types of prescription or supplemental medications. Pre-enrollment, the cohort had an event rate of 4.3 ED visits/PY, 2.0 urgent or emergency admissions/PY, 5.3 primary care visits/PY, 8.3 specialty care visits/PY, and <1 visit/PY with any social work, behavioral health, nutrition, or pharmacy provider in the ambulatory setting. During the pilot post-enrollment, the cohort had 2.4 ED visits/PY, 1.9 admissions/PY, 5.9 primary care visits/PY, 11.3 specialty care visits/PY, and between 4-8 visits/PY with outpatient behavioral health, nutrition, and pharmacy. ED disposition of an admission after an ED visit decreased from 42% pre- to 21% post-enrollment, and bed days per admission decreased from 9.1 days/PY to 8.2 days/PY.

Conclusions: A multidisciplinary care program for medically complex chronically ill patients targeting comprehensive health needs and care coordination reduced ED utilization by 43% and urgent or emergency admissions by 9%, while increasing use of outpatient ambulatory services during a pilot period, without prolonging or delaying necessary admissions.
CALIFORNIA POSTER FINALIST - RESEARCH Sarthi R Shah, MD

Utilization of G Charts to Analyze Rare Occurrence Events in Health Care Quality Improvement

First Author: Sarthi R Shah, MD Authors: Faraz Khan Luni, Abdur Rahman Khan, William Barnett, Ragheb Assaly

Introduction: Quality improvement professionals in many industries can use statistical control charts to differentiate normal variation from real change. Most traditional process charts, such as count charts (c charts) and proportion charts (p charts) lack the power to detect low occurring events. A g chart is used to identify the interval between rarely-occurring events and is sensitive enough to detect rare events, but is seldom used by infection control practitioners. The incidence of nosocomial infections is an important quality measure across all institutions, thus we have chosen to study the incidence of both central-line-associated bloodstream infections (CLABSI) as well as catheter induced urinary tract infections (CAUTI).

Methods: We used g charts to monitor nosocomial infections. We collected the data for both CLABSI as well CAUTI. Real-time occurrences were recorded on a daily basis from October 2013 to October 2014. The date of each adverse event was recorded over time and then plotted using a geometric control chart.

Results: We recorded 8 incidences of CLABSI and 21 CAUTI. From the g chart we were able to calculate there was a 4.8% chance of recording a CLABSI and 5.3% chance to record a CAUTI per day. We found that the dates between incidences stayed close to the center line and always below the upper control limit suggesting only normal variation. We believe the g chart is an effective tool to track real time changes in nosocomial infections and should be used more frequently in the healthcare setting.

Discussion: SPC allows effective implementation of quality improvement measures. The ease of data collection and ability to interpret low occurrence rates makes g chart a powerful tool when applied correctly.

G charts detect significant changes between rare events without requiring a high sample size and large amounts of data. Each point in a g chart represents the number of day, or any unit of time, between occurrences of a rare event. Like other control charts, the g chart has a center line and upper and lower control limits. However, the lower limit is often close to zero, thus you cannot determine when the adverse rate is unusually high. Points above the upper control limit signify a period of lower than normal probability of an adverse event. These points can suggest the success of a quality improvement measure in place; they can also be designed to further study the events leading up to an adverse occurrence.
CALIFORNIA POSTER FINALIST - RESEARCH Viet Tran, DO

Percentage of Patients with Gram Positive Bacteremia, Meningitis, Hospital-Acquired Pneumonia, Severe Sepsis, or Septic Shock who Achieve a Therapeutic First Vancomycin Trough

First Author: Viet Tran, DO Patrick Mulroy, DO Andrew Lowe, PharmD

Background: The 2009 Vancomycin Therapeutic Guidelines issued by the Infectious Diseases Society of America recommend higher serum Vancomycin trough concentrations of 15-20 mg/L for seriously ill patients and patients with complicated infections such as bacteremia, meningitis and hospital acquired pneumonia caused by Staph Aureus. A loading dose of 25-30 mg/kg (actual body weight) can be considered followed by 15-20mg/ kg every 8-12 hours for subsequent doses. The first serum trough is recommended to be drawn just before the fourth dose when steady state achievement is most likely to have been obtained.

Objective: The aim of the study is to determine the percentage of patients with serious infections who achieve a therapeutic first Vancomycin trough with and without a loading dose.

Methods: A retrospective review of the medical records of Arrowhead Regional Medical Center was conducted for patients admitted between January 1st, 2009 through April 30th, 2014. Patients were included in our study if they were treated with Vancomycin for the conditions listed in the background section. Patients were required to be age = 18, creatinine = 1.5, and not pregnant. The Vancomycin trough was required to be drawn within 1 hour of the scheduled 3rd or 4th dose of Vancomycin. Data was analyzed for patients who received the standard 15-20mg/kg dosing and those with an initial loading dose of 25-30mg/kg followed by standard dosing for subsequent doses.

Results: Patients in the group receiving a loading dose were more likely to have achieved a therapeutic first trough than standard dosing (p<0.01). Mean trough in the standard dosing group was 11.7 with a standard deviation of 5.35. Mean trough in the loading group was 17.8 with standard deviation of 6.65. Supra-therapeutic troughs were 45% in the loading group versus 8% in the standard group.

Discussion: Initial selection of vancomycin dose is of critical importance when treating patients with serious and life threatening infections. Improper dosing of vancomycin may lead to potential under treatment of these infections for 36 hours before the clinician becomes aware of the mistake. This not only may have grave consequences for the patient, but also contributes to selection of bacteria resistant to Vancomycin, limiting future effectiveness of Vancomycin. Newer nomograms such as those proposed by Wesner et al utilize a loading dose and aim for troughs of 15-20 mcg/ml.
Clinical characteristics of patients diagnosed with community-associated Clostridium difficile infection

First Author: Claudia Ihm, MD Bryan Knepper MPH MSc Heather Young, MD

Objectives: Community-associated Clostridium difficile infection (CA-CDI) is increasing, and many patients with CA-CDI lack traditional risk factors. In fact, a large number of CA-CDI patients have no previous antibiotic exposure, and they tend to be younger and healthier compared to patients with hospital-associated CDI. However, risk factors for CA-CDI are not well understood. We conducted a retrospective study to determine the clinical characteristics of CA-CDI.

Methods: Patients with potential CA-CDI were identified from a database maintained for infection control surveillance at an urban hospital in Denver, Colorado, between 10/1/2012 and 9/30/2014. Patients were included if they were tested positive for C. difficile. The National Healthcare Safety Network definition was used to define CA-CDI. A chart review was conducted to determine previous antibiotic exposure. Health care contact in the 6 months prior to CDI, including hospital stay, clinic visits, acute care or ED visits, outpatient surgery <24 hr, and observation <24 hr were documented. Clinical details of the acute infection such as severity, laboratory data and other stool pathogens as well as pertinent medications and co-morbidities were recorded.

Results: 152 patients were identified with possible CA-CDI, and 124 patients were included in the study. 28 patients were excluded because of age <18 (1), negative testing (12), deficient medical records (1), previous CDI <8 weeks (5), and recent hospital stay or hospital observation >24 hr (9). 54% (67/124) of included patients with CA-CDI were male, and the median age was 53 (IQR 42-61). Of 124 patients with CA-CDI, 60 patients (48%) had no antibiotic exposure within the previous 90 days. Cephalosporins (3+4 generation) were the most frequently prescribed antibiotics (25/64; 39%), followed by fluoroquinolones (24/64; 37.5%). 13% of patients with CA-CDI (16/124) had no health care contact documented in the chart in the 6 months prior CDI. The median number of outpatient visits was 5 (IQR 1-9). 38/124 (31%) of patients were hospitalized within the 6 months prior to the diagnosis (median: 8 days, IQR 4-21). The majority of patients (56%) were treated as inpatient for the acute CA-CDI episode with a median hospital stay of 7 days (IQR 4-11). Only 16/124 required ICU stay.

Conclusion: Almost half of CA-CDI cases had no prior antibiotic exposure although 87% had prior health care contact. Our data suggest that relying on antibiotic exposure to detect CDI may not be sufficient. Further work, including the selection of control patients, may help determine novel risk factors for CA-CDI.
COLORADO POSTER FINALIST - RESEARCH Kara R Mizokami-Stout, MD

Evaluation of the Appropriate Use and Safety of Intravenous Levothyroxine at an Academic Medical Center

First Author: Kara R Mizokami-Stout, MD Second Author: Paul M Reynolds, PharmD Third Author: Gerard Barber, PharmD Fourth Author: Larry K Golightly, PharmD Fifth Author: Michael T McDermott, MD

Purpose of Study: Intravenous levothyroxine (IV T4) provides a rapid repletion of thyroid stores and is often used in endocrinologic emergencies such as myxedema coma. The efficacy and safety of IV T4 for other clinical conditions is uncertain. Given the cost differential, hormone repletion rates, bioavailability and half-life, a retrospective study was conducted to evaluate the usage of IV T4.

Methods: A survey was sent to the Division of Endocrinology and University Health Consortium to establish compelling indications for IV T4 in addition to the FDA indication (myxedema coma). These included: NPO greater than 3 days, cardiogenic shock, and suspected thyroid malabsorption. Hospital inpatients receiving IV T4 were retrospectively evaluated over 6 months. Patients were assessed for presence of compelling indications for IV T4, appropriate dose reduction from oral T4, and duration of IV T4. A safety analysis was conducted to describe adverse events to IV T4 at higher risk from rapid supplementation (geriatrics, history of congestive heart failure, atrial fibrillation, or coronary artery disease). A cost analysis was performed to evaluate patients without compelling indications to IV T4.

Results: 76 patients were evaluated in the study period (Table 1). Among these, there were diagnoses of 5 (6%) cases of myxedema, 3 (4%) suspected T4 malabsorption, and 2 (2.5%) cardiogenic shock. Of patients without compelling indications, 49 (79%) patients had PO access while receiving IV T4. Of patients receiving IV T4, 22% were not converted correctly from their oral form. In addition, 13.5% developed atrial fibrillation and 14% developed troponin elevations while on IV T4.

Conclusions: Evaluation of necessity for IV T4 administration revealed that use of IV T4 was often unwarranted. Further analyses projected that implementation of an order set including standardized laboratory requests and conversions of T4 dosage forms coupled with clinical decision support aimed at limiting use of IV T4 to compelling indications could result in drug acquisition cost avoidance totaling $50,820 per year in our hospital. A post intervention analysis is to follow.
The Role of Cancer Stem Cells in Gauging Follicular Lymphoma Prognosis

Theodor Borgovan, MS, MD, Xin Zhang, MD, PhD, Li Huang, John Cole, MD, Li Li, MD, PhD

Background and Objective: Follicular lymphoma (FL) is an indolent disease of aberrant B cells marked by a relapsing and remitting pattern, partly due to the intrinsic resistance of a cell subset termed cancer stem cells (CSC). Although patients are often responsive to initial treatment, relapse rates into a more resistant form of the cancer are significant. Median survival is approximately 10 years with or without aggressive or palliative treatment. Due to the variable course of FL, our objective is to identify FL biomarkers that are reliable indicators of disease relapse, and overall survival via a high-throughput screening using tissue microarray (TMA).

Methods: Pathology reports and electronic records were all queried to tabulate information on diagnosis, biopsies, and current health. This data was tabulated to create a FL patient database sorted according to survival time following diagnosis. Using this database, patient biopsies were collected to create a TMA for high-throughput immunohistochemistry (IHC) screening of putative CSC markers. Preliminary results were obtained via analyzing the CSC population of FL in a set of grouped patients (n=2, <5-year survival, >15-years survival). IHC for putative CSC markers ABCG2, Ki67, and OCT3/4 was performed via digital batch processing method using Image-Pro software and microscopy.

Results: 75 patients were initially partitioned into 2 cohorts: survival =15 and =5 years (n=24 and n=51, respectively). The finalized database serves as an adaptable blueprint for scrutinizing survival and for high-throughput screening of prognostic biomarkers in the form of TMA. Preliminary IHC results showed an increased expression pattern for all 3 CSC markers (ABCG2, Ki67, and OCT3/4) within a grouping of short-vs. long-survival FL patients.

Conclusion: Qualified prognostic markers for FL will direct clinical decision paradigms on which patients are favorable candidates for early therapy, and will offer additional insight in the development of targeted regiments and treatment protocols to ameliorate outcomes.
**CONNECTICUT POSTER FINALIST - RESEARCH Kofi M Osei, MD**

**The impact of an awareness campaign on hospital cost reduction and redundant laboratory testing in a community teaching hospital**

First Author: KOFI M OSEI, MD Virginia Cody, MD, MHS, Heather M. Gainer Huribal, MD, APRN BC, Catherine Apaloo, MD, and Forugh Homayounrooz, MD

**Introduction:** Health care waste, estimated at $690 billion dollars annually (2012) contributes to the rising cost of healthcare in the U.S. Unnecessary testing or diagnostic procedures accounts for between $158 billion and $226 billion (2012), with physicians being one of the drivers of this rising cost in healthcare. The ACP and AAIM have found ways to incorporate high value care (HVC) curricula in residency training programs to raise awareness of this issue. As part of a quality improvement (QI) project we assessed the impact of a computer monitor post-it to heighten awareness of HVC on cost savings and the number of laboratory tests ordered per hospital day.

**Objectives:** (1) To determine the absolute cost reduction (ACR) in the average cost per admission days due to CBC and BMP ordering before and after intervention. (2) To determine and compare the total number of laboratory tests (CBC and BMP) ordered per admission days, before and after the intervention. (3) To compare (1) and (2) amongst three physician groups, residents, hospitalists and private physicians

**Results:** There were 19,380 orders for CBC and BMP during the pre-intervention period compared to 17,848 during the post-interventional period. The ACR was 8.32 (2.95-13.70), p 0.002 with an estimated cost savings of $139,000 over the 3-month period. ACR was largest amongst the residents [ACR 17.14(4.12-30.16), p 0.01], hospitalists [ACR 13.17 (3.76-22.57), p 0.01], private physicians [ACR 4.85(-2.15-11.84), p 0.174]. The incidence rate ratio (IRR) for total number of labs per admission days was 0.98 (0.92-1.05), p 0.64 after adjusting for physician groups. Subgroup analysis showed favorable trend for residents though not significant; [IRR 0.99 (0.89-1.10), p 0.870.], hospitalist [1.04 (0.93-1.17), p 0.490] and private physicians [1.00 (0.93-1.08), p 1.00]. After adjusting for physician group CBC ordering pattern was not different pre or post interventional [IRR 1.01 (0.944-1.08), p 0.78], there was a non-significant favorable trend toward reduction in BMP orders after adjusting for physician group [RR 0.96(0.90-1.02), p 0.27]

**Discussion:** Our study demonstrates that a simple intervention such as post-it on HVC coupled with HVC awareness education can help reduce the cost of care. The greatest effect was seen in the resident group attesting that introducing HVC during training is likely to alter future ordering habits and help reduce the cost of care. Though there was a non-significant trend toward reduction in lab ordering, it was financially significant ($139,000). Thus minor reductions in wasteful tests are likely to produce huge healthcare cost savings. Future research should include radiologic testing. Such research in the future should adjust for disease burden in the pre-interventional and post-interventional period.

**Conclusion:** Low cost interventions such as post-its on HVC along with heightened HVC awareness is effective in reducing health care costs.
Supersize This - Improving Resident Communication about Obesity in the Outpatient Clinic

First Author: Nirmol Philip, MD Tara Edwards-Booker DO, Matthew Lunser DO, Jung Kim RN, Evalyne Mwangi RN, and Dennis Shaw, PA-C, Edward Ewen MD

Introduction: Obesity is growing faster than any public health issue, and obese patients incur up to a 46% increase in inpatient costs. While physician discussion of healthy weight during office visits is critical, research demonstrates that the most effective behavioral weight loss treatments involve in-person, high-intensity, comprehensive programs provided by trained interventionists. This study aimed to 1) understand how often obesity is addressed by internal medicine residents in the outpatient setting; and 2) increase resident discussion of weight loss with obese patients by 50% over a two week period, through resident education and provision of a weight loss referral guide.

Methods: We conducted the study at the Adult Medicine Office (AMO), which is staffed by approximately 65 internal medicine residents and additional faculty and cares for >3,500 patients. Nearly half (48%) of AMO patients are obese (defined as body mass index (BMI) =30, compared to the national average of 33%. We surveyed residents initially to measure their self-reported frequency of weight loss discussions with obese patients.

During a two-week pre-intervention period, using our electronic medical record we measured whether residents documented obesity as a problem addressed during the office visit, which served as a proxy for discussion of obesity. We re-measured this documentation during a two-week post-intervention period, and compared the two periods using the Mantel-Haenszel chi square test. Our intervention involved creating a brochure with local weight loss resources that included descriptions, costs and contact information. We also launched a “BMI >30? Refer!” campaign, featuring a 10-minute presentation to residents about the intervention, the costs and morbidities associated with obesity, and the important role physicians can play in helping patients achieve effective weight loss.

Results: Of the 57 residents surveyed, over two-thirds admitted to addressing weight loss in obese patients less than 20% of the time during an office visit. Time limitations were cited as the major reason (37%). Of 276 obese patients seen during our pre-intervention period, residents listed obesity as problem 7.9 % of the time. During the post-intervention period, 257 obese patients were seen with documentation of obesity increasing to 14.8% (p=0.01).

Conclusion: Providing residents with education and information about community weight loss resources increased the frequency of obesity discussions with patients. Not only did our intervention directly address the time limitation cited by residents as a frequent barrier, but the information provided to patients can help connect them with multi-faceted programs that research has shown to be effective for weight loss.
DELaware poster finalist - research Xian Qiao, MD

Reflex to Urine Culture: Truncating the Time Taken to Transport the Tinkle to the Testing

First Author: Xian Qiao, MD Joseph Santora, DO Gealina Dun BS MS3 Kavita Patel, PharmD Alicia Edelblute, PA-C Nora Protokowicz, MSN, RN Allison Steuber, MSN, RN, CEN Loretta Consiglio-Ward, MSN John Powell, MD

Introduction: Complicated urinary tract infections (UTIs) are a common reason for Emergency Department (ED) visits, often leading to the initiation of empiric broad-spectrum antimicrobials and admission to the hospital. In our institution, if urine cultures are not ordered within two hours of the urinalysis (UA), the samples are discarded and must be recollected. This delay in urine culture plated times can often lead to prolonged use of empiric antimicrobials, along with patient and staff dissatisfaction. We sought to improve the delay in culture results by optimizing the time between UA and urine culture plating times.

Methods: Prior to our intervention, we determined the mean and median times between UA and culture plating time for 50 males presenting with symptoms of UTI over a 2-week period. We defined a positive UA per modified Centers for Disease Control and Prevention (CDC) surveillance criteria (positive nitrites, positive leukocyte esterase or presence of organisms). Working with our ED physicians and laboratory technicians, we implemented a method to automatically send (reflex) positive UAs for culture. Providing daily education to our laboratory staff, we tested this reflex method for a two-week period. We compared the mean and median times between urinalysis and urine culture to our baseline data.

Results: Among the pre-intervention group (n=50), the time between UA and culture plating ranged between 31–1020 minutes, with a median time of 128 minutes, and an mean time of 234 minutes. During the intervention, 35 UAs were successfully reflexed. The UA to culture plating time ranged between 28-388 minutes; the median time was 65 minutes and the mean time was 85 minutes. This represented a reduction of 49.2% and 63.7% in median and mean times, respectively. Overall, 83% of the reflex urine cultures were under the 2-hour criteria, compared with just 46% at baseline.

Conclusions: Reflexing reduced the time between urinalysis and urine culture at our institution. The impact of our intervention on the overall cost, initiation and duration of antimicrobials, and patient and staff satisfaction remains uncertain. Multiple studies have shown that correctly tailored antibiotic use can decrease mortality, length of hospital stay, and overall healthcare cost. Determining the impact of the intervention on our patient population will be the next step in our study.
Positive predictive value of elevated troponin for diagnosis of acute coronary syndrome

Lucas A. Burke MD, Nayan Agarwal MD, Carsten Schmalfuss MD, David E. Winchester MD

**Background:** Cardiac troponins are highly sensitive for detection of myocardial necrosis and considered the reference standard for diagnosing acute coronary syndromes (ACS). Due to high sensitivity and widespread use in patients with low likelihood of ACS, the positive predictive value (PPV) of elevated troponin for determining ACS may be limited. There is little evidence in the medical literature pertaining to the positive predictive value of troponins after evaluation by a Cardiologist.

**Methods:** From 2006-2007, all patients with elevated troponin (> 0.01 ng/dL) at our facility were evaluated by an attending cardiologist within 24 hours of a positive troponin in order to determine the presence or absence of ACS. Patients were then tracked during their hospitalization and relevant data were gathered prospectively in a database maintained for quality purposes. We conducted a cross sectional investigation of patients in this database to ascertain the PPV of elevated troponin for diagnosing ACS. Baseline characteristics and symptoms for patients with and without ACS were compared. Multivariate logistic regression was performed to determine correlations between the diagnosis of ACS and patient characteristics, symptoms and other objective findings.

**Results:** 1018 patients were included. Mean initial troponin value was higher for patients with ACS (0.42 versus 0.13, p < 0.0001). Overall, the PPV of elevated troponin for diagnosing ACS was only 29.8%. The PPV varied widely depending on the initial symptom reported (highest, chest pain 48.8%; lowest, low energy 2.3%). Few patient characteristics were correlated with ACS, including smoking (odds ratio [OR] 5.71, 95% confidence interval [CI] 3.50-9.31, p < 0.0001), and hyperlipidemia (OR 1.64, 95% CI 1.24-2.17, p=0.001). New electrocardiogram changes (OR 6.44, 95% CI 4.37-9.50, p<0.0001) and troponin value greater than 10 fold above upper limit of normal (OR 7.10, 95% CI 3.40-14.81, p<0.0001) were correlated with ACS. The only symptom correlated with ACS was chest pain (OR 5.00, 95% CI 3.51-7.14).

**Conclusion:** Elevated troponin alone has weak PPV for diagnosing ACS when adjudicated by an attending cardiologist. Troponin elevations were observed with various presenting symptoms, and the PPV was dependent on chief complaint. New electrocardiogram changes, level of troponin elevation, chest pain, and smoking were strongly correlated with the diagnosis of ACS. This is a unique report evaluating the positive predictive value of troponins in all comers who were followed prospectively by a Cardiologist.
Clinical Laboratory Practices in Speciating Organisms and Reporting Results of Voided Urine Cultures

First Author: Maroun Sfeir, MD Thomas Hooton, MD

Background: Studies comparing midstream voided and catheter urine specimens in symptomatic women have shown that colony counts of E. coli as low as $10^2$ CFU/mL in midstream voided urine (MSU), even when in mixed growth, are predictive of bladder infection. Given that clinical laboratories generally do not quantify organisms in MSU cultures to this level, the use of MSU cultures in the diagnosis of cystitis may lead to inappropriate interpretation of culture results. We queried laboratories to ask about their MSU culture and reporting practices.

Methods: A convenience sample of clinical microbiology laboratories in Miami, Florida, and nationally were queried. We called the laboratories to ask the microbiology laboratory manager and/or the clinical microbiologist about their practices in speciating and reporting results of MSU cultures and to send us any written algorithms relevant to such practices.

Results: We queried 11 local and 3 national clinical microbiology laboratories for our study. We were able to talk by telephone with laboratory personnel in all 14 laboratories to obtain study information, but only 8 laboratories sent us their MSU culture algorithms. No laboratory refused to provide us with information. Results are shown in the Table.

Table: Species identification and reporting of organisms growing in MSU.

<table>
<thead>
<tr>
<th>No. organisms grown and colony counts</th>
<th>No. (%) of labs speciating and reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 or more organisms at any colony count</td>
<td>0 (0)*</td>
</tr>
<tr>
<td>2 or less organisms, CFU/mL for either or both</td>
<td></td>
</tr>
<tr>
<td>• More or equal to $10^4$ CFU/mL</td>
<td>• 14 (100)</td>
</tr>
<tr>
<td>• $10^3$ - $10^4$ CFU/mL</td>
<td>• 1 (7.1)†</td>
</tr>
<tr>
<td>• &lt;$10^3$ CFU/mL</td>
<td>• 0 (0)‡</td>
</tr>
</tbody>
</table>

*9 laboratories report such cultures as “mixed flora”, 3 “contaminated urine” and 2 “multiple organisms present”; 5 of 14 also suggest to repeat the specimen

†4 other laboratories report growth at $10^3$ - $10^4$ CFU/mL but don’t speciate; 9 report as “no growth”

‡9 report “no growth”; 5 report “<$10^3$ CFU/mL of unidentified organism”

Conclusion: Only one of 14 clinical microbiology laboratories speciate and report organisms in MSU if 2 or less organisms grow at $10^3$-$10^4$ CFU/mL, and none do if 3 or more organisms grow at any colony count. Lack
of awareness by clinicians as to how their clinical microbiology laboratory reports MSU results may result in misinterpretation of such results, including underdiagnosis of low colony count or mixed growth *E. coli* UTIs.
College Education is an Independent Predictor of Survival in Patients with Heart Disease or Cardiovascular Risk Factors Who Undergo Left Heart Catheterization

First Author: Mosaab Awad, Salim S. Hayek, Yi-An Ko, Badr Harfouch, Andrea D. Soto, Adithya Yadalam, Aneese Chaudhry, Kareem Hosny, Natasha Anoka, Ganiat O. Adeogun, Kirandeep Dua, Sean T. Healy, Arshed A. Quyyumi

Introduction: Population level studies have shown a strong association between socioeconomic status and survival in patients with coronary artery disease (CAD). In industrialized nations, individuals with lower education, lower income, and blue collar occupations have higher mortality rates. Whether the level of education is an independent predictor of survival in patients with CAD is however unclear. We hypothesized that patients with CAD and a history of college education will have improved long-term survival compared those who did not receive any college-level education level independent of traditional cardiovascular risk factors.

Methods: 5552 patients who underwent left heart catheterization (LHC) between 2004 and 2013 at 3 different sites of the Emory Healthcare system were recruited after informed consent as part of the Emory Biobank prospective cohort. Demographics, education level and clinical characteristics were collected using questionnaires as well as medical record review. Enrolled patients were followed-up at 1 and 5 years post-LHC, for collection of outcomes. Information on death was obtain through family contact, medical record review and social security death index search. For the purpose of analysis, patients were stratified by education level as a binary variable (with or without college education). Demographics and clinical characteristics were compared. Multivariable survival analysis was performed using Cox regression, adjusting for age, race, employment status, history of smoking, diabetes mellitus, history of myocardial infarction, and presence of >50% stenosis of any major vessel of LHC.

Results: The cohort consisted of predominantly older (63±12 years), male (64%), white (76%) patients with CAD on LHC (65%). Over half (57%) of patients had at least some level of college education. Those with college-level education were more likely to be male (69% vs 59%), white (82% vs 76%), with less smoking (53% versus 63%) and had lower prevalence of CAD (63% vs 67%) as well as diabetes (32% vs 38%) and hypertension (68% vs 62%), p<0.001 for all comparisons. By the time of writing there were 737 deaths in the cohort, 337 in the college education group with a mean survival of 8.5 years post-LHC (95%CI 8.2-8.7) and 400 in the no-college group with a mean survival if 7.8 years (95%CI 7.6-7.9), Log-rank p<0.0001. On multivariable analysis, college education status imparted a HR of 0.69 (95%CI 0.59-0.81), p<0.0001 after adjusting for the aforementioned confounders.

Conclusions: Older patients with CAD and a history of college education had a lower burden of cardiovascular disease compared to those without a college education. Most importantly, college education as a discrete indicator of socioeconomic status was an independent predictor of survival in this cohort. While the reasons underlying this is unclear, one may speculate that college education imparts better awareness of their clinical condition, leading to better compliance with medication regimen and lifestyle changes.
Performance of Oxygen Saturation Index in Adults with Type 1 Respiratory Failure

Anthony Otekeiwebia MD, Oluwatosin Ajao, MD., Iwayemi Olayeye MD., Marilyn Foreman FCCP.

Introduction: Given recent advances in technology, pulse oximetry is increasingly taking the place of arterial blood gas monitoring as a noninvasive marker of lung disease severity in patients with hypoxemic respiratory failure. Our objective was to examine the performance of oxygen saturation index (OSI): \( \text{FiO}_2 \times \text{mean airway pressure} / \text{SPO}_2 \) to oxygenation index (OI): \( \text{FiO}_2 \times \text{mean airway pressure} / \text{PaO}_2 \) in a cohort of adults with type 1 respiratory failure.

Method: We performed a retrospective analysis of 127 mechanically ventilated patients admitted to our ICU with hypoxemic respiratory failure between 2010 and 2013. Simultaneous blood gas, pulse oximetry and ventilation settings were retracted from the database. \( \text{PaO}_2 / \text{FiO}_2 \) ratio (PF), OSI and OI were calculated. A linear mixed modeling was used to derive predictive equation for OSI between OI and OSI. Model performance was evaluated using the areas under receiver operating characteristic curves for diagnosis of PF ratio = 100, 200, and 300.

Result: Four hundred and forty one blood gas and Spo2 values from 127 patients were included. OSI had a strong linear association with OI, given by the equation OSI = 0.6075 X OI + 3.4489 (\( R^2 = 0.882, \ P<0.001, \ 95\% \ CI \ 0.587-0.628 \)). Oxygen saturation index as measured by \( \text{FiO}_2 \times \text{mean airway pressure} / \text{SPO}_2 \) values for OI of 5.3 and 8.1 were 6.7 (95% confidence interval [CI], 6.56-6.77) and 8.4 (95% CI, 8.20-8.52). OI cut off for severe hypoxemia; defined as PF=100 was 12.8 (sensitivity 94.2% and specificity of 90.1%). A corresponding OSI for OI of 12.8 was 11.2 (95% CI, 10.96-11.49). Areas under receiver operating characteristic curves for diagnosis of PF ratio less than 100, 200, and 300 with the OSI were 0.922, 0.869, and 0.787 respectively.

Conclusion: Oxygen saturation index is an adequate noninvasive surrogate marker of oxygenation dysfunction among adults with Type 1 Respiratory Failure and would be a good substitute for oxygenation index in adults with acute hypoxemic respiratory failure.

Study Implication: Oxygen saturation index has demonstrated to be an equally reliable marker of oxygenation dysfunction in adults. This would perhaps decrease the need for invasive oxygen monitoring in critically ill patient with hypoxemic respiratory failure.
Circulating progenitor cells are an independent predictor of coronary artery disease progression

First Author: Ayman Samman Tahhan 2nd Author: Salim Hayek 3rd Author: Muhammad Hammadah 4th Author: Danny J Eapen 5th Author: Riyaz Patel 6th Author: Arshed Quyyumi

Background: The pathophysiology of coronary artery disease (CAD) progression in patients on optimal medical therapy is not fully understood. CXCR4/CD34 is expressed on progenitor cells (PCs) and plays an integral role in their homing and mobilization. We hypothesized that progression of CAD will be greater in patients with lower levels of PCs.

Methods: We studied 103 patients, recruited from the Emory Cardiovascular Biobank, with significant CAD (at least one vessel = 50% stenosis on angiography) documented by two or more angiograms at least 6 months apart. Mononuclear cell levels (CD45 medium) with CXCR4/CD34 ligand were enumerated using flow-cytometry microbead approach on the day of the angiography. Gensini coronary severity scores (GS) were calculated for each angiogram and progression was assessed using net change of GS per year. Patients were categorized as “progressors” if they had an absolute net increase of 5 units per year in the GS. Regression models were adjusted for established CAD risk factors, prior myocardial infarction (MI), baseline GS, and number of stents. Patients with acute MI were excluded. C-Statistic was calculated for a model of established risk factors with and without PCs levels.

Results: The mean age of the cohort was 69 ± 11 years (74% were males, and 56% had history of prior MI) with a mean duration between angiograms of 6.7 ± 4 years. Patients with CAD progression 37/102 (36%) displayed lower levels of PCs with a median of 731 cells/milliliter (482-1456) as compared to non-progressors with a median of (960 cells/milliliter (751-1587), p = 0.03). For each 10% reduction in PCs, the risk of having progression increased by 9.1% (p=0.013). The C-statistic improved over a model of established risk factors from 0.715 to 0.776 (p= <0.01) with the addition of PCs counts.

Conclusions: In individuals with significant CAD on medical therapy, low levels of circulating CXCR4+/CD34+ expressed on mononuclear cells are associated with progression of CAD.
HAWAII POSTER FINALIST - RESEARCH Pamela Sebastian, MD, MBBS

Provider Orders for Life-Sustaining Treatment (POLST) Implementation and Training in Nursing Facilities in Hawaii

Pamela Sebastian, MBBS, MD; Elizabeth Freitas, APRN, OCN, ACHPN; Daniel Fischberg, MD, PhD

BACKGROUND A POLST document transforms medical wishes for end-of-life care into actionable medical orders. POLST programs have grown across the United States since 1991. This study was conducted to assess the extent of POLST implementation amongst nursing facilities in Hawaii. The Hawaii statute governing POLST was revised as of July 1st 2014 allowing APRNs, in addition to physicians, to sign the POLST document. Hence we also wished to assess POLST training across nursing facilities.

METHOD We performed a telephone survey using a modified instrument1. The survey instrument included questions about facility size, advance care planning processes, POLST training procedures, and the percentage of the units of the facility that had implemented a POLST program. A list of registered nursing facilities in Hawaii was obtained from the Department of Health website. Data were collected in July 2014 and results were tabulated for analysis. The study was approved by the Queen’s Medical Center and University of Hawaii Institutional Review Boards.

RESULTS Thirty-nine nursing facilities in Hawaii were called to participate in the study, of which 23 responded (59% response rate). The majority of the facilities (74%) were of moderate size (50-150 residents). All but one facility had a POLST program in place. Social workers and/or nursing staff usually held the POLST discussions. Thirteen of the 23 (57%) facilities had at least one APRN provider, of which 8 had APRNs involved in POLST discussions. In all but one instance, APRNs were also signing the document. The percentage of the units of the facility using POLST was reported to be over 50% for 20 out of 23 (87%) of nursing facilities surveyed with 10 (43%) of them reporting achieving 100% implementation rates. All facilities surveyed stated that their target implementation rate was 100%. Individualized counseling and facility-developed educational materials were the main methods of communicating and educating residents about POLST. Most facilities held training seminars on the POLST program with social workers and nurses being the focus for staff trained.

CONCLUSIONS The results of this study demonstrate significant penetration of the Hawaii POLST program into the nursing home community. All except one of the nursing facilities surveyed had a POLST program in place and of these most of them achieved over 50% implementation rates throughout the facility. Most nursing facilities required staff to undergo POLST training which largely targeted social workers and nursing staff. Some facilities reported APRNs are already involved in signing the POLST form, only weeks after their signatory capacity was enacted.

Correlation between Blood Glucose levels and duration of Mechanical Ventilation

First Author: Pakhadi H Buddhadev, MD, Mihir Shah, MD, Kushal Naha, MD, Jeffery Brower, MD, Harvey Friedman, MD.

Introduction: Uncontrolled hyperglycemia has been associated with poor outcomes in patients admitted to the Intensive Care Unit (ICU), but its impact on ventilator dependency in patients with exacerbation of chronic obstructive pulmonary disease (COPD) and/or congestive heart failure (CHF) is unknown. We conducted a retrospective study to determine whether an association exists between blood glucose levels and duration of mechanical ventilation in this population of patients.

Methods: Patient charts were reviewed using Electronic Health Record (EHR) system. Subjects admitted at St Francis Hospital between January 2011 and December 2012 with a diagnosis of COPD and/or CHF exacerbation and were intubated within 48 hours of presentation were included in the study. Patients requiring vasopressors and/or tracheostomy, pregnant patients, patients younger than 18 years of age and patients who did not survive were excluded. Subjects were divided into three groups based on mean fasting glucose levels: 70-110 mg/dl (group 1), 111-150 mg/dl (group 2) and >150 mg/dl (group 3). Clinical data and laboratory parameters including steroid usage, history of smoking, BNP level at admission and therapy with bronchodilator and diuretic was recorded for all the patients. Hypoglycemic episodes were also noted if any. The primary end point was defined as successful extubation. Data analysis was performed using SPSS software with one-way ANOVA test, chi-square test, Spearman correlation and multinomial regression analysis.

Results: Forty eligible patients were included in the study with six, fifteen and nineteen patients in groups 1, 2 and 3 respectively. ANOVA test showed statistically significant difference in mean duration of ventilation between the three groups (1.67±0.8 vs 2.87±1.8 vs 4.05±2.5; p=0.047), as well as significant difference in BNP level at admission (p=0.027). Multinomial regression analysis confirmed independent association between blood glucose level and duration of ventilation. Spearman test also showed positive correlation between duration of ventilation and mean fasting blood glucose (R=0.52, p=0.001).

Conclusion: Blood glucose level is independently associated with duration of mechanical ventilation in patients with COPD and/or CHF exacerbation, with a positive correlation between rising blood glucose levels and prolonged need for ventilation. Hyperglycemia increases the chances of developing sepsis and critical illness neuropathy, which is related with increased duration of mechanical ventilation. Our study showed that blood glucose above 150 mg/dl was associated with an increased duration of mechanical ventilation.
IF YOUR PATIENT HAS-BLED, DID YOU CALCULATE THE CHA2DS2-VASc SCORE?

Briana T. Costello MD, Jordan Harris MD, Jason Rodriguez MD, Ann Goh MD, Sarah Alexander MD, Kousik Krishnan MD, FACC, FHRS

Introduction: An estimated 2.66 million people had atrial fibrillation (afib) in 2010 and this number is projected to grow to nearly 12 million by 2050. Physicians deal with afib often in their clinic and the hospital setting. While stroke risk from afib gets more attention, one cannot ignore the major bleeding risk associated with anticoagulation. Stroke risk is widely assessed through the use of CHADS2 or CHA2DS2-VASc scoring. The HAS-BLED scoring system is validated tool used to assess one-year major bleeding risk. These two scores together can aid in the decision to start anticoagulation. It is hypothesized that incomplete assessment of stroke and bleeding risk results in inappropriate clinical decisions.

Methods: Retrospective chart review was conducted on 250 consecutive patients with afib admitted to a tertiary medical center. CHA2DS2-VASc and HAS-BLED risk factors, medication regimens on admission and discharge, and warfarin teaching occurrence were collected. Risk scores were calculated.

Results: Stroke and bleeding risk were documented for 53% and 4.8% of patients, respectively. Averages for CHADS2, CHA2DS2-VASc, and HAS-BLED score were 2.52, 3.7, and 2.57 respectively. On admission, 60% of patients with CHADS2 score greater than HAS-BLED score were on anticoagulants; 46% of patients with HAS-BLED score greater than CHADS2 were on anticoagulants. On discharge, 73% of patients with CHADS2 greater than or equal to HAS-BLED were on anticoagulants; 51% of patients with HAS-BLED greater than CHADS2 were on anticoagulants. Patients at risk for stroke (no anticoagulation with CHADS2 = 2) improved from 40% on admission to 27% on discharge. Fifty percent of patients with HAS-BLED scores greater than CHADS2 were discharged on anticoagulation. Average annual stroke risk for the patient populations was 4.6% and annual bleeding risk was 1.8-3.7/100 patient years (2.3% per year). Warfarin teaching was documented in 34% patients.

Discussion: This analysis supports that physicians document stroke risk much more frequently than bleeding risk and that decision making to start anticoagulation is still not ideal when comparing the bleeding and stroke risk. Many patients with bleeding risk greater than stroke risk were started on anticoagulation while bleeding risk is often not documented. These findings reveal a potential gap in our clinical decision-making and present an area for quality improvement. To address this, the authors created an afib order set to be used in the electronic medical record with mandatory documentation of CHA2DS2-VASc and HAS-BLED scores. Included are definitions and parameters of each scoring system and each score’s risk. Afib medications, pertinent labs and patient teaching are also included. It is the authors’ hope that this intervention will reinforce the need to address both bleeding and stroke risk before starting anticoagulation. A retrospective analysis to evaluate effectiveness of this quality measure will take place in the future.
ILLINOIS POSTER FINALIST - RESEARCH Manjusha Das, MD

Antibiogram of VRE causing Urinary Tract Infections as a retrospective study from MMC, Springfield Illinois

Das, Manjusha M.D., Sundareshan, Vidya M.D. M.P.H, Southern Illinois University

The prevalence of Vancomycin-resistant Enterococci (VRE) has steadily been increasing in the hospital setting for nosocomial infections. Data from the Centers for Disease Control and Prevention reported that during 2006 and 2007, 30% of all enterococci infections within hospitals in the United States are VRE. Of the total percentage of VRE, approximately 80% are species *E. faecium*. The objective of our study was to determine the prevalence of VRE at our institution and determine the best therapy for treatment based on the susceptibilities to a panel of antimicrobials.

We performed a retrospective analysis of any enterococci isolate found in the urine from August 2012 to August 2014 at Memorial Medical Center, in Springfield Illinois. The microbiology department used the VITEK system which is a microbial identification system to determine the susceptibilities to each of the isolates found. The isolates were then broken down into those susceptible and those resistant to a select group of antimicrobials, thus generating an antibiogram for each isolate. The antimicrobials which were tested included: gentamicin, streptomycin, nitrofurantoin, daptomycin, linezolid, ciprofloxacin, levofloxacin, erythromycin, tigecycline, tetracycline, and doxycycline. The results showed a total of 180 enterococci isolates collected from urine cultures. Of these 180, nearly 60% were *E. faecium* and 40% were *E. faecalis*. Of the *E. faecium* group 94% were resistant to ampicillin and 100% produced beta lactamase. From the *E. faecalis* group 100% were susceptible to ampicillin and 100% were beta lactamase producers. Further data analysis is currently in process to stratify which of these isolates were symptomatic UTIs versus colonization as well as which antibiotic was used for treatment.

Our results so far are comparable to those found nationally, where *E. faecium* was the predominant organism isolated which was also found to be more resistant to ampicillin compared to *E. faecalis*. Daptomycin is the preferred agent for treatment of ampicillin resistant VRE, however there are many downsides to the use of it. There is a lack of FDA approval for *E. faecium* infections, and inability to concentrate in the genitourinary system. Other antibiotics have the risk of toxicity the drug interactions, and the cost limit the use of linezolid and quinupristin/dalfopristin in treatment of VRE, especially with prolonged use. Ampicillin resistant strains, which produce beta lactamase, can be treated with ampicillin with sulbactam, and aminopenicillins should be considered first-line therapy for empiric treatment of ampicillin sensitive enterococcal UTIs, with the exception of penicillin allergy or recent *E. faecium* infection. Further research is to be completed in evaluating overall outcomes in those enterococci infections which were treated but the results will help in VRE associated UTI treatment guidelines. This would ideally aid in clinician awareness, supporting antimicrobial stewardship goals, and in treatment direction.
Preparing for the Primary Care Clinic: An Ambulatory Boot Camp for Internal Medicine Interns

Lindsay Esch MD, Amber Nicole Bird MD, Julie Oyler MD, Wei Wei Lee MD, Sachin Shah MD, Amber T. Pincavage MD

**Background**: Fourth year medical students often have limited exposure to primary care education in their last year of medical school and interns often report being unprepared to start internal medicine continuity clinic. Although boot camps have been used at the beginning of post-graduate training programs to improve preparedness and clinical skills for clinical work, there has not been adequate research regarding how to best prepare interns for primary care clinic. Thus, we created and implemented an ambulatory boot camp.

**Aim**: To implement and assess the impact of an intern ambulatory boot camp on primary care knowledge, confidence, and curricular satisfaction.

**Methods**: During July 2014, 38 internal medicine interns attended ambulatory boot camp prior to starting primary care clinic. The boot camp included one half day of clinically focused case-based didactic sessions on common ambulatory topics including diabetes, hypertension, hyperlipidemia, health maintenance screening, shoulder pain and knee pain. This was followed by another half day of orientation to the clinic, outpatient team and EMR. To evaluate the curriculum, interns anonymously completed a 15 question pre-test on topics covered in the boot camp and were re-assessed with an identical post-test after the boot camp. The interns were also surveyed regarding their confidence, satisfaction with the boot camp experience and exposure to ambulatory education in medical school.

**Results**: There were 38 interns who participated in boot camp and all (100%) completed tests and surveys. Prior to the boot camp, few interns reported confidence managing common outpatient conditions: 55% for hypertension, 50% for hyperlipidemia, 42% for health maintenance screening, 32% for diabetes, and 11% for musculoskeletal complaints. Only 15% of interns felt they had received sufficient training in medical school to manage primary care patients. On average, the interns reported 2.9 months of primary care clinic rotations during medical school. At the time of boot camp, it had been 15 months since their last primary care clinic experience on average. The average pre-test knowledge score was 6.95/15 (46.3%). After the boot camp, the average post-test knowledge score significantly improved to 11.42/15 (76.1%) (p<0.001). After completion of the boot camp, 100% of interns reported that the boot camp was good preparation for ambulatory clinic, 100% felt that ambulatory boot camp should be a required component of internship, and 97% felt that the lectures boosted their confidence in managing common conditions encountered in the primary care clinic.

**Conclusions**: The intern ambulatory boot camp improved intern knowledge of commonly encountered medical topics in the primary care clinic. The participants thought it was good preparation for the ambulatory clinic and it should be a required component of internship. The intern ambulatory boot camp may be an effective way to improve the preparation of interns for primary care clinic.
Risk of Crohn’s Disease Recurrence after Surgical Resection: Implications of Tobacco Use and Preoperative Corticosteroids

First Author: Adriana G Olariu, MD 1,2 Richard Hodin, MD 2 Liliana Bordeianou, MD 2 1, Department of Medicine, Resident, Louis Weiss Memorial Hospital, Chicago, IL 2, Department of Surgery, Massachusetts General Hospital, Boston, MA

Introduction: Up to 30% of patients with Crohn’s disease (CD) experience postoperative recurrence within 1 year after ileocolonic resection (ICR). We sought to describe the patterns of recurrence and identify the prognostic factors associated with higher risk of clinical recurrence (Harvey-Bradshaw index \( \geq 8 \)).

Methods: A total of 170 consecutive CD patients (2008-2014) treated with ICR at Massachusetts General Hospital were included. Outcomes including endoscopic, clinical and surgical recurrence were recorded. Cox proportional hazard regression models were used to identify the clinical, pathological, and environmental variables that predict clinical recurrence.

Results: After a median follow-up of 30.5 months (interquartile range, 10.8-51.75 months), 103 patients (58.9%) developed disease recurrence. Endoscopic recurrence was identified in 89 patients (50.3%), and confirmed by biopsy in 70 patients (78%). Clinical recurrence occurred in 53 (30.3%) of all patients and 10 patients (5.7%) required a new surgical intervention for their disease. Cox regression models identified 4 variables associated with increased risk of clinical recurrence: smoking in the 6 months prior to surgery (HR=2.36, 95% confidence interval [CI] 1.32-4.23; P=0.03), presence of comorbidities (Charlson Comorbidity Score \( \geq 1 \); HR=1.98, 95% CI 1.09-3.57; P=0.02), preoperative use of corticosteroids (HR=2.07, 95% CI 1.15-3.71; P=0.01) and inflammation at the resection margin (HR=2.06, 95% CI 1.12-3.79; P=0.02). The effect of preoperative corticosteroids use was dose-dependent (HR=1.76-6.78, P<0.001). Disease location, behavior, and history of prior resection did not increase the risk of recurrence (P>0.1, all).

Conclusion: Corticosteroid-dependent CD patients appeared to have higher risk of postoperative clinical recurrence, with risks increasing further in smokers with medical comorbidities and positive inflammation at margins. It remains unclear whether corticosteroid taper prior to surgery would make a difference in recurrences, though dose-dependent corticosteroid effect is suggestive of this possibility.
Rates of infection for single vs multilumen peripherally inserted central catheter: A systematic review

First Author: Karthik Ragunathan, MD Other Authors: Nikhil Kalva MD, Lori Grooms RN , John Farrell MD

Background: Central line associated blood stream infection (CLABSI) related to peripherally inserted central catheter (PICC) are associated with prolonged hospital stay, hospital readmissions, intravenous antibiotics and repeat procedures which can result in unnecessary costs to the healthcare system. Data regarding the CLABSI rates in PICC based on the number of lumens are available in very few studies. However there is no systematic review comparing infection rates between single and multi lumen PICC.

Objective: To determine if multilumen PICC carry higher risk of CLABSI when compared to single lumen PICC

Design: MEDLINE, EMBASE, and SCOPUS were searched to identify potential articles published from 1946 to October 2014. MeSH headings included in the search were peripherally inserted central catheter, PICC, infection, CLABSI, lumen. References from the identified articles were also reviewed. Studies comparing the prevalence of CLABSI among single-, double-, and triple-lumen PICCs were included. Studies that reported infection rates in only one type of PICC lumen, studies reporting infections in central line infections other than PICC were excluded.

Patients: Adult patients in inpatient and outpatient settings who received a PICC line.

Main Outcome Measurement: odds ratio of CLABSI rates in multi lumen vs single lumen PICC

Results: 360 articles were identified from the literature search, out of which 40 articles were selected from further review. A total of 5 articles met the inclusion criteria. Total number of patients who were included in the analysis under single, double and triple lumen categories altogether was 5966. All the 5 studies reported CLABSI rates in inpatient setting and four of the five studies were from patients admitted to large tertiary care referral hospital. CLABSI was more common in triple lumen (summary odds ratio, 5.5; 95% confidence interval 3.8 to 7.9) when compared to single lumen. Similarly, CLABSI was more common in double lumen (summary odds ratio, 2.0; 95% confidence interval 1.4 to 2.8) when compared to single lumen PICC. Both the results were statistically significant (p<0.0005)

Limitations:
1. No randomized studies available.
2. Studies are predominantly from large tertiary care referral hospitals and may represent a high risk population.
3. No published studies reporting CLABSI rates in outpatient settings.

Conclusion: Multilumen PICC is associated with a higher risk of infection when compared with single-lumen PICC. Applying the results of this systematic review to clinical practice can help physicians and residents to reduce the unnecessary costs associated with CLABSI from PICC. Although multi lumen PICC provide more convenience for drug administration and blood draws, clear justification should be applied
before choosing multi-lumen catheters in place of single lumen catheters to reduce the infective complications.
Impact of Evidence-Based Guidelines for Management of Clostridium Difficile Infection

Emily Cochard, MD Carol Rupprecht, MD Stephen Knaus, MD Lindsay Saum, PharmD

Clostridium difficile infection (CDI) is a prevalent and potentially fatal cause of infectious diarrhea in hospitals, thus responsible for a significant cost to the healthcare system and adverse patient outcomes.

In order to follow best evidence for treatment of CDI and improve quality care and patient outcomes, a group of internal medicine faculty, residents and pharmacists reviewed relevant literature to devise a set of evidence-based diagnosis and treatment guidelines for the teaching hospitalist service. These guidelines were publicized via a noon conference, an email, an internal website and a resident handbook. The guidelines emphasized severity-based treatment and provided institution-specific guidance for infection control and diagnosis of CDI. We analyzed data on all patients (79) treated for CDI at our hospital in a three-month period after publication of the updated guidelines in 2013. Outcomes examined included length of stay after diagnosis (mLOS), mortality, cost and readmission rate in the group of patients treated with guideline-based therapy and those not treated with guideline-based therapy. For patients treated with guideline-based therapy, the mLOS was shorter (7.45 days vs. 7.9 days), 30-day readmission rate was lower (29% vs. 38%), and mortality rate was lower (3.2% vs. 6.3%). Cost in the group treated with guideline-based therapy, however, was higher. None of these results reached statistical significance. The patients in the group treated with guideline-based therapy were more ill, as evidenced by a higher risk of mortality index. Interestingly, despite the educational resources provided, resident and hospitalist physicians followed guideline-based therapy only 45.2% of the time.

Residents (11 respondents) were surveyed after the most recent conference on the CDI guidelines. On a 5-point Likert scale, residents reported that the conference was educationally beneficial (4.18) and that attending the conference would change their management (4.36).

This study analyzed the effect of a best-practice guideline for treatment of CDI on patient outcomes and educational benefit within a hospitalist service in a teaching hospital. We discovered trends toward improved outcomes, but they did not reach statistical significance. We propose that development of best practice guidelines for quality care within an internal medicine residency program can improve education of residents and management of patients with CDI.
Evaluation of discrepancies in statin use recommendations between ATP3 and ACC/AHA lipid guidelines in a primary care population

Stephanie N Martin, MD, Amanda J Place, PharmD, BCACP, Karie A Morrical-Kline, PharmD, BCACP, Victor Collier, MD, FACP

Introduction: In 2010, over 700,000 people died of heart attack or stroke. This highlights the importance of preventing these common conditions. Controlling modifiable risk factors, such as low density lipoprotein (LDL) cholesterol, is one strategy to reduce these outcomes in atherosclerotic cardiovascular disease (ASCVD). Clinical trials show that use of HMG-CoA reductase inhibitors, or statins, reduce LDL and the risk of ASCVD. In November 2013 the American College of Cardiology and the American Heart Association (ACC/AHA) released new guidelines for treatment of cholesterol and reduction of ASCVD risk. These guidelines were a significant change from the 2002 Adult Treatment Panel III (ATP III) guidelines, as they shifted focus from risk based LDL targets to risk based percent LDL reduction. Multiple editorials published since then suggest the number of patients requiring treatment with statins will greatly increase but to date supporting evidence is lacking.

This study explores the hypothesis that under the new ACC/AHA cholesterol guidelines more individuals will qualify for statin therapy and those that do qualify will require higher intensity statin therapy.

Methods: This study was a retrospective chart review of patients age 40-75 seen in the Internal Medicine or Family Medicine clinics at the St. Vincent Primary Care Center (PCC) between November 2011 and November 2013 who had a lipid panel performed. The PCC is dedicated to caring for the underserved and teaching St. Vincent residents. Patient demographic and cardiovascular risk factor data were collected. Patient statin eligibility was assessed using ATP III guidelines and ACC/AHA guidelines in conjunction with the respective recommended risk calculators.

Results: Based on study eligibility criteria, 3,194 patients were identified. Of these, 301 patients were randomly selected and 299 were included in data analysis. At the time of their lipid panel, 202 patients were prescribed statin therapy and 97 patients were not. When comparing the two guidelines, over a quarter of patients not on statin treatment now qualify for statins (25.7%, p<0.001). Of the 97 patients on statins, 83 had sufficient data to calculate the appropriateness of statin intensity. Almost half of these patients (49.4%) now require higher intensity statin treatment. Subgroup analysis revealed that an additional 34 of 92 diabetic patients (37.8%) and an additional 39 of 101 patients (38%, p=0.019) older than 60 years now qualify for statin treatment.

Conclusion: Our study reveals that significantly more PCC patients qualify for statin therapy with the ACC/AHA guidelines than with ATPIII guidelines. Diabetic patients and the elderly were significantly more likely to be in this group. In addition, high intensity statins were recommended more frequently with the new guidelines. This data supports our hypothesis that the new guidelines will increase both quantity and intensity of statin prescribing in PCC patients.
The practice of ordering “serial markers” is ingrained in our practice culture. When a patient comes to the emergency room with any symptom remotely resembling cardiac symptoms at least one set of markers will be ordered, and as inpatient physicians any phone call of chest pain with prompt the reflexive statement “draw cardiac markers.” But what clinical value to these markers have and at what cost? Cardiac markers have been conventionally defined as a troponin along with CKMB or CK Panel (Total CK and CKMB). A cardiac marker series is held as three separate testing points usually six to eight hours a piece. This is done as the laboratory values are known to peak hours after injury has occurred. Historically CK and CKMB were the first identified possible markers of cardiac tissue injury. These markers however were not specific enough to the cardiac tissue and have since been replaced by Troponin as the primary marker of cardiac tissue injury. This replacement with Troponin as the standard is evident in our clinical conversations. Discussion amongst physicians concerns “what was the troponin” and does not include the other laboratory values. Despite the shift in how clinical decisions are made CKMB Panels have remained as part of the “serial marker” set. Saint Vincent Hospital Indianapolis is a 700 bed inpatient facility located in Indiana. The facility is the tertiary hub for a 16 hospital system covering central Indiana. Laboratory and billing information were reviewed for a 6 month period. The laboratory processed 11,901 Troponins and 11,349 CKMBs during this period. Inpatient billing charge for both of these labs were: $345.00 Troponin and $194.00 CKMB. Thus for a 6 month period in charges were created for cardiac markers. Of this in charges would have been from CKMB $2,201,706.00 in only 6 months. In the era of increasing cost conscience medicine and possible capitated care models providing high value care is going to be the gold standard of the future. One of the easiest places to improve care towards this goal is to examine practices that occur as part of a culture but do not actually influence clinical care or decision. Elimination of the CKMB from the standard cardiac marker series could eliminate as much as of charges to patients in a year’s time in one facility alone. The examination of the use of this one lab could, on a national scale, represent significant savings.
DETECTION OF ARRHYTHMIC EVENTS: AN ASSESSMENT OF SCREENING

First Author: Chad C Ward, MD Michael J. Mirro, M.D., F.A.C.S

**Background:** More than 25 million Americans have experienced arrhythmia symptoms such as palpitations, dizziness, syncope, chest pain, and fatigue: however, only 2.3 million patients currently have a diagnosed arrhythmia. Cardiac monitoring is important for diagnosis and treatment of arrhythmic events. Devices record/store cardiac electrical activity for analysis. We evaluated the effectiveness of placing symptomatic patients on a 24-hour Holter monitor vs. a 30-day event loop-recorder.

**Methods:** A retrospective chart review was conducted on 553 patients (387 Holter and 166 loop-recorders) monitored for arrhythmias between January 1st and June 30th, 2009. Information collected for each patient included age, gender, monitor type, indication, ordering physician, and relevant health history. Each monitor was examined for arrhythmias: diagnosis and treatment was also collected.

**Results:** 70.0% of patients wore Holter monitors while 30.0% wore loop-recorders. In the Holter group, 40.1% reported no symptoms, and 29.2% had symptoms unassociated with arrhythmic events. Significantly fewer loop-recorders reported no symptoms (24.1%, p = 0.001) and symptoms unassociated with arrhythmia (18.7%, p = 0.013). Symptoms were most commonly associated with PVCs in the Holter group and intermittent sinus tachycardia in the loop group. Non-cardiology physicians ordered 6.9 Holters to 1 loop-recorder. Among cardiologists, the ratio dropped to 1.6:1. Finally, 47/48 devices ordered in the ED were Holter monitors.

**Conclusion:**

4. 30-day event loop recorders are more efficient at detecting arrhythmias with greater correlation between symptoms and proven arrhythmias.
5. 24-Hour Holter monitors are more popular, especially among non-cardiology physicians.
6. The diagnostic yield of Holter monitoring is very low.

*This abstract was published in a collection of abstracts describing the research projects that students completed during the Midwest Alliance for Health Education Summer Research Fellowship Program affiliated with Parkview Health in Fort Wayne, Indiana.

**The results and conclusion of this research paper was used to help implement a new protocol in the Parkview Health Emergency Department to increase the utilization of 30-day event loop recorders for patients presenting with symptoms of an arrhythmia.
Effects of Revised Consultation Room Design on Patient-Physician Communication

Allison Baughman, M.D., Folaranmi Ajiboye, M.S., Fanglong Dong, Ph.D., K. James Kallail, Ph.D., Justin Moore, M.D.

Introduction: Outpatient facilities are the primary point of healthcare contact for many Americans. The outpatient consultation room design remains largely unchanged since World War II despite increased utilization and the adoption of technology-mediated information sharing in clinical encounters. The purpose of this study was to evaluate the impact of revised consultation room design on patient-physician interaction in the outpatient setting.

Methods: The Table And Bed Laboratory Experiment (TABLE) study was a randomized controlled trial that took place in the fall of 2013 at the Center for Internal Medicine, University of Kansas School of Medicine-Wichita (KUSM-W) resident clinic. The study used a post-visit questionnaire completed by 59 patients to assess 6 domains of interest (satisfaction with the visit and the consultation room; mutual respect; patient trust in the physician; communication quality; people-room interaction; and interpersonal-room interaction) in two different room designs (a traditional room and an experimental room in which a pedestal table had replaced the examination table).

Results: Interpersonal-room interaction was enhanced in the experimental room when compared to the traditional room \( (P = 0.0038) \). Participants in the experimental room reported better access to the computer screen, increased provider information sharing, and more time engaging providers in conversation about information on the monitor.

Conclusions: Changing the layout of a consultation room has the potential to improve interpersonal communication through better information sharing and through improving patients’ interpersonal-room interactions. Clinicians who are interested in maximizing the benefits of clinical encounters should consider changing the layout of their consultation room, especially the positioning of the computer screen.
KANSAS POSTER FINALIST - RESEARCH Kaitlin M Ditch, MD

Barriers to Enter Weight Maintenance

First Author: Kaitlin M Ditch, MD Frank Dong PhD., Bobbie Paull-Forney, R.N., B.S.N., M.P.H., K. James Kallail, PhD., Justin Moore, M.D.

Introduction: Over one third of Americans are obese, including 29.9% of Kansans. The amount of weight loss maintained is closely linked to individuals’ adherence to lifestyle modification. Individuals enrolled in formal weight loss programs tend to maintain a larger weight loss than persons not enrolled. This suggests that studies are needed to focus on factors to improve long-term adherence to weight loss programs.

Objective: The purpose of this study was to identify specific factors associated with individuals not entering the weight maintenance phase of a community-based weight loss clinic.

Methods: A list of individuals who completed a weight loss program at Via Christi Weight Management in Wichita, KS was generated. These individuals were mailed a survey which addressed demographic information and explored factors associated with not entering the weight maintenance phase. Chi-square analysis was used to identify risk factors which differed between the groups.

Results: Among the 78 individuals who responded to the survey, 64.1% (n=50) reported entering the weight maintenance phase. Responders were predominantly female (n=61; 78.2%) and white (n=73; 93.6%). Neither sex, student status, marital status, presence of children, income, employment status, nor number of hours worked were associated with the likelihood of entering weight maintenance. Participants reporting a specific reason for not entering weight maintenance most frequently reported financial (n=28; 34.6%) or time (n=10; 12.4%) constraints (participants were allowed to choose more than one answer).

Conclusion: No single demographic variable was associated with failure to enter weight maintenance in this cohort. Poor adherence to long-term medical weight management programs is pervasive across social and demographic boundaries. Further studies are needed to explore ways to decrease perceived financial or time barriers.
KANSAS POSTER FINALIST - RESEARCH Youness Hussein, MD

IMPROVING ANTICOAGULATION MANAGEMENT

Julie Kietl, MD; Mustapha El-Halabi, MD; Sadaf Farooqi, MD; Kayla Gray, DO; Youness Hussein, MD; Najla Itani, MD; Robert Badgett, MD

INTRODUCTION: Warfarin is the most commonly prescribed anticoagulant in our resident clinic. The goal of this quality improvement project was to increase the Time in Therapeutic Range (TTR) in our clinic population.

METHODS: We used principles of Six Sigma and implemented a DMAIC (define, measure, analyze, improve and control) cycle. For data analysis, we used multiple linear regressions to separate secular from intervention effects. A chart review quantified characteristics associated with INR nonconformity. Sixty-six patient encounters were randomly selected from those clinic patients with INR values out of range and who were on warfarin and without bioprosthetic valves.

Based on the results of our chart review, for our interventions we chose:

1) To merge warfarin management recommendations from the RE-LY trial (64% TTR) with the more recent 2013 ACCP guidelines, plus the Intermountain Health Care protocol. Our team used the Delphi consensus building tool to develop our protocol. After approval by clinic faculty, it was disseminated to all KUSMW-affiliated clinics.

2) To address patients who consistently missed INR checks, nursing staff implemented a workflow modification. The intervention stops warfarin refills on patients who missed one month of INR checks.

3) Initially we measured INR values as a proportion of values in range each month. However TTR more accurately reflects efficacy of anticoagulation over time and allows benchmarking to published reports. Thus using the OpenCPU project at UCLA, we collaborated with researchers at Boston Children’s Hospital to develop opensource software to measure our population TTR (https://public.opencpu.org/ocpu/github/anticoagulation/warfarin/www/).

RESULTS: From August 2011 to December 2013, we managed 84 unique patients. The INR proportion of values in range was 61.9%. Common associations with nonconformity included: not using standardized weekly dosing based on 5mg tablets (56%); dose adjustment discordant to our nomogram (41%); and late return for INR check (35%). After interventions, the proportion of values in range dropped to 44% for 54 unique patients, which corresponds with a TTR of 52.8%. Multiple linear regressions show no secular trend, but a significant association with our interventions (p=0.007).

CONCLUSIONS: KUSM-W has standardized anticoagulation management. We assessed the merits of monitoring INR with proportion of values in range versus proportion of time in range. Our impression is that simple proportion of values better reflect short-term workflow changes, while TTR offers long-term benchmarking against national rates. Interdisciplinary discussion regarding the drop of “in-range” proportion of values post-intervention, led to the observation that fewer patients are now managed by point-of-care-testing. We hypothesize that patients with better control have shifted to home monitoring and therefore are
not captured in our data reporting. In conclusion, initial results show a TTR similar to that of the RE-LY trial, but further data monitoring is required.
Cardio-Renal association for heart failure re-admissions

First Author: Mohinder Reddy Vindhyal, MD Brent Duran, Do Hussam Farhoud, MD K James Kallail, Ph.D.

Background: Heart Failure is the leading cause of morbidity and mortality, as well as hospitalization rates in the US. An impetus has been created to identify improved predictors to prevent hospital readmission. The average life span of patients admitted to the hospital for heart failure is 5.5 years. The aim of this study was to identify the causes and reduce heart failure re-admissions. Glomerular Filtration Rate (GFR) was one of the associations with heart failure re-admissions, which was studied in the Japanese population but was never studied in the American population. Even though the DOSE trial validates that the kidney function (GFR and/or creatinine) will return to normal status two months after placing them on high dose diuretics in heart failure patients, the study doesn’t mention about re-admissions or the change in renal function status (GFR/creatinine) within one month from discharge. Moreover, Chronic kidney Disease patients were excluded from the study.

Methods: A retrospective cohort study was performed utilizing data from three community hospitals in the United States. A total of 132 patients with heart failure were evaluated over one year comparing GFR at admission and discharge and 30-day readmission status.

Results: There is a significant difference by readmission status in the change in GFR from admission to discharge. The GFR of patients readmitted in 30 days had an average decrease in GFR by 2.46 mL/min/1.73 m² whereas patients not readmitted in 30 days had an average increase in GFR by 1.92 mL/min/1.73 m². In the 28 readmitted patients, 13 (46%) had a decrease in GFR, 6 (21%) had an increase, and 9 had no change (32%). In the 99 patients not readmitted, 33 (33%) had a decrease in GFR, 48 (48%) had an increase, and 18 (18%) had no change.

Conclusions: A decline in renal function (GFR) over hospitalization in patients with heart failure is associated with an increase in readmission for heart failure. Providers should be cognizant of the need to optimize renal function (GFR) as well as cardiac function during hospitalization.
KENTUCKY POSTER FINALIST - RESEARCH Anub G John, MD

Changes in Glomerular Filtration Rate (GFR) following implantation of Continuous Flow Left Ventricular Assist Devices (LVAD)

Anub John, Amaninderapal Ghotra, Rahul Sinha, Emma Birks, Mark Slaughter and Kelly McCants

INTRODUCTION: Continuous Flow Left Ventricular Devices (LVAD) have replaced pulsatile flow pumps with survival estimated at 70% at two years. Renal dysfunction, defined as glomerular filtration rate (GFR) < 60, is common in patients with end stage congestive heart failure and may be due to cardiorenal syndrome or intrinsic kidney disease.

AIM: To determine the changes in renal function after implantation of continuous flow LVAD, in patients with renal dysfunction prior to LVAD use.

METHODS: A retrospective single center analysis was conducted in 47 patients implanted with continuous flow LVAD over a period of 2 years. Patients were divided into 2 groups based on the Modification of Diet in Renal Disease (MDRD) calculation for GFR at the time of LVAD implantation: GFR < 60 (n = 28) and GFR > 60 (n = 19). GFR was calculated at 1, 3, 6 and 12 months post LVAD implantation in both groups. Baseline clinical patient characteristics including basic laboratory parameters, medications, outpatient vitals and number of hospitalizations were studied. T test and chi square tests were used to analyze the data.

RESULTS: In patients with GFR < 60 prior to LVAD implantation, a significant improvement in GFR was noted at 1 (p < 0.001), 3 (p < 0.001), 6 (p = 0.005) and 12 (p = 0.004) months post LVAD implantation (Table 1). 62% of patients (n = 26) with GFR < 60 acquired a normal GFR at 1 month and 45% of these patients (n = 11) on continued LVAD support at 12 months maintained a normal GFR. Renal function did not worsen with LVAD use in the group with GFR > 60 prior to LVAD implantation. Among the patients with GFR < 60 with improved GFR at 1 month and on continued LVAD support at the 1 year follow up (n = 11), 6 patients had reduced GFR (< 60) with 17 hospitalizations; the other 5 patients continued to have normal renal function and had 11 hospitalizations at 1 year follow up period.

CONCLUSION: Following LVAD implantation in patients with renal dysfunction (GFR < 60), there is an increased perfusion of the kidneys as evident from the improvement in the GFR. The increase in GFR is the highest during the first month and then stabilizes by 6 months. Increased duration of LVAD support may lead to complications, thereby limiting the improvement in kidney function with time. This is evident from the increased hospitalizations in these patients.

Table 1: Changes in GFR before and after LVAD implantation in group 1 and group 2.

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<tr>
<th></th>
<th>GFR &lt; 60</th>
<th>GFR &gt; 60</th>
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<tbody>
<tr>
<td>GFR at admission(pre-LVAD)</td>
<td>41.29 ± 10.54</td>
<td>86.05 ± 25.96</td>
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<tr>
<td>GFR at 1 month (post LVAD)</td>
<td>72.35 ± 30.05</td>
<td>91.61 ± 26.88</td>
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<td>GFR at 3 months (post LVAD)</td>
<td>68.08 ± 19.39</td>
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<td>GFR at 6 months (post LVAD)</td>
<td>57.64 ± 23.88</td>
<td>89.15 ± 21.06</td>
</tr>
<tr>
<td>GFR at 1 year (post LVAD)</td>
<td>60.85 ± 25.11</td>
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**Background:** Midgut neuroendocrine tumor (NET) patients are often diagnosed at an advanced stage with extensive mesenteric lymph node and liver metastasis. The only treatment for potential cure and durable results is resection with extensive debulking. However, even with the most elegant surgical dissection/resection, macro and microscopic residual disease at the tumor resection bed remains a distinctive possibility. We hypothesize that local application of 5-flourouracil (5-FU) within tumor bed would eliminate the microscopic residual disease post operatively.

**Method:** Surgical records of 188 consecutive patients who underwent extensive cytoreductive surgeries for stage IV, small bowel NETs with boggy mesenteric lymphadenopathy between 2003-2012 were reviewed. 85 Patients who had 5-Flourouracil saturated gelfoam strips secured into their mesenteric resection defects served as the study group (n=85) with one hundred three patients who did not receive such intra-operative chemotherapy as the control (n=103). Survival from the time of diagnosis, postoperative morbidity and mortality between the two groups were collected and compared.

**Results:** Mortality rates at immediate, 30, 60 and 90 days post operative period were 3; 0; 1; 0; and 0; 2; 0; 4 respectively for study and control group. Minor complications (Clavien-Dindo Grade I and II) at 30, 60 and 90 day postoperative period were 12; 0; 1 and 12; 5; 5 respectively. Major complications (Grade III and IV) at the same time intervals were 2; 0; 2 and2; 3; 2 for study and control groups. Most of all, the mean survival from time of histological diagnosis for the study patients was 210 months (17.5 years) as compared to 177 months (14.7 years) for the control group with a difference of 33 months (2.75 years).

**Conclusion:** Intra-operative tumor resection bed chemotherapy is a safe adjuvant without any discernible toxicity. Furthermore, it might provide survival benefit to midgut NET patients with extensive mesenteric lymphadenopathy undergoing extensive cytoreductive surgery without additional procedure related complications. Further studies are needed to validate the long term efficacy of this novel adjuvant intra-operative chemotherapy.
Background: Positive remodeling (PR), a plaque characteristic associated with risk for myocardial infarction, may be more prevalent in people with HIV. We evaluated the prevalence of PR using coronary CT angiography (CCTA) in HIV-infected (HIV+) and –uninfected (HIV-) men.

Methods/Results: Men enrolled in the Multicenter AIDS Cohort Study underwent CCTA if they were 40-70 years, had normal kidney function and no history of coronary revascularization. Multivariable logistic regression models were used to estimate the odds ratio (OR) of PR by HIV serostatus, adjusting for demographics and CAD risk factors. Analysis of PR among atherosclerotic segments further adjusted for plaque type and stenosis. The prevalence of PR was 8.4% versus 12.1% (p=0.10) for HIV- and HIV+ men, respectively. After adjustment, HIV+ men had twice the odds of PR [OR 2.01 (95% CI 1.20-3.38)], which persisted after adjustment for CAD risk factors [1.76(1.00-3.10)]. Higher systolic blood pressure, total cholesterol, diabetes medication use, older age, segment involvement score, mixed and non-calcified plaque, and stenosis>50%, were associated with increased odds of PR, while higher HDL cholesterol, higher nadir CD4 count, and black race were associated with lower odds of PR. In the segments with plaque, the association between HIV and PR persisted, but was not statistically significantly.

Conclusion: HIV+ men have more positively remodeled plaques, which may be partially related to having more coronary segments with plaque present and more non-calcified plaque. Longitudinal studies are needed to evaluate whether a greater prevalence of PR contributes to higher rates of myocardial infarction in HIV+ individuals.
Long Eye Lashes, and Too long To See Them!

First Author: Fadi Alkhatib, DO Second Author: John Dodd DO Third Author: Steven Dunn MD

Introduction Mucous Membrane Pemphigoid is a rare and debilitating disease that affects bodily mucous membranes, especially those of the eyes and oropharynx. Persons afflicted with mucous membrane pemphigoid often battle with trichiasis that adds to their discomfort and leads to corneal decompensation. It has been observed that pemphigoid patients with trichiasis must have their lashes epilated at an increased rate compared with those patients without pemphigoid. Hypertrichosis associated with increased local prostaglandin levels due to topical medication or other types of ocular inflammation has been well documented.

Methods Our pilot study examined 4 eyes with biopsy confirmed MMP and compared them to 4 healthy eyes from control patients. Tear samples were collected at the slit lamp with microcapillary pipettes and processed using an ELISA kit for Prostaglandins E2 (PGE2). Lashes both trichiatic and normal were epilated from a predetermined location; four weeks later lashes from the same location were re-epilated and measured using Castro-Viejo calipers. The primary end points were average prostaglandin E2 levels and lash length over a four-week period.

Results PGE2 levels in the control group ranged between 155 pg/ml – 310.50 pg/ml. The study group demonstrated levels ranging from 418 pg/ml – 2,325.3 pg/ml. Independent t-test calculations excluding sample (002SL) demonstrated a statistically significant difference between the mean of the control group 227.89 (SE +/- 32.09) and study group 472.23 (SE +/- 51.86); p=0.008. During the course of chart review it was noted that study patients were being seen every 3-4 weeks on average for lash epilation. The mean lash length (to the nearest mm) of each eye was recorded and the mean of each group was then compared to one another using an independent t-test. There was a statistically significant difference between the two groups with the average length of the control group at 4.08 mm (SE +/- 0.54); and the study group at 5.72 mm (SE +/- 0.19); p=0.02.

Discussion Mucous Membrane Pemphigoid patients had increased local prostaglandin levels that might play a role enhancing lash growth rate. Targeting prostaglandin to decrease complication from trichiasis and subsequent complication would need to be further investigated. This is a novel concept in regards to lash growth in response to inflammatory mediators and may help further our understanding of the complex interaction between the ocular and adnexal surface.
The effects of Candida Colonization and antifungal use on the outcomes of patients with Ventilator-Associated Pneumonia

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Background: Mechanical ventilation (MV) is associated with colonization of the upper respiratory tract (URT) by a multitude of bacteria and fungi, which interact with important clinical implications. We investigated the effect of Candida colonization anywhere in the body as a comorbidity factor and a predictor of the outcome in patients with Gram-negative Ventilator Associated Pneumonia (VAP), as well as the potential role of prophylactic antifungal administration.

Methods: We retrospectively reviewed the medical charts of all 182 patients with VAP treated in the Intensive Care Units of the Massachusetts General Hospital over a 6-year period and compared the outcomes (mortality, length of MV, hospital stay) between Candida colonized and non-colonized patients. Continuous variables were reported as mean (SD) and compared using the T-test. Median (IQR) values were reported using the Mann-Whitney non-parametric test. Dichotomous outcomes were compared using the chi-square and Fisher exact tests. Odds ratios (OR) (95% Confidence Intervals, CIs) for VAP related mortality were reported after fitting logistic regression models. Level of significance was set to 0.05 and all tests were two-sided.

Results: Gram-negative bacteria were isolated in 71 patients (55%) and 47 of those (66.2%) were colonized with Candida spp. Body sites included URT (n=41; 57.8%), urine (n=13; 18.3%), abdominal fluid (n=1; 1.4%), and wound (n=7; 9.9%). There were no significant differences between colonized and non-colonized patients regarding SAPS II score. Interestingly, Candida colonization anywhere in the body was associated with longer hospital stay (36 vs. 25 days, p=0.04) and MV (21 vs. 14 days, p=0.05) and marginally higher mortality (17% vs. 8.3%, p=0.06), while colonization of the URT led to significantly higher mortality (25% vs. 5%, OR 6.17, 95% CI 1.20-31.55, p=0.04), which persisted after adjusting for age and colonization at other sites (OR 6.04, 95% CI 1.05-34.75). Also, patients with multiple colonized sites had higher mortality (46.2% vs. 7.7%, p=0.05), increased duration of MV (26 vs. 16 days, p=0.05), and length of hospital stay (41 vs. 30 days, p=0.04). URT colonization was associated with increased risk of colonization at other sites (44% vs. 18%, p=0.02). Surprisingly, prophylactic antifungals were associated with a higher mortality (66.7% vs. 33.3%, p=0.04) likely due to the multiple comorbidities in this population.

Conclusions: Candida colonization at multiple sites increases morbidity and mortality among patients with Gram-negative VAP, while prophylactic antifungals do not appear of any benefit.
The Baystate Frailty Study – Prevalence of Frailty in a Cohort of Hospitalized Elderly Patients

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Background: Elderly patients have limited physiological reserves and decreased ability to compensate for stress, resulting in a delayed return to baseline function and an increased vulnerability to in-hospital and post-discharge complications. The objectives of this study are to assess the prevalence of frailty and its association with in-hospital and post-discharge outcomes in hospitalized elderly patients (phase I) and to implement a coordinated care team approach to improve the outcomes of frail elderly patients (phase II).

Methods: This is a prospective study including patients older than 65 years admitted for urgent surgeries, trauma, elective orthopedic surgeries and 3 frequent medical diagnoses (heart failure, COPD, pneumonia). In the first phase, we collected measures of frailty at admission using Edmonton Frailty Scale which includes questions about general health status, cognition, functional independence, social support, medication use, nutrition, mood, self-reported performance and continence. Patients scoring >10 were classified as severely frail, 6-9 as mildly frail or vulnerable and 0-5 as non frail. Patients were followed with phone calls at one, two and three months after discharge. The study which is still ongoing will enroll a total of 200 patients admitted for urgent surgeries, 100 patients for medical conditions and 100 patients admitted for elective surgeries. We present preliminary results.

Results: Of the 212 patients who were enrolled till now, 110 were admitted for urgent surgeries or trauma, 38 for elective orthopedic surgeries and 64 for medical conditions. Mean age was 76.70(SD = 8.3) and 131 were female (61.8%). 93.4% were admitted from home, 3.8% from assisted living and 2.8% from a nursing home facility. The mean Edmonton Frailty Scale (EFS) for the entire patient cohort was 5.10 (SD = 3.6). Mean EFS was 4.7(SD = 3.4) for urgent surgery/trauma patients, 7.2 (SD = 3.1) for medical patients and 2.8 (SD = 3.0) for elective surgeries. One in four patients had more than 1 falls in the 6 months prior to admission. On the 3 objects recall test, one fourth of the patients were able to remember only one word. 68% of patients were on >5 medications before coming to the hospital and 20% admitted that they forget to take their medications sometime. 17% of patients admitted to being depressed and 19% having urinary incontinence.

Only 60% of the patients were able to walk 2 blocks in the 2-3 weeks prior to being admitted. Overall 61.3% of patients were vulnerable-mildly frail and 14.2% were severely frail. Medical patients were the most likely to be frail (72%) and patients undergoing elective surgeries the least likely (5%). 168 patients consented for phone calls follow up and we were able to obtain follow up for 121 at 30 days, 100 patients at 60 and 57 at 90 days. At 30, 60 and 90 days after discharge 29%, 48% and 64% of patients returned to baseline. At 90 days after discharge 34% of all patients and 60% of severely frail patients were readmitted at least once.

Conclusion: Less than half of the patients over 65 years of age hospitalized for urgent or emergent surgeries and for 3 frequent medical conditions were non frail. Medical patients were the most likely to be frail and had the higher score on EFS, followed by patients admitted for urgent surgeries. At 3 months after discharge one in 3 patients was not at the baseline level and two thirds of the frail patients were readmitted.
Changes in Health Care Spending and Quality 4 Years into Global Payment for Accountable Care Organizations

Zirui Song, Sherri Rose, Dana G. Safran, Bruce E. Landon, Matthew P. Day, Michael E. Chernew

**Purpose:** In an era of payment reform, the effect of global payment in accountable care organizations (ACOs) on health care spending and quality remains poorly understood. We evaluated changes in spending and quality 4 years into the Blue Cross Blue Shield of Massachusetts Alternative Quality Contract (AQC), a global budget risk contract with quality bonuses that began in 2009 with 7 ACOs and expanded to 17 ACOs in Massachusetts by 2012.

**Methods:** Enrollees whose provider organizations entered the AQC from 2009 to 2012 (4 intervention cohorts, N=490,000, 177,000, 97,000, and 583,000, respectively) were compared to similar commercially-insured individuals from control states (N=966,000). Using 2006-2012 claims, we employed a difference-in-differences linear multivariate model controlling for age, sex, comorbidities, and indicators for intervention, year, and their interactions. We decomposed spending results by year, category of service, site of care, risk-contracting experience, and price versus utilization. We compared process and outcome quality to national and New England Healthcare Effectiveness Data and Information Set (HEDIS) averages.

**Results:** In the 2009 cohort, claims spending grew on average $62.21 per enrollee per quarter less than control over 4 years (p<0.001), a 6.8% savings. Analogously, the 2010, 2011, and 2012 cohorts had average savings of 8.8% (p<0.001), 9.1% (p<0.001), and 5.8% (p=0.04), respectively, by the end of 2012. Savings on claims were concentrated in the outpatient facility setting, specifically procedures, imaging, and tests (8.7%, 10.9%, and 9.7%, respectively, p<0.001). Organizations with and without risk-contracting experience saw similar average savings of 6.3% and 7.7%, respectively, over 4 years (p<0.001). About 40% of savings were explained by lower volume. Pre-intervention trends were not statistically different between intervention and control (-$4.57, p=0.86), suggesting savings were not driven by inherently different trajectories of spending. No differences in coding intensity were found. In sensitivity analyses, estimates were robust to alterations in the model, variables, and sample. Notably, claims savings were exceeded by incentive payments to providers (shared savings and quality bonuses) in 2009-2011, but exceeded incentives payments in 2012, generating net savings.

Improvements in quality among intervention cohorts generally exceeded New England and national comparisons. Quality performance on chronic care measures increased from 79.6% pre-intervention to 84.5% post-intervention in the 2009 cohort, compared to 79.8% to 80.8% for the HEDIS national average, a 3.9 percentage-point relative increase. Analogously, preventive care and pediatric care measures increased 2.7 and 2.4 percentage points, respectively. On outcome measures, achievement of hemoglobin A1c, LDL cholesterol, and blood pressure control grew by 2.1 percentage points per year after the AQC, while HEDIS averages remained relatively flat.

**Conclusions:** After 4 years, organizations in the AQC had lower spending growth relative to control and generally outperformed national averages on quality measures. The AQC experience may be useful to policymakers, insurers, and providers. Combining global budgets with pay-for-performance may encourage provider organizations to slow spending and improve quality.
Prevalence of pathology renal findings not associated to disease activity in patients with Systemic Lupus Erythematosus (SLE).

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INTRODUCTION: Kidney involvement, generally related to lupus nephritis (LN) is one of the cardinal manifestations of SLE, associated with a 6-fold increase in mortality. However, in patients with SLE, kidney abnormalities are not always caused by LN.

The aim of this study was to identify the pathologies not associated with lupus activity and different from LN according to the International Society of Nephrology/Renal Pathology Society (ISR/RPS) that occur in patients with SLE.

METHODS: We conducted a retrospective descriptive study. All patients with diagnosis of SLE in which a renal biopsy was performed between 1987 and 2013 were identified from our institute, a tertiary care center in Mexico. SLE diagnosis was confirmed by reviewing the medical record (ACR 1982 criteria). All histopathological diagnoses other than LN according to the ISR/RPS classification of lupus nephritis were considered. Patients with a histopathological diagnosis different from LN, but associated with lupus activity were excluded. We obtained demographic data, disease characteristics, comorbidities and treatment received from medical files. We used descriptive statistics for this study. Results are expressed as number (percentage) or mean±SD.

RESULTS. We identified 622 patients with diagnosis of SLE and renal biopsy performed. In 564 of them, diagnosis of SLE was confirmed after reviewing the medical file, 75 of these biopsies had a diagnosis different from LN, but 27 of them were excluded due to a histopathological diagnosis associated with SLE activity.

Thereby we included 48 patients (8.5% of the biopsies performed in patients with a confirmed diagnosis of SLE), with a mean age of 36±2.4 years; 44 (92%) patients were women. The mean duration of disease was 6.9±7.1 years. The mean disease activity (SLEDAI-2K) was 13.1±6.5 points, while the cumulative damage (SLICC) was 2.3±2.1 points. Thirty four (71%) patients had hypertension and 13 (27%) diabetes mellitus. The more frequent histopathological diagnoses were arteriolosclerosis, observed in 24 (50%) cases and diabetic nephropathy in 7 (15%). Global and segmental glomerulosclerosis and podocytopathies were reported in five biopsies (10%) each. In 28 (58%) patients there was concomitant form of classified LN.

CONCLUSIONS. This is the largest case series reported of nephropathy not associated with activity in patients with SLE. The prevalence was 8.5%, however this entity presents alone in a low percent of the biopsies. The most frequent histopathological diagnoses were arteriolosclerosis and diabetic nephropathy, which disagrees with previously reported series.
MEXICO - POSTER FINALIST - RESEARCH Jorge Rafael Romo Tena, MD

The E3 ligase Casitas B Lineage Lymphoma b (Cbl-b) Modulates Peripheral Regulatory T cell Function via p27kip1 in patients with Systemic Lupus Erythematosus.

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Background/Purpose: The interplay between effector and regulatory T cells (Tregs) is a key element among peripheral tolerance mechanisms in Systemic Lupus Erythematosus (SLE). Resistance to suppression has been recently acknowledged as part of the defects shown by T cells from SLE patients. The E3 ligase Cbl-b has been shown to modulate T cell unresponsiveness in SLE. However its potential role in the regulation of peripheral Tregs tolerance has not been fully addressed. The aim of this study was to assess the expression of Cbl-b and its relationship to the resistance to suppression phenotype in SLE patients.

Methods: We included 25 patients with SLE (10 in remission and 15 with active untreated disease) according to the classification criteria of the American College of Rheumatology and 25 age and gender-matched healthy controls. PBMCs were isolated by density gradient and effector (CD4+CD25-) and Tregs (CD4+CD25+CD127-) were purified by magnetic selection. The expression of Cbl-b and p27kip1 was analyzed by Western blotting. Interaction between Cbl-b and p27kip1 was addressed by immunoprecipitation (IP). Proliferative responses were assessed in allogeneic and autologous cocultures by CFSE. Differences were assessed by t Student test. p<0.05 was considered as statistically significant. In all cases, an informed consent was obtained, and the ethics committee approved this study.

Results: We found diminished Cbl-b expression in Tregs from SLE patients in comparison to healthy controls (1.3±1.0 vs 2.8±1.8, p=0.002), which was associated with resistance to suppression in proliferation assays (r=0.553, p=0.041). Moreover, this phenomenon was related to deficient expression of the cell cycle regulator p27kip1 in Tregs from SLE patients when compared to healthy controls. We also found by IP assays, that p27kip1 interacts with Cbl-b in Tregs. We found no significant differences regarding to disease activity.

Conclusion: Our data suggest that the ligase Cbl-b is able to regulate the interplay between effector and Tregs, particularly, the resistance to suppression via ubiquitination of p27kip1 in SLE patients. To our knowledge, this is the first study to demonstrate that p27kip1 is able to interact with Cbl-b, which might constitute another mechanism by which this ubiquitin ligase is able to modulate the T cell receptor activation threshold.
Epidemiology of Takotsubo cardiomyopathy in US: An analysis of NIS data

Sourabh Aggarwal, Yashwant Agrawal, Devin Malik

Introduction  Takotsubo cardiomyopathy (TC) is a transient systolic dysfunction of the apical/mid segments of left ventricle that mimics myocardial infarction but without any obstructive coronary artery disease. It is an increasingly reported entity with unclear etio-pathogenesis. This study was done to identify the patient and hospital characteristics of patients diagnosed with TC in USA.

Methods  We queried Healthcare Cost and Utilization Project’s Nationwide Inpatient Sample (NIS) data using for patients discharged with primary diagnosis of TC using ICD9 code of 429.83 for TC. NIS represents 20% stratified sample of US community hospitals data in US. Data was extracted for years from 2007 to 2011. Patient characteristics (age, gender, insurance, residence) and hospital characteristics (ownership, teaching, size, and location) were identified and analyzed. For individual variables, analysis was done for available data, missing data being excluded.

Results  We identified 26,090 patients diagnosed with TC. Age was available for 19,469 patients, with 65-84 being affected most commonly (45.5%) and 69.5% patients were above the age of 65. Females were affected more than males (89.3% vs 10.7%). Most patients were covered by Medicare insurance (48.89%).

Most of diagnoses were made in Private, not-for-profit hospitals (84.5%), hospitals in metropolitan areas (93.6%), hospitals with large bedside number (54.8%). Both teaching and non-teaching hospitals were equally associated with diagnosis of TC (50.1% vs 49.9%) Geographically, most patients were diagnosed in southern part of USA (31.4%) and least in north-east part (19.1%).

Discussion  This study, largest on TC till date, identifies epidemiology of TC in USA with most patients being elderly (>65 years of age) and females. Further studies need to be done to identity risk factors in detail to better prevent and manage TC.
MICHELLAN POSTER FINALIST - RESEARCH Daniel E Ezekwudo, MD

Chapter Winning Abstract

Daniel Ezekwudo MD, Ph.D; Periasamy Selvaraj Ph.D, Ravi Palaniappan Ph.D, Bala Grandhi MD, MPH. a Central Michigan University, b Emory University School of Medicine, c Mercer University

**Introduction**: Paclitaxel have been implicated with severe adverse effects such as acute pain syndrome, and vesicant extravasation injury owing to its excipient (Cremophor EL). Replacing this excipient with a non-toxic biomaterial will reduce these adverse effects. Using human prostate adenocarcinoma (HPA), we studied the efficacy of our formulation.

**Methods**: Ptx-GGbPEG was formulated via nanoprecipitation and surface-coated with ligand specific for human prostate specific membrane antigen. Using Human xenograft prostate tumor induced mice; the efficacy of the formulation was studied. The following regimens were administered (i) saline; (ii) GGBPEG alone 40mg/kg; (iii) commercial paclitaxel 40 mg/kg; (iv) Ptx-loaded GGbPEG-Aptamer 40 mg/kg. Post treatment histological staining of the excised tumors was analyzed by an independent Pathologist.

**Results**: In vitro cytotoxicity of Ptx-GGbPEG on HPA cell lines showed prolonged cytotoxicity (< 10% viability after 72 hr) when compared to commercial paclitaxel (35% viability, p<.05). Furthermore, the formulation showed increased in vivo efficacy and specificity when compared to commercially available paclitaxel resulting in decreased tumor volume. At 60 days, mean tumor volumes were 194.1 mm3, 187.9 mm3, 166.2 mm3 and 96.2 mm3 for saline, GGbPEG alone, commercial paclitaxel and Ptx-GGbPEG respectively (p < 0.05). H & E staining showed well-defined cell boarders and hyperchromatic nuclei with mitoses in the saline and GGbPEG treated groups whereas group with commercial paclitaxel and ptx-GGbPEG were extensively necrotic.

**Conclusion**: Prolonged cytotoxicity and specificity of our formulation may provide a better alternative to currently used paclitaxel by reducing the frequency of drug use, thus decreasing the overall side effects.
Cost of Mediterranean Diet Compared to Dietary Expenditures Recommended by the United States Department of Agriculture

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Introduction: The Primary Prevention of Cardiovascular Disease with a Mediterranean Diet study concluded that consuming a diet rich in virgin oil and nuts can reduce the incidence of myocardial infarction, stroke and death due to cardiovascular causes. While the Mediterranean diet presents an appealing recommendation for preventative medicine, the financial feasibility of dietary adherence is unknown.

Methods: We estimated the cost of this diet by using the spring 2013 shopping list obtained from the Predimed website. It was translated and found to be approximately 2100 calories per day. The cost of this diet was then estimated by going to three grocery retailers. For items not available at any of these stores, the closest substitute was chosen or the item cost from another retailer was used. The costs recorded were the current price at the time of shopping. For most items, we chose the option that was the lowest cost per volume or weight. Weekly expenditures were calculated using Excel for each store and also using the cheapest item combination of the three stores. Totals were compared to the June 2013 USDA food plan weekly costs over four economic levels and percentage of an individual budget based on median per capita income.

Results: The three stores had weekly per person expenditures of $126.88, $111.26 and $106.90. When combining the lowest cost items from each store, the cost was $96.99. To initially begin eating the diet, one would have to spend $241.29 to purchase all of the items, many of which could be used in subsequent weeks. When using the lowest combination of costs compared to the USDA thrifty, low-cost, moderate-cost and liberal plans, the diet was more expensive by $58.59 (153%), $45.79 (89%), $33.39 (52%) and $20.49 (27%) respectively. Looking at the US Census statistics in 2012 dollars the cost would be 25%, 20% and 18% of the total budget for those at the median per capita level in Grand Rapids, Michigan and the United States respectively.

Conclusion: The Mediterranean diet, as it is effective in preventing cardiovascular disease, presents a very appealing recommendation for preventative medicine but could be burdensome financially to patients. The yearly expenditure of such a diet could be over $4900 per person, which would make it inaccessible to a large part of the population. More studies are needed to find an effective and affordable diet that addresses both nutritional and financial disparities within the U.S.

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**Introduction:** An abdominal aortic aneurysm (AAA) is defined when infra-renal aortic diameter is at least 3.0 cm. The United States Preventive Services Task Force (USPSTF) made recommendation in 2005 that all men between the age of 65 to 75 years and who have ever smoked should be screened one time for AAA by abdominal ultrasonography. However, the clinical impact of these recommendations are unknown in the American population.

**Methods:** We queried Healthcare Cost and Utilization Project’s Nationwide Inpatient Sample (NIS) for AAA and AAA rupture using ICD9 codes 441.4 and 441.3 respectively. The NIS represents 20% of all hospitals data in US. All the data was extracted for years 2000-2010. The prevalence and in-hospital mortality for pre-screening years (2000-2004) was compared with post-screening years (2006-2010). Chi square was used to find statistical significance.

**Results:** A total of 527,801 hospitalizations secondary to AAA and AAA rupture were analyzed for the study period. AAA prevalence decreased from 61.72 to 58.77 per 10,000 total hospitalizations with in-hospital mortality decreasing from 3.5% to 2.12% (p value <0.001). On sub-analysis, the decrease in prevalence was chiefly in 65-84 age group (77.19 to 74.54 per 100 AAA admissions, p <0.001), with increase in 84+ age group (6.37 to 8.6 per 100 AAA admissions, p<0.001) and no significant change in 45-64 age group (16.16 to 16.51 per 100 AAA admissions, p value >0.05). Prevalence increased in males (77.84 to 78.13 per 100 AAA admissions, p <0.001) and decreased in females (22.13 to 21.81 per 100 AAA admissions, p<0.001). Decrease in mortality was uniform in all age and gender sub-groups.

The prevalence of AAA rupture decreased from 9.51 to 7.03 per 10,000 total hospitalizations (p<0.001). On sub-analysis decrease in prevalence was reciprocated in 65-84 age group (70.08 to 64.94 per 100 AAA rupture admissions, p value <0.001) and males (73.23 to 71.7 per 100 AAA rupture admissions, p value <0.001). However, prevalence of AAA rupture increased in age group 45-64 (14.41 to 15.43 per 100 AAA rupture admissions, p value <0.001), age 84+ (15.21 to 19.2 per 100 AAA rupture admissions, p value < 0.001) and females (26.28 to 28.28 per 100 AAA rupture admissions, p value <0.001).

**Discussion:** Our study reveals that post screening recommendations, hospitalizations for AAA decreased significantly with decrease only reciprocated in the age group 65-84 years. Also hospitalizations and in-hospital mortality from AAA rupture decreased in males and age group 65-84, with increase in hospitalizations for the 45-64 and 84+ age group and females. The possible explanation is better screening as outpatient resulted in decreased morbidity with decreased hospitalizations from AAA and AAA rupture in susceptible population. Our study also makes the case to consider extension of recommendations to include other susceptible groups.
Ofatumumab for Rheumatoid Arthritis: A Cochrane Systematic Review and Meta-analysis

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Ofatumumab is a unique anti-CD20 monoclonal antibody with its epitope more proximal and distinct from the epitope recognized by rituximab or by other anti-CD20 monoclonal antibodies. The proximity of this epitope probably accounts for the high efficiency of B-cell killing than other B-cell-deleting antibodies and makes it ideal for use in rheumatoid arthritis (RA). We conducted a systematic review and meta-analysis assessing the benefits and harms of ofatumumab in reducing disease activity and pain and improving function in people with RA. To date, there is no systematic review or meta-analysis assessing ofatumumab for treatment of RA.

Methodology: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2014, Issue 1), MEDLINE (from 1946), EMBASE (from 1947), ClinicalTrials.gov, and the International Clinical Trials Registry Platform (ICTRP) search portal for randomized controlled trials comparing ofatumumab alone or in combination with disease-modifying anti-rheumatic drugs (DMARDs) or biologics to placebo or DMARDs or biologics alone or in combination with DMARDs, with no restrictions with regard to the dosage. Two authors independently assessed search results, trial quality and risk of bias, and extracted data. Our search identified three trials with low risk of bias that included 654 patients (383 ofatumumab and 271 placebo) for analysis. A stable methotrexate dose was allowed in all patients.

Benefits: Compared with placebo, patients in the ofatumumab group were 2.3 times more likely to achieve an ACR 20 (20% clinical improvement) response (RR 2.3, 95% confidence interval (CI) 1.76 to 3.01). Similarly, patients in the ofatumumab group are 3.1 times more likely to achieve an ACR50 (RR 3.12, 95% CI 1.98 to 4.91). The number needed to treat to achieve an ACR 50 response was six. Only one trial found improvement in ACR70 response. A significant reduction in disease activity was found in ofatumumab-treated patients as compared with those in the placebo group. Quality of life also significantly improved with the ofatumumab treatment, as measured by SF-36 summary score (MD 2.48, 95% CI 2.23, 2.73).

Harms: In terms of withdrawal, total withdrawals and withdrawals due to adverse events were not statistically different between ofatumumab and placebo users. However, withdrawal due to lack of efficacy was four-times higher in the placebo group as compared with patients treated with ofatumumab (RR 0.24, 95% CI 0.10 to 0.60). The risk of adverse events was 1.5 (95%CI 1.37 to 1.72) in the ofatumumab group as compared with the placebo group. The incidence of serious adverse events, however, was not significantly different between patients treated with ofatumumab and those who received placebo (RR 1.72, 95% CI 0.91 to 3.26). The heterogeneity of the trials was low ($I^2=0\%$).

Conclusion: This systematic review and meta-analysis suggests that ofatumumab is efficacious and safe for treating patients with RA as compared with placebo. The adverse events profile appears to be
acceptable at the present, but long-term trials and postmarketing surveillance are required to assess sustained efficacy and harms.
Reducing Unnecessary Routine Lab Tests for Hospitalized Medical Patients

First Author: Joel D Beachey, MD Urshila Durani, MD Elsie T Mensah, MD Priya Vijayvargiya, MD John T Ratelle, MD Sara Reppert, MD

Introduction: Routine ordering of basic blood tests in the hospital drives up healthcare costs, increases risk of iatrogenic anemia and nosocomial infections, and extends length of stay. Reducing unnecessary labs may ultimately improve patient safety and outcomes, increase satisfaction, and lessen financial burden.

Objective: We aimed to reduce the number of routine complete blood counts (CBCs) and electrolyte panels ordered on Medicine teaching services at Mayo Clinic Hospital in Rochester, MN.

Methods: This quality improvement project took place at Mayo Clinic Hospital, Saint Mary’s Campus, and involved two general medicine teaching services. Stakeholders were identified, including patients, providers, nurses, lab technicians, and hospital administrators. Interviews were conducted with members of each group in order to determine factors contributing to the problem, and a root cause analysis was performed outlining those factors and barriers to change. Factors contributing to the ordering of unnecessary lab tests included resident inexperience, unclear expectations set by supervising physicians, and ease of ordering daily morning labs. Based on root cause analysis, provider education was selected as an intervention strategy. For the initial Plan-Do-Study-Act (PDSA), residents were asked to list “Daily Labs” as a numbered problem in their progress notes and indicate whether daily CBCs and/or electrolyte panels were necessary for each patient. The outcome measured was the average number of routine labs per patient. Total numbers of CBCs and electrolyte panels were measured for three days before and after the intervention, and data was compiled in a run-chart.

Results: 54 patients were admitted to the medicine 1 and 3 teaching services during our 6-day period of analysis. 71 CBCs and 125 electrolyte panels were ordered on 32 patients in the 3 days preceding intervention. 45 CBCs and 68 electrolyte panels were ordered on 34 patients in the 3 days post-intervention. The average number of labs per patient-day for the three days prior to intervention was 2.7. The average number of labs per patient-day for the three days after intervention was 1.8.

Conclusion: Encouraging providers to routinely consider and document necessity of daily labs led to a 33% reduction in tests ordered per patient-day. While the scope of duration in this initial PDSA cycle was limited, results indicate that provider training and accountability can potentially decrease unnecessary routine lab tests. Future studies can be designed to assess sustainability and applicability of this intervention in addition to assessing impact on patient outcomes and cost of care.
The Relationship between Serum Electrolytes and Electrocardiographic Intervals

Introduction: Hypokalemia, hypocalcemia and hypomagnesemia are thought to cause an acquired long QTc syndrome, but this association is based only on a few small case series. Here, we aimed to evaluate the relationship between serum electrolyte concentration and changes in QTc interval and QRS complex.

Methods: This retrospective cohort study included 8,498 consecutive participants admitted to the coronary care unit at an academic tertiary care center from 2004 through 2013 who had at least one serum potassium and magnesium level measurement. The means of serum potassium, ionized calcium and magnesium were then categorized and the reference groups were 4.0-<4.5 mEq/L, 4.8-<5.0 mg/dL and 2.0-<2.2 mg/dL, respectively. Multivariate analysis adjusted for age, sex, race, mean serum electrolyte level, antiarrhythmic and drugs known to cause QTc prolongation was used.

Results: Serum potassium and ionized calcium were inversely associated with the prolonged QTc interval; only hypermagnesemia independently increased the risk of widened QRS complex. The association between serum potassium and prolonged QTc interval was shown by the adjusted ORs (1.04 95% CI, 1.03-1.05, 1.01 95% CI, 1.01-1.02 and 0.99 95% CI, 0.98-0.99 for potassium levels of <3.5, 3.5-<4.0 and >4.0 mEq/L, respectively). Similarly, the association between serum ionized calcium and prolonged QTc interval was shown by adjusted ORs (1.02 95% CI, 1.02-1.03, 1.01 95% CI, 1.01-1.02 and 0.99 95% CI, 0.98-0.99 for ionized calcium levels of <4.4, 4.4-<4.6, and >5.0 mg/dL, respectively). Paradoxically, hypermagnesemia was associated with QTc interval prolongation (ORs: 0.98 95% CI, 0.98-0.99, 0.99 95% CI, 0.99-0.99 and 1.01 95% CI, 1.01-1.02 for magnesium levels of <1.8, 1.8-<2.0, and >2.4 mg/dL, respectively). After adjusting for duration of QRS complex, the relationship between hypermagnesemia and prolonged QTc interval was no longer present. However, hypermagnesemia was independently associated with a widened QRS complex (ORs: 0.97 95% CI, 0.96-0.99, 0.98 95% CI, 0.97-0.99, 1.03 95% CI, 1.01-1.05 and 1.09 95% CI, 1.07-1.11 for magnesium of <1.8, 1.8-<2.0, 2.2-<2.4 and >2.4 mg/dL, respectively).

Conclusion: Contrary to conventional wisdom, hypermagnesemia was associated with a prolonged QTc interval via a mechanism of widened QRS complex. We also observed a level-dependent relationship between hypokalemia and hypocalcemia and an increase in risk of QTc interval prolongation, but neither serum potassium nor calcium was associated with changes in duration of the QRS complex.
MINNESOTA POSTER FINALIST - RESEARCH Paolo Strati, MD

Renal Complications of Chronic Lymphocytic Leukemia/Monoclonal B-cell Lymphocytosis (CLL/MBL)

First Author: Paolo Strati, MD Other authors: Samih H Nasr, Nelson Leung, Curtis A Hanson, Kari G Chaffee, Sara J Achenbach, Tait D Shanafelt

INTRODUCTION. Renal dysfunction, including both renal failure and nephrotic syndrome, can be a complication of hematological malignancy. While the renal complications of plasma cell dyscrasia are well described, the prevalence and types of renal complications in patients with CLL/MBL are not well delineated, with most information deriving from case reports or small case series.

METHODS. We conducted a retrospective analysis of all 4033 patients with CLL/MBL followed at Mayo Clinic between 01/1995 and 06/2014 and identified all CLL/MBL patients who underwent a kidney biopsy during the course of their disease to evaluate either renal failure or nephrotic syndrome. Standard processing of renal biopsies included light microscopy, immunofluorescence, and electron microscopy.

RESULTS. Between 01/1995 and 06/2014, 49 of 4033 (1.2%) patients with CLL/MBL had a renal biopsy. The most common renal pathology included: membranoproliferative glomerulonephritis (MPGN; n=10, [20%]), CLL interstitial infiltration as primary etiology (n=6, [12%]), thrombotic microangiopathy (TMA; n=6, [12%]), and minimal change disease (MCD, n=5 [10%]). Nine of 10 (90%) MPGN cases were immune-complex-mediated. All 5 MPGN patients treated with rituximab and cyclophosphamide (RC)-based regimens had recovery of renal function compared to 0/3 patients treated with rituximab +/- steroids without inclusion of an alkylating agent. Two patients remained untreated, and 1 eventually needed chronic dialysis. CLL infiltration as the primary cause of renal abnormalities was primarily observed in relapsed/refractory patients (4 of 6), although occurrence in 2 previously untreated cases was also observed. All cases of MCD resolved with immunosuppressive agents (e.g. monoclonal antibodies with or without steroids) only. TMA primarily occurred as a treatment related toxicity due to pentostatin (4/6 cases), and resolved with drug discontinuation.

CONCLUSIONS. Renal biopsy plays an important role in diagnosis and management of CLL/MBL patients who develop renal failure and/or nephrotic syndrome. MPGN appears to be the most common etiology of renal disease in CLL/MBL patients with proteinuria, although MCD is another relatively common etiology. While MCD responds to immunosuppressive therapy, alkylating agent based treatment appears necessary for MPGN. CLL infiltration should be considered as a potential etiology, particularly in relapsed refractory patients. Survival data for each etiology are being abstracted and will be presented at the meeting.
MINNESOTA POSTER FINALIST - RESEARCH Priya Vijayvargiya, MD

Characterization of hypothalamic hunger and satiety signals with pulsed arterial spin labeling MRI

First Author: Priya Vijayvargiya, MD Other Authors: Barham K. Abu Dayyeh MD MPH, John D. Port MD PhD, Michael Camilleri MD

Introduction: The hypothalamus is the center for energy homeostasis in the brain regulating energy intake and expenditure to preserve a biologically-preset body weight. Two leptin-sensitive neuronal subsets situated within the hypothalamic arcuate nucleus have been identified: the neuropeptide Y and agouti-related peptide (NPY/AgRP) neurons, which potently increase food intake and reduce energy expenditure, and the proopiomelanocortin (POMC) neurons, which reduce food intake and increase energy expenditure.

Aims: To characterize the hypothalamic signals of satiation by magnetic resonance imaging (MRI) with pulsed arterial spin labeling (PASL) in response to a nutrient drink, and to compare these signals and their relationship with the maximal tolerated volume (MTV) ingested on a liquid meal tolerance test in non-obese healthy volunteers.

Methods: We prospectively studied the hypothalamic response to feeding using PASL MRI (3 Tesla MRI scanner) in 20 healthy subjects. All subjects had normal scores, comparable to those of lean references, on the 21-item Three-Factor Eating Questionnaire (TFEQ-R21). The liquid meal tolerance test used was Ensure® (Abbott Labs, Abbott Park, IL) ingested at a rate of 120ml every 4 minutes. Sequential dynamic PASL MRI scans were obtained from each subject after a period of 8 hours fasting and repeated at 15 minute intervals during the liquid meal tolerance test, at the time of reported MTV, and 30 minutes after MTV. Cerebral blood flow in brain regions of interest (ROI) was quantified and reported as (ml/g/min). Repeat measures analysis of variance, and multivariate linear regression were used for statistical analysis. Data show mean + SD.

Results: Age of the 20 white subjects was 33 ± 7.4 years, 10 were female, and BMI was 25.6 ± 3 kg/m². Male and female subjects had similar baseline characteristics. The MTV for the entire cohort was 1220 ± 317 ml. There was no gender difference in the MTV (p=0.14). Baseline (pre-meal) hypothalamic signal on PASL MRI was positively correlated with MTV on univariate (β=0.45, p=0.04) and multivariate analysis (β=0.53, p=0.018) after adjusting for gender and BMI. On repeat measures analysis, hypothalamic PASL MRI signal decreased significantly after ingesting the MTV of the liquid meal and this decreased signal persisted 30 minutes later, compared to the control region of the posterior frontal cortex, which did not change with meal ingestion (p=0.04). Females had a more robust decrease in hypothalamic signals after meal ingestion compared to males (β=-0.16, p=0.07).

Conclusions: PASL MRI provides a novel brain imaging technique able to dynamically quantify satiation signals within the hypothalamus. This novel approach, which does not require ionizing radiation, will enable interrogation of the neural circuits regulating appetite, satiation and satiety in humans in health and in obesity.
Analysis of a Guideline-Derived Resident Educational Program on Inpatient Glycemic Control

William B. Horton, MD, Andrew Q. Weeks, MD, J. Matthew Rhinewalt, MD, Richard D. Ballard, MD, and Frederick H. Asher, MD

Introduction The link between uncontrolled hyperglycemia and increased patient morbidity, mortality, and length of hospital stay is well-established. Consensus guidelines recommend basal plus bolus insulin regimens rather than sliding scale insulin alone for inpatient glycemic control. We sought to determine the effects of a resident educational program designed to encourage use of proper insulin regimens on glycemic control and length of stay.

Methods We performed a quality improvement project at an academic medical center in Jackson, Mississippi. All patients admitted to two inpatient medicine teams and placed on an insulin regimen from February to May 2014 were included. We compared the following variables before and after resident education: percentage of patients on basal plus bolus regimens, mean fingerstick glucose (FSG), length of hospital stay (LOS), and rates of hypoglycemia (FSG < 70 mg/dL) and severe hypoglycemia (FSG < 40 mg/dL). Sixty patients were included in the pre-education group and sixty-five in the post-education group. A two-tailed T test was used for all continuous data and a p-value < 0.05 was considered statistically significant.

Results After education, more patients (23% vs. 8%; p-value 0.024) were placed on basal plus bolus regimens. We observed a decrease in mean FSG (158.7 mg/dL vs. 165.1 mg/dL; p-value 0.028) and LOS (5.03 days vs. 6.98 days; p-value 0.042). Rates of hypoglycemia (4.6% to 1.5%; p-value < 0.001) and severe hypoglycemia (0.71% to 0.24%; p-value 0.089) increased. Discussion Our resident educational program significantly increased the number of patients receiving guideline-based inpatient insulin therapy and reduced mean FSG and LOS. Rates of hypoglycemia showed a statistically significant increase while rates of severe hypoglycemia did not. Larger multicenter studies with adjustment for potential confounders are needed to further assess the impact of educational intervention on inpatient glycemic control.
Protective Role of Acute Testosterone Infusion during Acute Kidney Injury (AKI)

Arnaldo Lopez-Ruiz, Andrea Soljancic, Kiran Chandrashekar, Luis A. Juncos

Introduction: Ischemia-reperfusion (I/R) injury commonly causes AKI during cardiac or aortic surgery and is associated with 60% mortality. The incidence and severity of I/R-induced AKI is higher in male surgical patients compared to females. Acute conditions like myocardial infarction or sepsis are associated with low testosterone levels. It is known that testosterone exerts cytoprotective actions through vasodilatation and modulating inflammation. Since I/R-induced AKI in males is associated with low testosterone levels, we believe that reduced testosterone levels during acute conditions like AKI contribute to increased renal damage due to greater intrarenal inflammation and vasoconstriction.

Hypothesis: “Infusing a bolus dose of testosterone during AKI reduces the pro-inflammatory response and improves the renal hemodynamics abnormalities leading to a lower renal dysfunction”

Methods: 4 groups of male SD rats; Sham, Sham + Testosterone, I/R-AKI and I/R-AKI + Testosterone. AKI was induced by placing intra-abdominal clamps in both renal pedicles for 40 min (ischemic period); clamps were then released and the rats followed for 48hs (reperfusion period). Testosterone propionate (20 µg/kg/min iv) was given at 3 hours post ischemia. During reperfusion, urine and blood were collected to evaluate renal function (plasma creatinine) and tubular injury (urine KIM-1). After 48hs, the renal medullary blood flow (RMBF) was measured in vivo and then the kidneys were harvested to measure intra-renal TNFa (Tumor necrosis factor-alpha) and VEGF (vascular endothelial growth factor) using Elisa Kits.

Results: Plasma creatinine (0.5 mg/dl vs 2.2mg/dl) and urine KIM-1 (380 pg/24h vs. 2200 pg/24h) were higher in AKI rats vs. controls (Sham). Also, RMBF was lower in rats with AKI (9 tpu vs 19 tpu) vs. controls. Intra-renal TNFa was elevated in AKI rats vs. controls (1.2 pg/mg vs 5.9 pg/mg). However, intra-renal VEGF was markedly reduced post-AKI (35 pg/mg vs 12 pg/mg). Rats receiving testosterone had lower creatinine (1.4 mg/dl vs 2.2 mg/dl) and less tubular injury (1300 pg/24h vs 2200 pg/24h) than rats with AKI. Furthermore, testosterone improved RMBF (15 tpu vs 9 tpu), reduced intra-renal TNFa (3.1 pg/mg vs 5.9 pg/mg) and increased intra-renal VEGF (21 pg/mg vs 12 pg/mg).

Conclusion: A bolus dose of testosterone given after the ischemic period improved renal function (creatinine) and attenuated tubular injury (KIM-1). Also, testosterone improved the RMBF, reduced intra-renal TNFa (pro-inflammatory cytokine) and increased intra-renal VEGF (cytoprotective factor), suggesting that a bolus dose of testosterone following cardiac or aortic surgeries may improve renal function in patients who have developed AKI.
Incorporation of the 2013 ACC/AHA Lipid Guidelines into the Management of Patients with Diabetes

First Author: Purvi G Patel, MD Stephanie Canham, MD Emily Fondahn, MD Melvin Blanchard, MD.

Significance: 100 million people worldwide are affected by diabetes mellitus and atherosclerotic cardiovascular disease (ASCVD) is the principal source of disability and death in diabetics. With the release of the 2013 ACC/AHA Lipid Guidelines, lipid management is now based on the correct intensity of statin therapy rather than a goal LDL. Diabetics, ages 40-75, should be on a moderate or high intensity statin based on the presence of clinical ASCVD and the 10-year risk score. Our internal medicine residency clinic was at goal for percent of patients with an LDL less than 100 (56%). Our clinical observation suggested that resident physicians may have difficulty with the implementation of these new guidelines in their continuity clinic. This quality improvement project aimed to assess and improve compliance with the 2013 ACC/AHA lipid guidelines for patients with diabetes in a large Internal Medicine resident clinic.

Methods: The charts of patients with diabetes with a lipid panel checked were reviewed monthly. The patients were evaluated for clinical ASCVD and had an ASCVD risk score calculated. Compliance to the new guidelines was determined by assessing whether patients were prescribed the correct intensity statin. A baseline compliance rate was determined between the months of 3/2014-6/2014. Monthly chart audits have continued to monitor compliance with the guidelines over time. All patient charts were then reviewed a second time after at least three months to assess improvements made at follow-up appointments.

Quality improvement initiatives included a brief 5 minute presentation and hand-out to residents and attendings regarding the lipid guidelines at 5 conferences, updating the diabetic note template to include ASCVD risk score, and encouraging use of ASCVD calculator applications via e-mails to the staff.

Results: 474 diabetic patients ages 40-75 were assessed for recommended management according to the new lipid guidelines. At baseline, 52% of patients were on the correct intensity statin which increased to 55% after various initiatives and to 63% on follow-up analysis. 23% had a chart history of ASCVD, but the vast majority had an ASCVD risk score of greater than 7.5 (83.1%). The percent of patients with a documented ASCVD risk score increased from 9.1% to 51.1%.

Value & Sustainability: Despite knowledge of clinical guidelines, physicians may not readily incorporate new guidelines into their clinical practice. The 2013 ACC/AHA lipid guidelines dramatically shifted how we perceive and treat hyperlipidemia. In our clinic, we found that about half of patients with diabetes were on the correct intensity statin, which increased slightly after education and changing a note template. We did have a substantial increase in calculation and documentation of the ASCVD risk score. Continued work is needed to identify further barriers to incorporation of the new lipid guidelines.
MISSOURI POSTER FINALIST - RESEARCH Dhivya Sugumar, MBBS

Improving documentation of Advance Directives and Code status in the outpatient setting by Resident Physicians

Dhivya Sugumar M.D, Lakiea Sidney MS, Eric S. Armbrecht PhD, Chitra R Uppaluri MD.

Data reveals that primary care physicians (PCPs) are in the most optimal position to discuss advance directives (AD) and code status with their patients, yet only 18 – 36% of adults have a completed AD. Residency training is a critical time where physicians must develop the skills and knowledge to discuss these topics with their patients to ensure that these discussions are done both effectively and timely after graduation.

At baseline, 11% of Internal Medicine Residency continuity clinic patients had a documented AD, and only 7% had a documented code status. Pre-intervention surveys revealed that 90% of resident PCPs acknowledged the importance of outpatient discussion of ADs and code status, but only 4% routinely discussed these topics with their patients. To bridge this gap and improve documentation of advanced directives and code status by resident PCPs in the outpatient setting 1) educational sessions during noon conference by a palliative medicine specialist explaining the technical aspects of ADs were done 2) a reminder code status prompt in the clinic note template was implemented and 3) A palliative care sub specialty clinic was started, where residents would specifically address ADs and long term goals with their clinic patients.

Six months post intervention 2, chart reviews revealed a 58% increase in code status documentation by resident PCPs. Since implementation of interventions 1 and 3, documentation of advance directives by resident PCPs has increased by 32%. Innovative ways to increase resident awareness and education of the importance of discussing AD and code status in the outpatient setting can be successful and translate long term into improved quality of care, especially at the end of life.
Extracorporeal photopheresis as second-line treatment for acute graft-versus-host disease: Impact on six month freedom from treatment failure

Li Zhou, Emma Das-Gupta, Hildegard Greinix, Ryan Jacobs, Bipin N. Savani, Brian G. Engelhardt, Adetola Kassim, Nina Worel, Robert Knobler, Nigel Russell, Madan Jagasia

Extracorporeal photopheresis (ECP) is a promising treatment for corticosteroid-refractory or dependent acute graft vs host disease (GVHD). However, traditional clinical endpoints used in studies to evaluate treatments of this complication incompletely capture a patient’s clinical response. Six month freedom from treatment failure (FFTF) has been proposed as a novel clinical trial endpoint and is defined by the absence of death, malignancy relapse/progression, or addition of next line of systemic immunosuppressive therapy within 6 months of intervention and prior to diagnosis of chronic GVHD. In this study, we analyzed 128 patients enrolled from three centers treated with ECP as second-line therapy for acute GVHD.

Our study demonstrated that 6 month FFTF correlates strongly with overall survival at 1 year (78.9%), 2 years (70.8%), and 3 years (69.5%). Furthermore, the incidence of 6 month FFTF was 77.3% with a 2-year survival of 56%. Grade of aGVHD (grade 2 vs. 3-4) at onset of second-line therapy was an important determinant of outcome, as measured by survival (HR 2.78, P <0.001), non-relapse mortality (HR 2.78, P=0.001) and 6 month FFTF (HR 3.05, P <0.001).

Our study supports the use of 6 month FFTF as a clinical trial endpoint for evaluating second line treatments in steroid-refractory/dependent acute GVHD, and demonstrates the efficacy of ECP in this patient population.
Unexpected effects of amino acids and NMDA receptor in the treatment of Acute liver failure and acetaminophen hepatotoxicity.

First Author: Ahmad Farooq, MBBS Anaum Maqsood, MBBS Ahsan Farooq, MBBS Rafaz Hoque, MD Wajahat Mehal, MD

ABSTRACT BODY: Background: TLR4 and NLRP3 inflammasome activation are responsible for many inflammatory liver disease but little is known about their regulation. The NMDA receptor is known to be present on macrophages and its role in immune regulation has not been investigated. We used the NMDA ligand aspartic acid (AA) to test the role of NMDA activation in liver inflammation. Aims: To test if AA can modulate TLR4 and NLRP3 inflammasome signaling and liver injury via its known NMDA receptor.

Methods: The NLRP3 inflammasome was activated by LPS and ATP in primary mouse macrophages, Kupffer cells and human peripheral monocytes in the presence and absence of AA and production of pro-Il1 beta and IL-1 beta assayed. NMDA receptor and beta-arrestin 2 dependence of AA effects was examined in the RAW 264.7 cells using siRNA knockdown. AA was supplemented in vivo in the presence or absence of beta-arrestin 2 knockdown in the LPS/d-Gal hepatitis and acetaminophen hepatotoxicity. Liver tissue was examined for injury and inflammation by histological grading and serum transaminases.

Results: AA suppresses in vitro TLR4 and NLRP3 inflammasome dependent inflammation in human peripheral monocytes, mouse peritoneal macrophages and Kupffer cells as assessed by levels of pro-Il1 beta and IL-1 beta. AA immunosuppressive effects require NMDA and beta-arrestin 2. In vivo AA supplementation decreases liver inflammation and injury in the LPS/d-GalN hepatitis (hemorrhage 1.03 +/- 0.3 versus 3.89 +/- 0.2, ALT 744 +/- 406 versus 12560 +/- 5295, P < 0.05), and acetaminophen hepatotoxicity (necrosis 0.1 +/- 0.1 versus 1.4 +/- 0.1, hemorrhage 1.77 +/- 0.2 versus 2.5 +/- 0.6, liver transcript for pro-IL-1 beta and Nlrp3 caspase 1 and serum IL-1 beta release, P < 0.01). AA induced in vivo protection is dependent on NMDA and beta-arrestin 2.

Conclusions: Aspartic Acid acts through NMDA and beta-arrestin 2 to suppress TLR4 and NLRP3 mediated pro-inflammatory signaling and hepatitis. Aspartic acid has potential as a therapeutic agent in the treatment of acute liver failure.
Practices and Utilization of DVT Prophylaxis at a Community Hospital

Shahrukh Hussain Khan, Sumit Sehgal, Ranjit Makar, Aditi Singh

Deep venous thrombosis prophylaxis is an important preventive modality which should be utilized in appropriately selected patients. However, medications used for prophylaxis do not come without risk. The current CHEST guidelines recommend that patient's be appropriately risk stratified to avoid improper use of pharmacological or mechanical prophylaxis in low risk population. The aim of our study was to determine if clinicians appropriately adhere to guidelines in our community hospital. Proper use has both patient safety as well as cost implications.

We analyzed proper utilization of DVT prophylaxis in the inpatient setting to determine if clinicians implement practice current evidence based recommendations. We conducted a retrospective observational study at single center community hospital. All admissions between 4/1/14 to 4/4/14 were reviewed which included 330 patients. Among them 182 non-surgical adult patients were identified. Mean age 52.7 with 49% male patients. Average length of hospitalization was 3.4 days. In patients with DVT prophylaxis enoxaparin was used in 67 (36.8%) followed by heparin 9(4.9%). Early ambulation was selected for 43(23.7%) patients.

A DVT template was used in 154 (84.6%) patients. Padua prediction scale (PPS) was used for DVT risk stratification. All 11 parameters were abstracted from charts. Calculated mean PPS was 1.57. Pharmacological or physical DVT prophylaxis was used on low PPS score (PPS <4) on 95 (52.2%) floor patients while only 83(45.6%) patients received appropriate prophylaxis per guidelines. 4 (2.2%) patients were not placed on any prophylaxis even with high PPS score. In conclusion, we found that clinicians should be more cautious in DVT prophylaxis. Our data suggests that medications are likely overused. Efforts and policies should be made to have judicious use of DVT prophylaxis in non-surgical patients.
**NEW JERSEY POSTER FINALIST - RESEARCH Abhinav Agrawal, MD**

**Are we being an Oxy-moron: The overuse of oxygen in a community hospital setting.**

First Author: Abhinav Agrawal, MD Paavani Atluri, MD Koteswararao Thella, MD Anar Modi, MD Mana Rao, MD Imran Ismail, MD Tisha Tan, MD Madhu Paladugu, MD

**Introduction:** Oxygen is one of the most important and yet the most misused therapy in an in-patient hospital setting. In spite of having clear indications physicians often tend inadvertently order oxygen on every patient being admitted. This leads to wastage of resources and increases the cost of healthcare. More importantly, oxygen therapy is not benign and has deleterious adverse effects. Our objective was to study the overuse of oxygen and institute an intervention to prevent the wastage of resources and prevention of such potential adverse events.

**Methods:** We designed a pilot project and implemented on one of our telemetry units. We first assessed the patients on a single inpatient floor at bedside and looked into their electronic health records for indication of oxygen, co morbidities, orders for oxygen therapy, orders for titration, actual implementation of the physician orders by nurses and respiratory therapist. Our intervention was to educate the residents, nurses on the targeted floor and respiratory therapists about the potential adverse effects of overuse of oxygen, importance of titration of oxygen to a set goal, indications and expenses involved in the usage and wastage of oxygen therapy. After 4 weeks of intervention, we collected post-intervention data using the same parameters on the same floor.

**Results:** The total number of patient’s in the pre-intervention and post intervention arms were 40 each. In the pre-intervention arm, 28 patients had active orders of oxygen of which 24 had indications to be on oxygen therapy. 18 patients were using oxygen. 12 patients were using oxygen without being titrated to the goal of saturation >92%. In the post-intervention arm 22 patient’s were on oxygen of which all the patient’s had an indication to use oxygen (p-value - 0.6825). 20 of these 22 patients were using NC thus with a significant P-value of 0.0447 after an intervention. Only 4 of these patients were on therapy without titration (p value – 0.0761). Based on our calculations, the total annual saving after 1 intervention on a floor having 40 patients was $2441.12.

**Conclusion:** Based on our results, we concluded that oxygen is often used a placebo because of lack of awareness of its potential hazards as mentioned above and its expenses involved. This involves: (1) Oxygen therapy being initiated without an appropriate indication. (2) Wastage of oxygen and oxygen delivery devices in patients who are off the floor or are doing well without oxygen therapy (due to lack of titration). (3) Lack of awareness about adverse effects of oxygen. By the means of education of the physicians, trainee physicians, nurses and ancillary staff, we calculated that we could save a significant amount of expense and also avoid the preventable adverse effects of overuse of oxygen therapy.
Monmouth Emergency Evaluation Tool (MEET) - a unique tool to predict observation status.

First Author: Abhinav Agrawal, MD Sarfaraz Jasdanwala, MD Manan Parikh, MD Prashant Rawla, MD Imran Ismail, MD Warren Walkow, MD

**Introduction:** Observation status, as delineated under CMS-1599F - Inpatient Prospective Payment System, which encompasses the "two midnight rule", requires hospitals to determine whether a patient is likely to stay for greater than two midnights in the hospital. Determination of whether the patient is either an inpatient status or an observation status has a significant financial impact on both the hospital and the patient. A scale that can reliably and consistently distinguish between patients who are likely to stay for less than 48 hours and who are likely to stay for more than 48 hours would be invaluable. Correct stratification early on in the course of admission can help hospitals adopt strategies that can partially mitigate the substantial financial losses incurred in caring for general internal medicine observation patients. At the same time, it can also facilitate the interaction between the admitting physician and patient regarding the patient status.

**Objective:** To develop and retrospectively validate a scale that can reliably predict length of stay less than 48 hours.

**Methods:** The scale was devised at the Department of Medicine, Monmouth Medical Center. In devising the scale, experience gained by reviewing several thousand observation cases over several years by the faculty member mentoring the project, along with the insight obtained by reviewing the current literature and about 1000 recent observation admissions at MMC by the authors was utilized. The scale was validated retrospectively. A list of 400 consecutive patients on medicine service who were discharged by a physician from MMC in less than 48 hours after being admitted between the months of January 2013 and December 2013 was generated from medical records. Patients who were transferred to other hospitals for inpatient care, expired, left against medical advice (AMA), transferred to hospice, transferred to other departments were excluded from the list. Similarly, a contemporaneous consecutive list of 414 patients who were discharged by a physician from MMC after greater than 48 hours was generated. The scale was then applied to these patients by reviewing their electronic medical records and the data was tabulated and analyzed with the help of MS office Excel sheet and QuickCalcs-Graphpad software.

**Results:** MEET score of greater than or equal to 3 predicts a length of stay less than 48 hours with 90.5% sensitivity (95% CI between 87.10%-93.15%) and 93.47% specificity (95% CI between 90.64%-95.51%).

**Conclusion:** MEET score is easy and quick to calculate as it utilizes parameters readily and routinely available in the ED records at the time of admission. Based on the high sensitivity and specificity of the MEET scale as shown by retrospective validation, it is recommend that it be studied in a prospective fashion at MMC ED.
Association of Obstructive Sleep Apnea and Pulmonary Hypertension: a meta-analysis

First Author: Tasnim F. Imran, MD Spencer Liu BS, Tanzib Hossain MD, Marya Ghazipura MS, Hormoz Ashtyani MD, Bernard Kim MD

Background: Mild pulmonary hypertension (PH) may occur in patients with obstructive sleep apnea (OSA), even in the absence of cardiac or lung disease. There is limited data on the development and severity of pulmonary hypertension in patients with obstructive sleep apnea without underlying cardiac or lung pathology, and the response of continuous positive airway pressure (CPAP) treatment on pulmonary artery (PA) pressures.

Methods: The Pubmed, Medline, Cochrane reviews, Central Registry of Controlled Trials, Web of Science, and EMBASE databases were searched (the latest search date: October 2014) with the following keywords: obstructive sleep apnea and pulmonary hypertension, sleep apnea, pulmonary artery pressure.

Results: A total of 1,152 patients filled our criteria from 17-pooled studies. Of these studies, 8 met criteria for mean PA pressures defined as greater than 25 mmHg. The prevalence of PH in patients with OSA was calculated to be 30.6% from the literature. The pooled mean PA pressure was 33 mmHg ± 9.7 for patients with OSA who had PH. OSA patients with PH have a mean deviation of 3.29 ± 0.68 higher BMI than those without PH (t-value: 5.37, p<0.0001). Five studies measured PA pressures pre and post continuous positive airway pressure (CPAP) therapy. The mean reduction in PA pressures was 6.69 mm/HG (95% CI -12.63, -0.74) after CPAP treatment.

Conclusions: We conclude that OSA may be associated with PH (mean PA pressures of 33 mmHg ± 9.7) even in patients without coexisting cardiovascular or lung disease and in the absence of significant daytime hypoxemia. Even patients with severe OSA were noted to have only a modest increase in PA pressures. Potential mechanisms leading to daytime PH in patients with OSA include hypoxic pulmonary vasoconstriction, hypoxia induced endothelial dysfunction, and pulmonary vascular remodeling. OSA patients with PH tend to have higher BMIs than those without PH. Pulmonary hypertension is an independent predictor of mortality in patients with obstructive sleep apnea. CPAP may reduce pulmonary vessel reactivity to hypoxia and improve pulmonary endothelial function, which may reduce PA pressures to near normal. It may potentially lead to reversal of PH in some patients, but further studies with larger sample sizes and longer duration are needed to confirm this hypothesis.
Peritoneal Carcinomatosis in Colorectal Cancer: Proposed Algorithm for Cytoreduction/HIPEC

First Author: Nara Lee, MD Joseph Skitzki, MD Valerie Francescutti, MD

Background: As a natural progression of colorectal cancer, transcoelomic spread to the peritoneum result in peritoneal carcinomatosis (PC). Historically, this was approached as generalized disease with systemic therapy, but locoregional approach with cytoreduction and hyperthermic intraperitoneal chemotherapy (HIPEC) has gained wide acceptance. Given the inherent morbidity and mortality, patient selection is paramount, yet challenging due to limited practical clinical tools available. It is our attempt to reduce the confusion and assist in the decision process by providing a treatment algorithm.

Methods: Published literature in the PubMed database regarding peritoneal carcinomatosis in colorectal cancer was reviewed. Based on the available evidence, algorithm is proposed to aid in patient selection for cytoreduction/HIPEC.

Results: Peritoneal Carcinomatosis Index (PCI) of 20 is widely accepted as the threshold above which cytoreduction/HIPEC should be reconsidered as a treatment option. If PCI < 20 and complete cytoreduction can be achieved through peritoneal stripping, cytoreduction/HIPEC should be considered. If PCI <20, but prospect of complete cytoreduction is unlikely, systemic therapy is recommended with restaging CT afterwards to determine candidacy for cytoreduction/HIPEC. For PCI >/= 20, systemic chemotherapy is preferred over locoregional therapy for achieving complete cytoreduction is more difficult with increased risk of surgical complications. If restaging CT shows favorable response to systemic therapy and complete cytoreduction is probable, cytoreduction/HIPEC may be considered at that time. If unresponsive or progressive disease on systemic therapy, locoregional therapy is of limited benefit.

In synchronous peritoneal metastases with primary tumor, if primary tumor is asymptomatic and PCI < 20, resection of the primary tumor and cytoreduction/HIPEC for PC should be considered with curative intent. If asymptomatic and PCI >/= 20, systemic therapy with repeat CT to determine tumor response is recommended. If favorable, primary tumor resection with cytoreduction/HIPEC may be considered. For symptomatic primary tumor, mixed data exists regarding primary tumor resection thus decision should be made on an individual basis. If resection of symptomatic tumor is performed, we suggest systemic therapy with repeat CT to assess response. Based on the treatment response and PCI, cytoreduction/HIPEC may be considered as discussed above.

Conclusion: Although the cornerstone of treatment decisions involves a thorough discussion between the multidisciplinary team and the patient, we present treatment algorithms to assist in patient selection for cytoreduction/HIPEC. These algorithms should be used in conjunction with clinical expertise, patient’s comorbidities, performance status and surgical risk stratification.
NEW JERSEY POSTER FINALIST - RESEARCH Abdul Hameed Zaid, MBBS

Interprofessional education: establishing a collaborative medicine-pharmacy research program.

First Author: Abdul Hameed Zaid1, MBBS Jennifer Costello2, Shilpa Amara2, Daryl Schiler2, Sunil Sapru1, and Paul Yodice1 1Dept. Of Medicine, St. Barnabas Medical Center, Livingston NJ 2Dept. Of Pharmacy, St. Barnabas Medical Center, Livingston NJ

Introduction: It is imperative that students and professionals understand how to assess medical literature and conduct clinical research as medical research is vital to the progress of evidence-based medicine (EBM). A strong research foundation is an invaluable asset in judging study merit and making clinical practice decisions. Interprofessional collaboration (IPC), where participants from two or more professions learn from and with each other, is an important model in medical education. This study was conducted to determine the impact of an IPC research certificate program in improving the competence of healthcare residents and students in interpreting medical research.

Methods: Our study utilized the before-and-after study design in which an eight-hour research certificate program was provided to internal medicine residents and students as well as pharmacy residents. The program was conducted by experienced clinical pharmacists with significant research experience. It consisted of four, two-hour topic lectures on statistical concepts and clinical trial design, developing research questions and abstract writing, developing and performing platform and poster presentations, grant writing/submission and manuscript development. Participants completed the Fresno test, a validated educational tool designed to assess knowledge of basic EBM concepts, both before and after attending the program. Changes in test scores were used to assess the impact of the program on research competence. Participants were required to attend all four lectures in order to be included in the study, and each participant served as his or her own control. Test scores were evaluated using the Student's two-tailed T test for analysis. A medicine resident who did not participate in the program reviewed and interpreted all test results.

Results: The program was open to 51 participants and a total of 41 healthcare residents and students completed the program. EBM knowledge scores on the 212-point Fresno test increased from a baseline mean of 96.5 +/- 16 points (46%) to 133.7 +/- 22 points (61%) (p<0.001) upon completion of the program. These results were consistent across all disciplines; medical students, medical interns and residents as well as pharmacy residents demonstrating significant improvement in interpreting data and understanding concepts at the core of medical research.

Conclusion: An interprofessional collaboration (IPC) research certificate program increased evidence-based medicine (EBM) research knowledge, as demonstrated by a validated research test. IPC research certificate courses may be considered for incorporation into both medical and pharmacy resident training programs.
Improving the Documentation of Nutritional Supplements in an Outpatient Primary Care Clinic

First Author: Christopher Bunn DO Lida Fatemi DO, Christina Rea MD, Elizabeth Snyder MD, Jens Langsjoen MD

**Introduction**: Research indicates that 15-20% of Americans have taken some form of supplement in the last 12 months. One study demonstrated over half of patients don’t disclose supplement use because providers don’t specifically ask. Joint Commission requires documentation of supplements during medication reconciliation but the current EMR formulary does not contain a complete registry of common over-the-counter (OTC) supplements. Supplements must be tediously entered manually as miscellaneous medications. The lack of auto-populating makes documenting patient’s herbal supplements prohibitively difficult. This lack of medical documentation could result in adverse drug-supplement interactions. Our objective is to improve the documentation of supplements during electronic medication reconciliation.

**Process Mapping and Defining the Problem**: The current system for documenting supplements fails in multiple ways, but three main pathways were identified for intervention. The areas for improvement included changing the electronic medication reconciliation process by creating an auto-populating folder of supplements. Educating providers about the importance of supplement documentation and instructing providers to directly ask patients about supplement use.

Interventions: A computerized folder entitled “Supplements” was created in the EMR. This folder contains evidence based dosing of 65 supplements, 32 Chinese herbal preparations and 5 OTC proprietary herbal blends. The folder appears whenever the add medication tab is activated. When a supplement is selected from the folder, a dose, route, and frequency are automatically reconciled into the patient’s medication list.

Fifty two providers were polled regarding their attitudes toward supplements. 20% indicated that they did not perform supplement reconciliation and 68% indicated that supplement reconciliation was somewhat difficult with the current system. 23% responded that they were least concerned about patient safety and supplement use. Providers were educated about JHACO requirements for supplement reconciliation and the possible dangers of common supplement-medications interactions. Providers were trained on how to use and document supplements with the new folder. After six months of educational interventions providers will be surveyed. Changes in their attitudes toward supplement medication reconciliation along with their self reported reconciliation habits will be assessed.

In order to prompt patients to disclose supplement use providers were instructed to ask patients “In addition to your prescribed medications, do you use any supplements, vitamins, minerals, herbs, nutritional supplements or over the counter medications?”

**Measuring the Outcome**: In the four months before the interventions, 91 supplements were documented as patient medications in the EMR. In the four months following the interventions, 230 documented supplements appeared in patient’s medication lists. This represents a 130% increase in supplement documentation.

**Conclusion**: Using a dedicated supplement folder that automatically populates dose, route, frequency and indication improves the documentation of OTC supplements in an outpatient primary care clinic.
NEW MEXICO POSTER FINALIST - RESEARCH Benjamin R Deaton, MD

Trajectory and Long Term Outcomes in Patients with MRSA bacteremia

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Introduction: MRSA is an important cause of bacteremia. It remains the most common pathogen in health care associated bacteremia and carries significant morbidity and mortality. The aim of our study was to describe the trajectory and long-term outcomes of patients with MRSA bacteremia and the interplay between bacterial, treatment, and host factors in determining outcomes.

Methods: We included all patients admitted to the University of New Mexico Hospital between January 1st, 2002 to December 31st, 2013 who were either admitted with or developed MRSA bacteremia during their hospital stay. The first episode of bacteremia was considered the index case for each patient. Candidate predictor variables included: host data (age, co-morbidities, McCabe-Jackson score, MRSA carriage status, bacteremia Pitt score and criteria for complicated bacteremia), bacterial characteristics (USA strain, Panton Valentine Leukocidin production (PVL), presence of Accessory Gene Regulator – AGR) and treatment data (drug and duration). The main outcomes were mortality at 90 days and 1 year. The secondary outcomes were hospital readmission during the same period and nursing home residence. Predictors were evaluated using survival analysis.

Results: We identified 242 distinct patients with MRSA bacteremia. Mean age was 51.8 ± 16.0 years, 175 (72.3%) were male, 95 (39.3%) Caucasian and 90 (37.2%) Hispanic.

The most common sources of bacteremia were injection drug use (26%) and endocarditis (23%). USA 100 (35.5%) and USA 300 (60.5%) strains were the most prevalent. The vast majority of patients received vancomycin (237 patients, 97.9%) with a median duration of treatment of 31 days (IQR 14-42 days).

41(16.9%) patients died during the index hospitalization. Mortality at 3 months was 23.5% and 37.4% at 1 year. 62 patients were readmitted between 3 months and 1 year with infectious diseases being the main cause in 30 (73.2%) patients. Independent predictors of mortality at 3 months were age (HR 1.03; 95%CI 1.01-1.05), liver disease (HR 2.0; 95%CI 1.0-4.0) and ICU stay (HR 3.7; 95%CI 1.7-8.1). Duration of treatment of at least 4 weeks was protective (HR 0.3; 95%CI 0.2-0.8). For 1 year mortality, same variables remained significant with the addition of septic shock (HR 2.4, 95% CI 1.2-4.8.)

Conclusion: Age, liver disease, markers of severity of acute illness (ICU stay, septic shock) and duration of treatment impact mortality at 90 days and 1 year following MRSA bacteremia. Corrected for co-morbidities, there was excedent mortality at 1 year. Most readmissions were due to infectious processes.
HIV ASSOCIATED PULMONARY ARTERIAL HYPERTENSION IN A COHORT OF HIV INFECTED AFRICAN AMERICANS.

First Author: Puvanalingam Ayyadurai, MBBS

Background: Pulmonary arterial hypertension has been described in HIV patients. This is believed to be due to HIV virus per sec. The prevalence of HIV associated pulmonary artery hypertension has been estimated to vary from 0.5% to 2.6%. The purpose of this study is to find out the prevalence of HIV associated pulmonary hypertension among African Americans with HIV infection and analyse the clinical feature of this entity.

Materials and methods: A retrospective analysis of 2512 African American (males-- 1230; females-- 1282) patients with HIV infection who were seen in the Bronx Lebanon hospital and it's affiliated clinics from 2009 to 2014 were evaluated for the presence of pulmonary hypertension. Mean age of all the patients who were analysed was around 50.12. Both inpatients and outpatients were analysed involving patients of all age and both sexes. Pulmonary hypertension diagnosis was made by using Echocardiogram. For all the patients other tests like chest X ray, CT chest and in selected cases, specific laboratory tests had been done to rule out other secondary causes.

Results: Out of the 2512 HIV infected African American patients analysed, 260 (10.35%) patients had pulmonary hypertension of any cause. Out of the 260 HIV patients with pulmonary hypertension, 48 patients (1.91%) were found to be having HIV associated pulmonary arterial hypertension. Of these males were 20, females --28. Prevalence among females was 2.1% and among males 1.6%. The average CD4 count of the entire sample was 362.42. The mean CD 4 count of these patients with HIV associated pulmonary arterial hypertension were found to be 316.57 (p value >0.05) implying that the CD 4 count level does not correlate with the occurrence of pulmonary arterial hypertension in HIV patients. Mean pulmonary artery systolic pressure for all these 48 patients was 42.30. (SD+- 1.8).

Conclusion: HIV associated pulmonary arterial hypertension prevalence in this study is higher than the data obtained from other series. This is the first study done exclusively among African Americans. This study was done in the post HAART era and there is no significant difference in the prevalence of HIV associated pulmonary arterial hypertension from the pre HAART era. This implies that the HAART therapy does not alter the course of pulmonary arterial hypertension.

Limitation: This study was done as a retrospective study in a hospital set up and all limitations of retrospective and hospital based studies apply. Also in this study Echocardiogram was used to document pulmonary arterial hypertension which may not be as accurate as pulmonary arterial catheterization.
**NEW YORK POSTER FINALIST - RESEARCH Amit Bhanvadia, MD**

**Shifts in the Microbiota Following Antibiotic Therapy for Clostridium difficile Infection Favor Enterobacteriaceae**

Bhanvadia, Amit Yang, Joy Smith, Mark B. Marwil, Zachary Kassam, Zain Grossman, Evan Lawlor, Garrett Alm, Eric Martello-Rooney, Laura

**Background:** Clostridium difficile infection (CDI) is the leading health care-associated infection in the United States and a significant public health threat. Standard antibiotic treatment with metronidazole or vancomycin for primary and recurrent CDI are suboptimal; however, restoration of a ‘healthy’ gut microbiome by fecal microbiota transplantation has been promising for recurrent CDI. It is understood that CDI occurrence and recurrence is linked to a dysbiotic microbiome, however there is a paucity of data examining microbial signatures in relation to antibiotic therapy.

Aims: Our aim was to examine the microbiome in patients pre- and post-CDI treatment to determine microbial predictors of severity and response to specific therapeutic strategies.

**Methods:** We enrolled 18 patients prospectively at 2 hospital sites in Brooklyn, New York. CDI patients were identified via toxin+/PCR+ stool samples and diarrhea symptoms in keeping with clinical guidelines. Samples were collected at 4 distinct time intervals: Day 0 (diagnostic sample), T=2 days (post-treatment), T=7 days, and T=14-21 days. Stool samples were placed into 1mL RNAlater and stored at -80°C until analysis. Clinical meta-data obtained at each time interval to assess clinical severity included vital signs, abdominal pain and distension, number of bowel movements, components of the Hines VA criteria and laboratory data. Extracted DNA was multiplexed with molecular barcodes and sequenced on an Illumina HiSeq 2000.

Operational taxonomic units (OTUs) were called using an in-house pipeline, SmileTrain, which utilizes UCLUST. OTUs were then clustered by sample profile using the Ward method, with Shannon-Jensen Divergence as a distance metric. The coherence of Enterobacteriaceae OTUs upon clustering with sample profiles was assessed for significance by computing the UNIFRAC distance. A null distribution was obtained by randomizing the taxonomic labels.

**Results:** A general trend toward an increase in the relative abundance of Enterobacteriaceae (gram-negative facultative anaerobes) was observed following antibiotic therapy. We suggest that this clade is able to expand since a niche space previously occupied by sensitive strains is released upon antibiotic therapy. While this family-level classification is general and includes commensal species, it also boasts a variety of other pathogens such as Salmonella, Klebsiella, and Shigella.

**Conclusions:** The lack of targeted strategies in current CDI treatments fails to address the specific manner in which these therapies are effective. In this study, we identified a bacterial community that becomes abundant with CDI treatment regardless of the antibiotic regimen employed. The goal of this investigation is to put forth a model of bacterial identification that predicts future response to therapy.
NEW YORK POSTER FINALIST - RESEARCH Sunny Goel, MD

Relationship of Body Mass Index With All-Cause and Cardiovascular Mortality and Hospitalizations in Patients with Chronic Heart Failure- "The Obesity Paradox"

Sunny Goel, MD Abhishek Sharma, MD Carl J. Lavie, MD Jeffrey S. Borer, MD Ajay Vallakati, MD Francisco Lopez-Jimenez, MD, MSc Armin Arbab-Zadeh, MD, Ph.D Debabrata Mukherjee, MD, MS Edgar Lichstein, MD

Background: Clinical studies have indicated the existence of an “obesity paradox” in patients with chronic heart failure (HF), i.e., reduced mortality among patients who have elevated body mass index (BMI) compared to normal weight reference groups. We aim to investigate the relationship of BMI with all-cause and cardiovascular (CV) mortality and hospitalizations in patients with chronic HF.

Methods: A systematic search of studies published between 1966 to January 31, 2014 was conducted using Pub Med, CINAHL, Cochrane CENTRAL and the Web of Science databases. We identified studies reporting rate of total mortality, cardiac mortality and risk of hospitalization in patients with HF in various BMI categories [<20 kg/m^2 (low); 20-24.9 kg/m^2 (normal reference); 25-29.9 kg/m^2 (overweight); 30-34.9 kg/m^2 (obese); >=35 kg/m^2 (severely obese)] were identified. Event rates were compared using a forest plot of relative risk using a random effects model assuming inter-study heterogeneity.

Results: Two study authors independently reviewed 124 articles reporting the outcomes of interest and identified 6 studies for final analyses (N=22807). After mean follow up period of 2.85 years, the risk for adverse events was highest among patients with low BMI: Total mortality RR 1.27 [95% CI 1.17 – 1.37]; CV mortality1.20 [95% CI 1.01 -1.43]; and re-hospitalization 1.19 [95% CI 1.09 – 1.30]. Risk of CV mortality and hospitalization was lowest in overweight patients (RR0.79 [95% CI 0.70 - 0.90] and 0.92 [95% CI 0.86-0.97] respectively). Increasing degree of obesity failed to achieve a statistically significant effect on CV mortality (0.82 [0.64-1.05] and 0.71 [0.50-1.01] for obese and severely obese, respectively and on hospitalization (0.99 [0.92-1.07] and 1.28 [0.88-1.87] for obese and severely obese, respectively.

Conclusion: Risk of total mortality and CV mortality and hospitalization was highest among chronic HF patients who were underweight as defined by low BMI, whereas risk of CV mortality and hospitalization was lowest in the overweight. Further prospective studies are needed to investigate this association and apparent “overweight paradox” and explore potential underlying mechanisms for this association.
The Etiology and Risk Factor Analysis in Hypercalcemic Crisis

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Introduction: Hypercalcemic crisis is a rare but life-threatening condition involving the decompensation of hypercalcemia (usually when serum calcium > 13-15 mg/dL) with significant disturbance to cardiac, renal, gastrointestinal and neurological function. Although major textbooks have thorough and detailed reviews of hypercalcemia, there are no articles elaborating specifically the etiology and pathophysiology of hypercalcemic crisis. The goal of this study was to identify the etiologies and risk factors of hypercalcemic crisis.

Methods: We performed a retrospective review from 01/2012 to 05/2014 of patients with hypercalcemia at our tertiary care center and analyzed their characteristics. Sixty-two patients with severe hypercalcemia (adjusted serum calcium level by albumin = 13.5 mg/dL) were identified from 262 of hypercalcemia. Demographic and clinical characteristics, such as age, gender, race, etiologies (e.g. primary hyperparathyroidism (pHPT), malignancy, or other causes), serum calcium level, clinical manifestations including gastroenterology, renal, cardiovascular, altered mental status, EKG changes, precipitating factors (dehydration, acute kidney injury (AKI), infection) were evaluated.

Results: Our study revealed that there were no differences in the etiologies between hypercalcemic crisis (pHPT/malignancy/others: 15%/60%/25%) and severe hypercalcemia without crisis (pHPT/malignancy/others: 7.1%/64.3%/28.6%, P = 0.617). Compared with severe hypercalcemia without crisis, the serum calcium level was significantly higher in hypercalcemic crisis (16.9±1.8 mg/dL vs 14.8±1.1 mg/dL, P < 0.001). However, no differences in serum calcium level were observed among the subgroups of different etiologies in hypercalcemic crisis (P = 0.662) or severe hypercalcemia without crisis (P = 0.423). The logistic regression analysis showed that serum calcium level (OR = 3.66; 95% CI: 1.83 to 7.31) and age (OR = 1.06; 95% CI: 1.00 to 1.13) were independent risk factors for hypercalcemic crisis. Specifically in our risk-prediction model, 1 mg/dL increase serum calcium concentration increases 2.7 times the odds of hypercalcemia crisis; one year increase in age increases the odds of hypercalcemic crisis by 61%. The multivariate linear regression analysis showed that significant predictors of serum calcium level in hypercalcemic crisis were age (β = -0.694, P = 0.001) and AKI (β = 0.449, P = 0.013).

Conclusion: To our knowledge, this is the first and most comprehensive study to investigate the etiology and risk factors of hypercalcemic crisis. Our constructed risk-prediction model makes possible the rapid and easy calculation of risk for hypercalcemic crisis. The accurate assessment of risk before investigating etiology has an important place in hypercalcemic crisis screening. The implementation of our risk-prediction model is expected to improve clinical and critical care practice in hypercalcemic crisis.
Patient satisfaction: Is it linked to quality and cost of care?

First Author: Ronald A Luna, MD Second Author: Linda Williams, MD Third Author: Daniel Pomerantz, MD Fourth Author: Prasanta Basak, MD Fifth Author: Stephen Jesmajian, MD

Introduction. Patient satisfaction surveys are used to gauge the quality of service of hospitals. However, the relationship between patient satisfaction and other metrics such as quality and cost of care remains unclear.

Methods. We examined the association between the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient satisfaction survey scores and core measures performance, Medicare spending, mortality rates, readmission rates and emergency department wait times in 2,206 US hospitals (282 teaching and 1924 non-teaching). We used the 2013 data from the Medicare Hospital Compare website.

Results: Patient satisfaction (score of 9 or 10 in HCAHPS overall rating) is positively associated with core measures performance in myocardial infarction, heart failure, pneumonia and surgical care improvement (Spearman’s rank coefficient $\rho = 0.23$, $P < 0.001$). Patient satisfaction is negatively associated with risk-adjusted spending per Medicare beneficiary ($\rho = -0.18$, $P < 0.001$), risk-standardized all-cause 30-day readmission rate for myocardial infarction, heart failure and pneumonia ($\rho = -0.26$, $P < 0.001$) and time from emergency department arrival to departure for admitted patients ($\rho = -0.21$, $P < 0.001$). We found no association between patient satisfaction and 30-day risk-standardized all-cause mortality for myocardial infarction, heart failure and pneumonia ($\rho = -0.01$, $P=0.38$). In addition, there was no difference in patient satisfaction between teaching and non-teaching hospitals (70% and 69% respectively, $P=0.095$).

Conclusion. High patient satisfaction is associated with adherence to core measures, low spending, low readmission rate and short emergency department wait time. Patient satisfaction can be used as an indicator of quality of care and other hospital metrics.
Absence of ST Elevation in Lead V1 Predicts Worse Long-term Outcomes in Patients with First Anterior ST Elevation Myocardial Infarction

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Background: The extension of ST elevation to leads V5–6 is associated with larger infarct size in patients with anterior ST-elevation myocardial infarction (STEMI). However, the significance of presence or absence of ST elevation in lead V1 in the setting of anterior STEMI has not been elucidated.

Methods: We performed a retrospective analysis of 190 consecutive first anterior STEMI patients who underwent coronary angiography. ST elevation in lead V1 >0.1mV on the admission electrocardiogram was recorded. Patients were divided into those with and without ST elevation in V1. Creatine kinase level was measured serially at approximately a 6-h interval before and after catheterization, as clinically indicated, with the highest level designated as the peak creatine kinase. Baseline characteristics, echocardiographic and angiographic findings, as well as in-hospital and 1-year major adverse cardiac events (MACE) defined as all-cause death, recurrent myocardial infarction, and target vessel revascularization were compared between patients with and without ST elevation in V1.

Results: Of the 190 patients, 148 patients (78%) had ST elevation in V1 and 42 (22%) did not. There was no significant difference in baseline characteristics between the two groups. Patient without ST elevation in V1 had a higher peak creatine kinase value (median; 3688 IU/L vs. 2563 IU/L, p=0.02). There was a trend toward lower left ventricular ejection fraction in patients without ST elevation in V1 (median; 35% vs. 38%, p=0.06). The prevalence of ST elevation in leads V5–6 was higher in patients without ST elevation in V1 (88% vs. 70%, p=0.02). Patients without ST elevation in V1 had a higher rate of Killip class 3 or 4 on admission (26% vs. 10%, p=0.008) and a lower rate of proximal left anterior descending artery culprit lesion (36% vs. 58%, p=0.01). At 1-year follow-up, patients without ST elevation in V1 had a higher incidence of MACE (38% vs. 13%, p<0.001), driven by a higher incidence of all-cause death (26% vs. 5%, p=0.001). On multivariate analysis, absence of ST elevation in V1 was an independent predictor for 1-year MACE after adjusting for age, Killip class on admission, left ventricular ejection fraction and ST elevation in leads V5–6 (Odds ratio 2.82; 95% confidence interval 1.09–7.26; p=0.03).

Conclusion: Absence of ST elevation in V1 was associated with larger infarct size and an independent predictor for 1-year adverse cardiovascular events in patients with first anterior STEMI.
Indwelling Urinary Catheters in Hospitalized Patients: Appropriate Use, Discontinuation and Follow-up: A Quality Improvement (QI) Project

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Background and Objective: Urinary catheters (UC) are commonly used in hospitalized patient, often for inappropriate indications. Once a catheter is removed, a post-removal follow up with quality measures is also indicated. The following project was initiated at our hospital following a UC removal in an older female, with inadequate follow up leading to urinary retention and an unhappy caregiver. Inappropriate use of UCs is associated with poor quality of care and morbidity.

Methods: This QI project was setup at the request of IPRO to improve physician knowledge and skills in managing indwelling UC catheter discontinuation and follow-up. The study was conducted over 2 months; every UC insertion in patients in the department of medicine was reviewed for indication, catheter removal and follow up for retention post-removal. Prior to starting the study, education was imparted to care providers and via prompts during interdisciplinary team rounds to increase physician awareness about catheter insertion, removal and assessment means post-removal.

The primary endpoint was timely removal of indwelling UCs. Secondary endpoints included follow up post catheter removal using clinical assessment, indirect assessment (bed wet or not wet) and where indicated post void sonogram. Patient caregiver involvement was also assessed.

Results: During the total study period, total 90 patients had an indwelling UC during the hospital stay over period of 2 months. 7% of patients with catheters had them on admission, 93% were inserted (64% ED, 20% medical floor and 9% in ICU). Following education, a significant increase was noted in providing follow up assessment (clinical or indirect) following catheter removal. 80% catheters were discontinued, while 20% were discharged with catheters in place. Post void sonogram was used in 4% of patients only. Discussions relating to catheter removal with family/caregiver and documentation improved from 42% to 76%. Instructions to providers of care (NH/Rehab) were documented in 20% in first month, but increased to 42% in 2nd month; they related to patients discharged to home or nursing home with indwelling urinary catheters.

Conclusions: A simple educational intervention is effective in raising health care provider awareness of the appropriate handling of indwelling UCs, including indications, removal, and follow-up with discharge instructions. Favorable response to such performance improvement strategies helps improve quality of care and caregiver satisfaction in a short period of time.

Reference

Evaluation of a Practical Low-Cost Quality Intervention to Improve Adherence to Evidence-Based Cancer Screening Recommendations in 642 Patients

First Author: Alejandro Recio Boiles, MD Jose N. Galeas Soriano , Parham Eshtehardi, Pavlos Msaouel, Andrew H. Gutwein, Richard J. Gralla.

Introduction: Current cancer screening rates remain lower than those targeted for Healthy People 2020, for cervical cancer (83%, target 93%), breast cancer (72%, target 81%) and colorectal cancer (59%, target 71%). A major issue continues to be non-adherence of providers to United States Preventive Task Force Service (USPSTF) recommendations that is directed at the significant reduction of morbidity and mortality, by approximately 350,000 and 100,000/year respectively. We tested whether distribution of USPSTF recommendations in a Health Maintenance (HM) card format among house staff of a teaching institution would lead to an increase in guided action and documentation, and subsequently could show a reduction in health care costs by avoiding over- and under- screening of cancer.

Methods: In January 2013, HM cards including up to date USPSTF recommendations were distributed to house staff and posted in each medicine clinic exam room. We compared data before and after the implementation of HM cards through review of appropriate electronic medical record (EMR) charting during the relevant periods, for screening documentation in accordance with the recommendations. Any screening action not following age or interval range consistent with USPSTF recommendations was considered inappropriate. We thus compared primary care visits in December 2012 (before card distribution, n = 336) with December 2013 (a year after distribution of cards, n = 306), using randomly selected and retrospectively reviewed EMRs.

Results: Cancer screening adherence to USPSTF recommendations had a significant increase by 40.8% (p<0.0001) for cervical, 33.2% (p<0.0001) for breast and 20.5% (p<0.0001) for colorectal cancer. Inappropriate screening actions were reduced by 26.8% (p<0.0001) for cervical and 32.8% (p<0.0001) for breast cancer. Only a 1.1% reduction (p= 0.829) was observed for colorectal cancer.

Conclusions: The HM card was found to be an effective and inexpensive approach which educated about cancer screening and most importantly had an impact on adherence to updated USPSTF recommendations. This intervention reduced unnecessary testing and radiation exposure; potentially it should reduce costs. Given prior studies indicating benefit by linking an EMR with cancer screening, the addition of this simple and universally available card should be tested to determine if the combination of these methods further enhances compliance with evidence-based screening recommendations.
NEW YORK POSTER FINALIST - RESEARCH Daniel C Rodriguez, MD

Is echocardiogram and left ventriculography both necessary in patients undergoing elective left heart catheterization?

First Author: Daniel C Rodriguez, MD Ram Balasubramanian MD, Joshua Fogel PhD, Vijay Shetty MD, Adnan Sadiq MD, Jacob Shani MD, Robert Frankel MD

Background: In the retrospective study of 96235 patients who underwent coronary angiography, 81.8% of the patients had left ventriculography and nearly 88% of the patients had a very recent ejection fraction assessment by another modality (within 30 days) and had no intervening diagnosis of new heart failure, myocardial infarction, hypotension or shock. We sought to analyze if there are significant differences in the assessment of ejection fraction and wall motion abnormalities between left ventriculogram and transthoracic echocardiogram in patients undergoing elective left heart catheterization. We also focused to study if there are significant changes in renal function after left ventriculogram.

Methods: We performed a retrospective analysis of 98 consecutive patients who had elective cardiac catheterization with a left ventriculogram at Maimonides Medical Center from November 2009 to November 2012 and who have had a transthoracic echocardiogram and renal function tests within 48-72 hours of the cardiac catheterization. Patients who had emergent left heart catheterization and those who had presented with STEMI and NSTEMI were excluded from the study. Patient(s) who had complicated PCI such as acute in-stent thrombosis were also excluded. The basic demographics, comorbid conditions, renal function, left ventricular ejection fraction and wall motion abnormalities were analyzed.

Results: There were very high percentages for agreement in the assessment of ejection fraction and anterobasal segment wall motion findings. Anterolateral, apical, and inferior segments had high percentages for agreement with minor disagreement all in the 20% range. Inferobasal segment had the lowest percentage for agreement at 66.3% and highest percentage for minor disagreement at 32.7%. The greatest percentage for major disagreement was for ejection fraction at 7.1%.

Conclusions: In summary, there are no significant differences in the reporting of ejection fraction by echocardiography and left ventriculography. However compared to echocardiogram, left ventriculogram might provide more incremental information about wall motion abnormalities in anterolateral and inferior segments which could be clinically significant. Hence we conclude that the use of left ventriculography in patients undergoing elective cardiac catheterization should be individualized based on the risk benefits and the clinical scenario.
Does an Upright T Wave in Lead V1 Predict Left Anterior Descending Artery Lesion and/or a Left Circumflex Artery Lesion on Cardiac Catheterization?

First Author: Naveen Sablani, MD, MS, Drew Murray, Praveen Chatani, Young Lee, MS, Bonnie Simmons, DO, Soheila Talebi, MD, Roger Chirurgi, MD, George Fernaine, MD, FSCAI, Getaw Worku Hassen MD, PhD

**Background:** An upright T wave (UTW) in V1 can be a normal variant in some cases, but it is considered abnormal especially if it is very tall and new. Few studies have investigated the significance of a UTW on V1 in predicting the presence of significant coronary artery disease (CAD). We investigated whether an UTW in lead V1 was associated with a left anterior descending (LAD) lesion in addition to association with left circumflex artery disease (LCfx), RCA or multi-vessel lesions.

**Methods:** We conducted a retrospective chart review of patients who presented with symptoms of acute coronary syndrome (ACS), or had positive stress test and underwent cardiac catheterization (cath). We evaluated patients with a significant UTW in V1 (= 0.15 mv) in their pre-cath electrocardiogram (ECG) and compared it to their post-cath ECG. We sought to determine if there was a relationship between UTW in V1 and location of coronary lesion.

**Results:** Out of 263 patients studied 53 (20.2%) patients had a significant UTW in V1, 29 (55%) had lesions in the LAD, and 10/29 (34%) had proximal LAD lesion. Post intervention 21 (39%) of 53 patients had normalized their T wave in V1. Nine (42%) out of 21 patients had involvement of the LCfx and another artery. Eleven (52%) patients had involvement of the LAD and another vessel. Only 5/21 (24%) patients had some involvement of the RCA. Of the 20 patients who did not have a change in T wave polarity, 13 (65%) patients had a lesion in the RCA.

**Conclusion:** A significant UTW in V1 may signify a lesion in the LAD, among other vessels, and in the appropriate clinical setting the presence of significant CAD should be suspected. Our study was limited by a small sample size. A large scale study in patients undergoing cardiac cath may elucidate the relationship between a UTW and the presence of significant CAD, specifically whether LAD is involved in ACS or as a preceding ominous sign for Wellens Syndrome.
NEW YORK POSTER FINALIST - RESEARCH Anawin Sanguankeo, MD

Association Between NSAIDs and Clostridium difficile-associated Diarrhea (CDAD): a Systematic Review and Meta-Analysis

First Author: Anawin Sanguankeo, MD Co-Authors: Nitipong Permpalung, MD Sikarin Upala, MD Suthanya Sornprom, MD

Objectives: Clostridium difficile infection is a leading cause of nosocomial diarrhea in developed countries. The incidence of community-acquired Clostridium difficile-associated diarrhea (CDAD) has increased in the past decade. Studies evaluating the associations of increased risk of community-acquired CDAD and the use of non-steroidal anti-inflammatory drugs (NSAIDs) have yielded inconclusive results. We conducted a systematic review and meta-analysis to compare the odds of NSAID exposure in patients with CDAD versus patients without CDAD in both community-based and healthcare-associated settings.

Methods: Established procedures were followed (MOOSE guidelines) to complete this study. Relevant observational studies indexed in the Cochrane Central Register of Controlled Trials, PubMed/MEDLINE, and EMBASE up to October 2014 were analyzed and data were extracted from nine studies. Of these, eight studies were included in the meta-analysis. The quality of observational studies was assessed using the Newcastle-Ottawa quality assessment scale.

Results: A search of the databases resulted in 987 articles, of which 971 were excluded. The nine studies from which data were extracted involved over 39,000 subjects. The pooled odds ratio for history of NSAID use in participants with CDAD compared with controls was 1.41 (95% CI 1.06–1.87; p<0.01), indicating a significant increased odds of CDAD among patients exposed to NSAIDs.

Conclusions: To the best of our knowledge, this is the first study of its nature to demonstrate the association between the use of NSAIDs and increased risk of CDAD. Further studies to evaluate if any specific types of NSAIDs can increase the risk of CDAD are warranted.
NEW YORK POSTER FINALIST - RESEARCH Ali A Torbati, MD

The Correlation of TIMI Risk Scores with Extent of Coronary Artery Disease in a Multi-Ethnic Patient Population Presenting with Non-ST Elevation Myocardial Infarction

First Author: Ali A Torbati, MD Joyce Chou, MD, Nyla Malik, MD, Preston Garnes, MPH, Francois Dufresne, MD

Introduction: Current literature demonstrates that in patients with non-ST-elevation acute coronary syndrome (includes unstable angina and non-ST-elevation myocardial infarction (NSTEMI)) who are referred for cardiac catheterization, the initial Thrombolysis in Myocardial Infarction (TIMI) risk score at presentation correlates with: angiographic severity, extent of coronary artery disease (CAD), death, and ischemic events. In this study, we explored the correlation of the initial TIMI risk scores with the extent of CAD specifically in patients with NSTEMI.

Methods: A retrospective cross-sectional study was conducted on 200 consecutive multi-ethnic patients with an initial diagnosis of NSTEMI who underwent coronary angiography from August 1, 2012 to December 30, 2013 at an urban community teaching hospital. Patients who did not have NSTEMI as one of the final diagnoses in the discharge summary and patients with history of previous coronary artery bypass graft (CABG) or recent cardiac catheterization and any ST elevation changes during same admission were excluded from this study. TIMI score was calculated based on the seven standard variables of NSTEACS TIMI scoring. Patients were divided into two risk groups based on their initial NSTEACS TIMI scores. One group had TIMI scores = 4; the other > 4. Stenosis = 70% in any of the epicardial vessels and = 50% in left main was considered as significant. Descriptive statistics and ?² bivariate analysis were performed.

Results: A total of 133 patients were included in this study. Of these, 77 (57.89%) were male and 56 (42.11%) were female. The age range was 30-94 years old with a mean age of 67.64 ± 13.05 years and median of 68 years old. The average TIMI score was 2.98 ± 1.33. 119 (89.5%) patients had TIMI scores =4 and 14 (10.5%) patients had TIMI scores > 4. After reviewing cardiac catheterizations results, no significant difference was reported between patients in the two TIMI score risk groups.

Conclusion: In contrast to previous studies, our study done on a multi-ethnic population at an urban community hospital demonstrated that after reviewing cardiac catheterization results of patients with NSTEMI, no significant difference was found with regard to presenting TIMI score and angiographic severity at time of catheterization. Our results suggest the need for further investigation of the relation between risk scores and specific subtypes of acute coronary syndromes.
Impact of Troponin Elevation Among Critically Ill Patients

INTRODUCTION: Cardiac troponin I (cTnI) is a myocardial contractile protein, the plasma level of which increases after myocardial damage. Troponin elevations are common in critically ill patients, and often are associated with an adverse prognosis. Whether this effect is related to the severity of the underlying disease process or to primary cardiac involvement per se, is unclear. We investigated the frequency of elevated troponin levels and its association with mortality and association with the need for ventilator, inotropic and sedative support.

METHODS: We conducted a retrospective chart review of all patients admitted to the ICU from October 2011 to 2012. APACHE II score, and use of any inotropes, sedation and ventilator support were also recorded. Inclusion criteria included patients admitted to the ICU with cTnI measurement and EKG recording within the first 24 hours of admission. Patients diagnosed with acute coronary syndrome, those who underwent major surgery within one month prior to admission or cardiopulmonary resuscitation prior to admission, were excluded. Continuous variables were presented as mean values. The student T-test was used to observe for any difference between groups.

RESULTS: A total of 145 patients were included in the study. There was no difference in APACHE II scores at baseline for both groups (p=0.48). The overall prevalence of elevated cTnI was 15%. The mortality rate was 28% for patients with normal cTnI (n=31) and 48% for those with elevated cTnI levels (n=10). Among the population with elevated troponins, only 6 had a history of coronary artery disease (CAD) and 1 patient died (mortality rate of 16.7%). Also, still in the group with elevated troponins, 16 patients had no documented history of CAD but 9 patients died (mortality rate of 56.25%).

There was a trend towards a greater need for inotrope support in the high cTnI group (29% in normal cTnI group vs 41% in elevated cTnI group, p=0.0752). There was no difference between groups for ventilator support (59% vs 68% p=0.1862) and sedation (25% vs 27% p=0.7471).

CONCLUSION: Our findings demonstrate that in critically ill patients, troponin elevation is associated with a higher risk of mortality, even after adjustment for severity of illness. This risk was regardless of their history of CAD. Thus making the need for obtaining a troponin level in critically ill patients crucial for prognostication. Further studies are necessary to explore other subsets of patients and their relation to troponin elevation.
The Efficacy and Safety of DPP4 Inhibitors compared to Sulfonylureas as add-on Therapy to Metformin in Patients with Type 2 diabetes: A Meta-analysis

Basem M Mishriky, MD, Doyle M Cummings, PharmD, FCP, FCCP, Robert J Tanenberg, MD, FACP

Purpose: Recent guidelines recommend metformin as the best initial drug for Type 2 diabetes (T2D). However, there is no consensus for add-on therapy if metformin fails to achieve the therapeutic goal. Sulfonylurea (SU) are an older while dipeptidyl peptidase-4 inhibitors (DPP4-I) are a newer class of antidiabetic medication. We performed this meta-analysis to determine the efficacy of DPP4-I compared to SU as add-on therapy to metformin in inadequately controlled T2D.

Methods: We searched MEDLINE, CENTRAL, EMBASE, and CINAHL for randomized trials comparing DPP4-I to SU as add-on therapy to metformin in inadequately controlled T2D and reported a change in A1c from baseline to a minimum of 12 weeks. Number needed to harm (NNH) was calculated for statistically significant side effects.

Results: Sixteen studies [1-16] were included. Pooled results showed a significantly greater reduction in A1c from baseline to 12 weeks favoring SU (MD [95%CI]= 0.21% [0.06, 0.35]) but no significant difference at 52 and 104 weeks between the two groups (MD [95%CI]= -0.01% [-0.07, 0.05] and -0.06% [-0.13, 0.02] respectively). There was a significantly greater weight reduction at 12, 52, and 104 weeks favoring DPP4-I (MD [95%CI]= -1.57Kg [-1.85, -1.28], -2.11Kg [-2.49, -1.72], and -2.13Kg [-2.58, -1.68] respectively). The proportion of patients achieving A1c< 7%, irrespective of hypoglycemia, showed no difference between the groups at 12, 52, and 104 weeks (RR [95%CI]= 0.93 [0.78, 1.12], 1.03 [0.95, 1.12], and 1.01 [0.93, 1.09] respectively). However, there was a statistically significantly greater proportion of patients achieving A1c< 7% with no hypoglycemia episodes in the DPP4-I group at 52 and 104 weeks (RR [95%CI]= 1.20 [1.05, 1.37] and 1.53 [1.16, 2.02] respectively). Incidence of hypoglycemia (=1 episode) was significantly lower at 12, 52, and 104 weeks in DPP4-I group (RR [95%CI]= 0.32 [0.22, 0.45]; NNH=8, 0.14 [0.08, 0.24]; NNH=6, and 0.15 [0.11, 0.20]; NNH=5 respectively). The percentage of patients with hypoglycemia (=1 episode) was higher with the SU compared to DPP4-I (20% vs 6% at 12 weeks, 20% vs 2% at 52 weeks, and 27% vs 4% at 104 weeks respectively).

Conclusion: While both SU and DPP4-I can be considered as options for add-on therapy to metformin in inadequately controlled T2D, SU results in a significantly increased risk of hypoglycemia and weight gain. By contrast; DPP4-I produce 0.4-0.6% reduction in HbA1c, lower risk of hypoglycemia, and weight loss.

"Seven Is the New Ten" – Comprehensive Quality Improvement Project to Adopt Restrictive Transfusion Strategies in a Community Hospital

First Author: Rahul Singh, MD, Charin Hanlon, MD, FACP

**Introduction:** An estimated 13,785,000 units of packed red blood cells (PRBC) were transfused in the US in 2011 of which an estimated 57.9% were found to be from the medical service. Risks of blood transfusion include infections and transfusion reactions.

In 2012, the American Association of Blood Banks released new guidelines for PRBC transfusion in hospitalized, hemodynamically stable patients. These guidelines set a threshold Hb of $\geq 7$ g/dL in critically-ill patients, and a Hb $= 8$ g/dL for surgical patients, for patients with pre-existing cardiovascular disease, or for patients with symptoms (tachycardia, chest pain or hypotension not corrected by crystalloids).

**Methods:** An IRB-approved retrospective study of inpatient PRBC transfusions at our hospital was conducted in 2013. The average pre-treatment Hb was noted to be $7.42 \pm 0.92$ (p=0.0009) and average number of units transfused were $1.78 \pm 0.58$ (p=0.1133). The average number of units transfused were $=1.5$, and 31% of the time 1 unit was given.

This data prompted a quality improvement initiative to improve in hospital transfusion strategies. The PDSA cycle included the following interventions. Hospital administration created a “Transfusion Safety Officer”. A transfusion committee championed by the Blood Bank Director was formed. In addition, a series of hospital wide didactics centered on restrictive transfusion practices were held, targeting nursing and physicians of all disciplines. A public relations campaign was launched by the hospital involving posters, newsletters, bulletins, and emails centered around slogans “7 is the new 10” and “1 is better than 2.” Four months after this, a new computerized physician order set was created by the Transfusion Committee and instituted in September 2014. The order set specifically separated out chronic anemia from acute blood loss anemia. Under the chronic anemia tab, practitioners can select the reason for PRBC transfusion based off of AABB guidelines, but are restricted to only transfusing 1 unit of PRBC at a time. Finally a new “My Report” has been built within EPIC EMR to allow a physician to see their transfusion average Hb and number of units ordered.

An IRB-exempt review of PRBC transfusions after the quality improvement impact and post CPOE go-live date was conducted. A total of 493 PRBC transfusions in non-acute blood loss patients were given between 9/11/14-11/1/14. The average pre-treatment Hb 7.0 of which 59% of the time 1 unit was PRBC was ordered.

**Conclusions:** A comprehensive, interdisciplinary QI project can successfully reduce unnecessary PRBC transfusions. By applying the PDSA cycle and harnessing the power of the EMR, we can improve the rapidity with which physicians adopt new evidence based guidelines. The success of a hospital-wide QI
project of this magnitude hinges on a motivated project management team able to engage all necessary stake-holders, to include the hospital C-Suite.
A Novel Outpatient Curriculum to Improve Residents’ Awareness and Knowledge of High Value Care (HVC)

Eric Walford, MD; Stacey Sheridan, MD; Richard Wardrop, MD; Brooke McGuirt, MBA; Thomas Miller, MD

Introduction: Health care costs are unsustainably high and continue to rise. As much as 87% of the estimated $700B in annual wasted healthcare costs can be attributed to the actions of physicians. In response, organizations like the American College of Physicians (ACP) have developed curricula aimed at teaching HVC to physicians in training. We assessed the need for a HVC curriculum within a large university-based Internal Medicine training program and pilot-tested a customized curriculum focused on HVC in the outpatient setting.

Methods: In May 2014, surveys were distributed to all internal medicine residents at the University of North Carolina (UNC) to assess their beliefs about HVC and their knowledge about the costs and effective use of medical tests. We then developed a novel HVC curriculum composed of three sessions as part of the existing faculty-led clinic conferences. The first session presented ABIM Choosing Wisely recommendations that applied to ambulatory medicine in the format of a Jeopardy game show. The remaining sessions used outpatient-focused cases from the ACP’s HVC curriculum, adapted to include data specific to UNC Hospitals, including actual costs of tests. Following the sessions, post-intervention surveys were distributed to all internal medicine residents.

Results: 32 of 69 categorical internal medicine residents (46%) completed baseline surveys on HVC, including 12 PGY-1, 11 PGY-2, and 9 PGY-3 residents. On baseline pre-survey, 53% were familiar with the term “High Value Care”, 54% were aware of published HVC guidelines, 56% felt they knew how to avoid wasteful testing, and 16% felt they knew the cost of common tests. On baseline pre-survey of residents’ knowledge, residents answered correctly on 25% of healthcare spending questions, 21% of questions on costs of common tests, and 60% of questions on low-yield testing.

Thirteen out of 37 residents (35%) scheduled in clinic during intervention weeks attended at least one session and completed both a pre- and post-survey. When comparing pre- and post-survey responses, residents demonstrated improvement in familiarity with HVC (62% to 85%), awareness of published HVC guidelines (54% to 85%), and familiarity with costs of common tests (23% to 54%). These residents also answered more questions correctly on the topic of healthcare spending in the United States (26% to 49%). With a sample size of thirteen, none of these changes were found to be statistically significant.

Conclusions: The pre-survey results demonstrate a lack of understanding of key HVC topics, including costs of common tests and awareness of published guidelines. A new, customized curriculum on HVC improved residents’ familiarity with both HVC and healthcare costs. Curricula of this format may need further optimization before widespread implementation.
Is There a Gender Disparity in the Management of STEMI?

First Author: Srinivasa Madhavan, MD Thomas Haldis, DO Susan Farkas, MD

Background: Women with STEMI (ST elevation Myocardial Infarction) tend to have higher mortality, which has been attributed in part to not receiving appropriate and timely management compared to men. Accordingly, a standardized protocol for the management of STEMI should eliminate any putative gender disparity. We sought to ascertain if there was any difference in management between men and women, when a standardized protocol was followed for management of STEMI.

Methods: Data for this study were obtained from a prospective STEMI database registry from a tertiary care community-based teaching hospital with a standardized STEMI management protocol. Consecutive patients admitted between January 2010 and June 2013 with clinical and electrocardiographic finding of STEMI were included in the study. All statistical tests were two tailed with p<0.05 considered to be significant. Chi square test for categorical variables and t test of the means were performed.

Results: A total of 843 patients were enrolled in the study; 215 (25.5%) were women. Mean age of the women was significantly greater than men (68±15 vs. 61±13 years, p<0.0001). Chest pain was the most common presenting symptom in both men and women (45% and 40% respectively, p=0.203). An electrocardiogram (EKG) was obtained earlier after hospital presentation in men than women; 73% men and 59% women had an EKG within 10 minutes of being evaluated by the first medical contact (p<0.0001). A significantly higher number of men underwent thrombolysis (17% vs. 9%, p<0.005). The time to percutaneous coronary intervention (PCI) from the time of diagnosis was similar in men and women (101±73 vs. 105±58 minutes, p=0.534). Mortality was higher in women than men (4.0% vs. 1.4%, p=0.0255). Post-hoc analysis with stratification of the cohort based on time to first EKG showed no statistically significant difference in mortality between men and women.

Conclusion: The results from our large cohort study concludes that, with a standardized protocol for management of STEMI, there was no difference in time to PCI from the time of diagnosis, between men and women. However, we identified a delay in obtaining the initial EKG in women, which appeared to impede the diagnosis of STEMI, which in turn could have lead to the higher mortality among women despite similar duration from diagnosis-to-PCI. We recommend improving the time to first EKG in patients presenting with symptoms suggestive of acute coronary syndrome in order to facilitate early diagnosis and treatment of STEMI.
Statin Therapy Impact on Postoperative Outcomes in Cardiac Surgery: A Meta-Analysis of Randomized Controlled Trials

First Author: Shadi Al Halabi Second Author: Saqer Alkharabsheh Third Author: Hadi Al Halabi Fourth Author: Ayman A. Hussein Fifth Author: Mina K. Chung

Introduction: Postoperative complications of cardiac surgery are common and associated with increased morbidity and mortality. Statins have been proposed as one of the interventions which may help reduce the incidence of postoperative complications. We performed a meta-analysis of randomized controlled trials (RCTs) comparing statin therapy to placebo in preventing post cardiac surgery outcomes.

Method: We searched Pubmed, Medline, Embase and Cochrane for prospective RCTs that compared the effect of statins to placebo on incidence of postoperative complications in patients undergoing cardiac surgery. Study quality was assessed using the Jadad score. Heterogeneity of the studies was analyzed by Cochran’s Q statistics. Mantel Haenszel relative risk and mean difference were calculated using the fixed effect model.

Results: Ten RCTs met our inclusion criteria and included 998 patients. Statin use was associated with shorter hospital (Mean difference -0.59 days; 95% CI -0.78, -0.40; P<0.001) and ICU stay (Mean difference -0.11 days; 95% CI -0.21, -0.00; P =0.05) compared to placebo. No differences in the incidence of myocardial infarction (RR 0.79; 95% CI 0.32, 1.99; P= 0.25) or acute kidney injury (AKI, RR 0.44; 95% CI 0.18, 1.12; P= 0.08) after cardiac surgery were found between the two groups. There was no evidence of heterogeneity or publication bias among the reported outcomes.

Conclusions: In patients undergoing cardiac surgery, statin therapy is associated with decreased hospital and ICU stay. However, it had no effect on myocardial infarction or incidence of AKI.
The Impact of Fellow Involvement on Quality Measures and Patient Satisfaction of Colonoscopy in Newly Established Gastroenterology Fellowship Program


**Background:** Studies have demonstrated conflicting data regarding the impact of trainee involvement during colonoscopy. To the best of our knowledge, there has been no study evaluating the effect on the quality of colonoscopy in a newly established gastroenterology fellowship program.

**Purpose:** To examine whether fellow participation during screening or surveillance colonoscopy affects the adenoma detection rate (ADR), polyp detection rate (PDR), cecal intubation rate (CIR), and patient satisfaction.

**Method:** This was a retrospective study of colonoscopies performed in an academic center from July 2012 to December 2013. Comparison of ADR, PDR, CIR, and patient satisfaction were examined when performed by fellows with supervising staff endoscopists (n=424) and those performed by staff endoscopists without fellow participation (n=558). Statistical analyses were performed by using logistic regression.

**Results:** There was no evidence of a lower rate of polyp detection in colonoscopies with a fellow present (OR 0.83; 95% CI 0.64, 1.07). Findings were similar for adenoma detection (OR 0.94; 95% CI 0.7, 1.24; P=0.65), CIR (OR 0.92; 95% CI 0.58, 1.46; P=0.73), and patient satisfaction (OR 0.59; 95% CI 0.16, 2.23).

**Conclusion:** Involvement of a fellow during colonoscopy in newly established gastroenterology fellowship program didn’t affect patient satisfaction, cecal intubation, adenoma, and polyp detection rates.

**Table 1:** Comparison of Quality Indicators and Patient Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>With Fellow (n=424)</th>
<th>Without Fellow (n=558)</th>
<th>OR</th>
<th>95% CI</th>
<th>p value</th>
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<td>PDR %</td>
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<td>0.83</td>
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<td>ADR %</td>
<td>26.65</td>
<td>27.96</td>
<td>0.94</td>
<td>0.7-1.24</td>
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<td>Cecal Intubation %</td>
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<td>92.11</td>
<td>0.92</td>
<td>0.58-1.46</td>
<td>0.73</td>
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<tr>
<td>Patient Satisfaction %</td>
<td>96.88</td>
<td>98.13</td>
<td>0.59</td>
<td>0.16-2.23</td>
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New disease specific graded prognostic assessment of brain metastasis from lung, breast, melanoma and renal malignancies.

First Author: Vyshak Alva Venur, MD Vidhya Karivedu, MD Rupesh Kotecha, MD Samuel Chao, MD Paul Elson, ScD Manmeet Ahluwalia, MD

BACKGROUND: Brain metastases (BM) are a serious complication of systemic malignancies. Common cancers causing BM include small cell and non-small cell lung cancer (SCLC, NSCLC), breast, melanoma, and renal cancer. The disease-specific Graded Prognostic Assessment (DS-GPA) is a useful tool for evaluating prognosis in BM. We evaluated the DS-GPA at our tertiary care institute.

METHODS: The Cleveland Clinic's IRB approval was obtained and the enterprise database was used to identify BM patients treated between 2000 and 2013. The primary endpoint was overall survival (OS) from BM diagnosis. Data for more than 20 variables including patient, tumour, and BM characteristics, local, and systemic therapies was recorded. Multivariate analysis was performed. Stepwise variable selection (entry, retention criteria of p=.10 and p=.05, respectively) was used to identify factors that were independent predictors of overall survival. Suitable cut-points were assigned to the measured factors by recursive portioning algorithm. Weighing system was used to assign "points" to each factor and define the risk groups. Final GPA was internally validated using a bootstrap algorithm.

RESULTS: Two thousand two hundred forty seven BM patients were included in this retrospective analysis (largest single center experience). Primary malignancy was NSCLC-1128(50%), breast-449(20%), melanoma-233(10%), renal-224(10%) and SCLC-213(9%). Median age at BM diagnosis was 60 (range, 24-93); 54% were female. Median number of BM was 2 (42% had 1, 25% had >5). Most patients had good performance status (70% had KPS>80). Initial treatment was whole brain radiotherapy (WBRT) in 43%, 24% underwent stereotactic-radiosurgery (SRS), 12% received WBRT and SRS, 11% were treated with surgery and WBRT, 3% underwent surgery and SRS. Eight four percent of patients have died at the time of analysis. Median OS for the cohort was 8.8 months (95% C.I., 8.1-9.5). DS-GPA was prognostic for each cancer (all p<.0001); however separation between groups was variable. Considering clinical factors not used to determine the DS-GPA, revised indices were developed that improved prognostication. The factors, in addition to DS-GPA, included in the revisions are: breast cancer-number of extra-cranial metastases (ECM), controlled primary (PC), BM location, and leptomeningeal disease; NSCLC-PC, number of ECM, histology, hemorrhagic metastases, and gender; melanoma-number of ECM and age; renal-PC and BM-free interval; SCLC-PC and number of ECM. Median OS (in months) for the revised GPA groups ranged from 3.1-27.6 (breast), 2.5-26.4 (NSCLC), 2.3-15.4 (melanoma), 3.5-41.6 (renal), and 3.5-15.3 (SCLC).

CONCLUSIONS: A revised DS-GPA is proposed which can serve as a useful tool to guide the treatment decisions for patients with brain metastasis. They also provide important stratification in clinical trials of these patients.
Association of Early Physician Follow-up and 30-Day Readmission After Hospitalization for Heart Failure Among Patients in a Residency-Based Ambulatory Clinic

Joanna Aquino-Laban, MD; Julius Laban, MD; Maricor Docena, DO; Ron Jones, MD; Michael Oravec, MPH

PURPOSE/OBJECTIVE: Heart failure (HF) is one of the most common reasons for hospitalization associated with high risk of readmission. Recent studies have shown that early physician follow-up, defined as within 7 days of discharge, decreases 30-day readmission rate. However, despite the growing evidence supporting early follow-up, many patients still do not receive it. This study was conducted to determine the association between early physician follow-up and 30-day readmission after hospitalization for HF among patients in a residency-based ambulatory clinic.

METHODS: This is a retrospective observational cohort study of records from an internal medicine residency clinic and a 460-bed community hospital in Akron, OH. Inclusion required each of the following criteria: outpatients with active diagnosis of HF or other related diagnoses, hospitalization for HF from January 2010 to November 2013, symptomatic with known structural heart disease (American College of Cardiology/American Heart Association Stage C), reduced ejection fraction on echocardiogram (EF < 40%), and prescribed guideline-directed medical therapy. Follow-up intervals after discharge from the hospital were noted and stratified as follows: = 7 days, between 8-14 days, or > 14 days. The primary outcome was 30-day readmission for HF. Statistical significance was tested using Pearson’s chi-squared test of independence for categorical variables and a one-way ANOVA for continuous variables. Multivariate logistic regression was used to model predictors of 30-day readmission, adjusting for post-hospital follow-up time, age, race, gender, and insurance status.

RESULTS: A total of 107 patients were included in the study. Of these, 39 completed an outpatient follow-up within 7 days, 32 between 8-14 days, and 36 after more than 14 days. The 30-day readmission rate for those who completed a follow-up visit within 7 days (21%) was significantly lower (p < 0.0001) than those who followed up between 8-14 days (50%) or > 14 days (78%). Patients who followed up between 8-14 days were over 3 times as likely to be readmitted as patients who followed up within 7 days (OR 3.6, 95% CI 1.2-10.8, p = 0.0218), while those who did not follow up within 14 days were over 12 times as likely to be readmitted (OR 12.6, 95% CI 4.0-39.2, p < 0.0001).

CONCLUSION: Physician follow-up within 7 days after hospitalization for HF is associated with lower 30-day readmission rate among patients in a residency-based ambulatory clinic. However, only one-third of the study population had early physician follow-up. Therefore, quality improvement initiatives are recommended.

First Author: Tariq Hammad, MD. Usman Ahmad, MD. Yaseen Alastal, MD. Osama Dasa, MD. Osama H. Alaradi, MD. Ali Nawras, MD.

Background: The evaluation of pancreatic lesions through the use of endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) plays an essential role for patients with indeterminate imaging as a critical first step toward developing an appropriate treatment plan for benign or malignant pancreatic lesions. Rapid on-site evaluation (ROSE) of EUS-FNA material coupled with cytopathologist guidance (CG) to the endoscopist allows for adjustments in technique and acquisition of additional passes if required.

Purpose: The aim of this study was to evaluate the influence of ROSE and CG on the diagnostic yield of EUS-FNA for the differential diagnosis of pancreatic lesions at a tertiary care center.

Methods: This study is a retrospective review of all EUS-FNA of pancreatic lesion performed at a single tertiary care center over a 25 month period between January 2011 through February of 2013 with the presence of ROSE. Patient’s gender, age, final diagnosis, ROSE result, type of lesion (solid or cystic), number of needle passes, and any surgical or autopsy pathology if available were analyzed. All patients underwent close clinical follow up for at least 9 months after the procedure.

Results: 203 EUS-FNA pancreatic cases were identified. Of these 125 were positive for malignancy or neoplasm. There were 80 adenocarcinomas, 37 mucinous neoplasms, 7 endocrine neoplasms, 1 solid pseudopapillary tumor. The remaining 78 cases of which 70 were negative for neoplasm/benign, 7 had atypical cells, and 1 was unsatisfactory. Overall, EUS-FNA with ROSE and CG achieved sample adequacy in 99% of the cases [202/203]. Matched surgical/autopsy specimen were available for 30 cases on follow-up. ROSE with CG resulted in an increase number of passes obtained for 17 of these cases. Of the 30 matched cases 29 were accurately diagnosed with the use of EUS-FNA and ROSE: 24 were neoplastic and 5 were negative for neoplasm. The one false negative case was determined to be atypical cells by EUS-FNA, but was found to be adenocarcinoma (See the table). Of the 25 neoplastic/malignant cases: 19 adenocarcinoma, 3 pancreatic endocrine neoplasm, 1 solid pseudopapillary tumor, 1 intraductal papillary mucinous neoplasm, 1 mucinous cystic neoplasm. The accuracy of EUS-FNA for pancreatic malignancy/neoplasm was 96% [24/25]. Overall accuracy when examining matched specimens was 97% [29/30].

Conclusion: The use of ROSE with CG improves cytological adequacy and the diagnostic yield of endoscopic EUS-FNA. The communication and feedback allow for improved sensitivity and providing more accurate results while only utilizing the appropriate number of passes required.
Vitamin D Inadequacy in Patients of Northeast Ohio

First Author: Bin Hu, MD Yun Xia, MD, Jung Kim, MD, Thomas Marnejon, DO, David Gemmel, PhD, Timothy Barreiro DO

Introduction: This study aimed to determine prevalence of vitamin D inadequacy (vitamin D< 30 ng/mL) and assess effects of season, ethnicity, and age on prevalence in patients from a large urban medical center in Northeast Ohio. We also compared prevalence of vitamin D inadequacy in our patients with the National Health and Nutrition Examination Surveys (NHANES) during 2001-2006.

Methods: We analyzed routine demographic characteristics and all serum 25(OH) D2 and D3 levels measured over a two year cycle from our hospital and outpatient database. We also analyzed vitamin D level in relationship to seasonal division.

Results: Of the 15,693 patients the mean age was 59 ± 6.1 year old, 67.6% females, 82.2% non-Hispanic whites, 12.1% African Americans, 5.7% other ethnicity. We found vitamin D inadequacy in 63.7% (n=10001), which was eight times higher than the general US population (8%, NHANES 2001-2006). Only 36.3% (n=5692) had normal levels of vitamin D, much lower than the 92% adequacy rate from NHANES. The overall prevalence of vitamin D deficiency (vitamin D < 20 ng/mL) was 38.4%, 35.8% in non-Hispanic whites, 56.3% in African American, and 39.1% in others racial and ethnic cohorts. Prevalence was higher in African American than White (relative risk (RR) = 1.3), and younger patients (RR1.59 age =30 yr, 1.59 age 31-50 yr, 1.24 age 51-70 yr) than age =71 yr. There was no significant difference seen in relationship to the four season division or gender. The overall prevalence of vitamin D insufficiency (vitamin D = 20 ng/mL but <30 ng/mL) was 25.3%, 26.3% in non-Hispanic whites, 17.9% in African American, and 26.3% in others. Prevalence was higher in non-Hispanic whites than African Americans (RR =1.47). There was no difference among younger patients (RR 1.08 age = 30yr, 1.01 age 31-50 yr, 1.02 age 51-70 yr) versus age =71 yr. There was no significant difference related to the four season division or gender.

Conclusion: Our retrospective cohort study revealed an alarmingly high prevalence of vitamin D inadequacy and significant difference between our patients and a national secondary populational database (NHANS 2001-2006). African American and younger age were risk factors for vitamin D deficiency. Northeast Ohio has 302 cloudy days every year, which could explain why there was no seasonal variation in vitamin D levels. We recommend more aggressive screening and treatment for the at risk population.
Reversibility of Statin Induced Myalgia and Myositis with High Dose Vitamin D Supplementation.

First Author: Maksim Y Khayznikov, MD Hemachrandra K Pandit R Kumar A Wang P Glueck CJ MD

Introduction: Statin-induced myalgia is a common cause of statin intolerance resulting with up to 20% of patients having to discontinue their lipid lowering medications. Low serum vitamin D has also been found to interact with statins to cause myalgia, myositis, myopathy, and myonecrosis. Some data suggests that statin-induced myalgia can be resolved by vitamin D supplementation. Our specific aim was to assess safety and efficacy of vitamin D supplementation in 146 patients intolerant to 2 or more statins and the potential reversibility of their musculoskeletal complaints.

Methods: We studied 74 men and 72 women (age 59 ±14 years) intolerant to 2 or more statins because of myalgia, myositis, myopathy, or myonecrosis, and found to have low (<32 ng/ml) serum vitamin D. We prospectively assessed whether vitamin D2 supplementation (50,000-100,000 units/week) to normalize serum vitamin D would allow successful re-challenge therapy with statins. Follow-up evaluation on vitamin D supplementation was done in 134 patients at 6 months (median 5.3), 103 at 12 months (median 12.2), and 82 at 24 months (median 24).

Results: Median entry serum vitamin D (22, 23, and 23 ng/ml) rose at 6,12, and 24 months to 53, 53, and 55 ng/ml (p<.0001 for all) on vitamin D2 therapy, 50,000-100,000 units/week. On vitamin D supplementation, serum vitamin D normalized in 90%, 86%, and 91% of patients. On rechallenge with statins, predominantly Rosuvastatin, while on vitamin D supplementation, median LDL cholesterol fell from study entry (167, 164, and 158 mg/dl) to 90, 91, and 84 mg/dl (p<.0001 for all). On follow-up at median 5.3, 12.2, and 24 months, on statins and vitamin D, 88%, 91%, and 95% of the previously statin-intolerant patients were free of myalgia, myositis, myopathy and/or myonecrosis.

Conclusion: Statin intolerance because of myalgia, myositis, myopathy, or myonecrosis associated with low serum vitamin D can, in most cases (88%-95%) be effectively and safely resolved by vitamin D2 supplementation (50,000-100,000 units /week).
Introduction: The Centers for Disease Control and Prevention (CDC) has issued updated criteria for Ventilator-associated Events (VAE) surveillance in 2013. In order to report a VAE, these guidelines necessitate increase in oxygen requirements (FiO2) on the mechanical ventilator and Positive End Expiratory Pressure (PEEP). However, patients who undergo neurosurgical intervention in the form of craniotomy are always kept at a PEEP of 0-5 cm/H2O to minimize intracranial pressure. This can result in limiting their qualification as a VAE upon surveillance.

Methods: We identified every patient who underwent a neurosurgical cranial intervention in our institution from January to the end of October 2014. Following that we referred to our database of all mechanically ventilated patients in the same time period. Our Infection Control Department has been reporting VAEs in concordance with the CDC guidelines. We challenged the hypothesis that neurosurgical patients will be under-reported in VAE surveillance given their lower PEEP by default regardless of their oxygenation. Incidences of Ventilator Associated Condition “VAC”, Infection-related Ventilator Associated Condition “IVAC” and Ventilator Associated Pneumonia “VAP” were compared in both groups; neurosurgical vs. non-neurosurgical.

Results: Twenty four patients were identified to be neurosurgical with craniotomy between January and October 2014 among 780 mechanically ventilated patients. The incidences of each VAE were as follows:

<table>
<thead>
<tr>
<th>Patients</th>
<th>n</th>
<th>VAC</th>
<th>VAC rate</th>
<th>IVAC</th>
<th>IVAC rate</th>
<th>VAP</th>
<th>VAP rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurosurgery</td>
<td>24</td>
<td>1</td>
<td>3.1</td>
<td>1</td>
<td>3.1</td>
<td>2</td>
<td>6.2</td>
</tr>
<tr>
<td>All others</td>
<td>756</td>
<td>28</td>
<td>7.2</td>
<td>11</td>
<td>2.8</td>
<td>6</td>
<td>2.33</td>
</tr>
</tbody>
</table>

Conclusions: The CDC criteria for VAE surveillance is a consistent and reliable method for reporting. However, in patients who undergo craniotomies, manipulation of PEEP is discouraged. Our data results showed a lower rate of VAC in the neurosurgical group implying that less PEEP settings has minimized the qualification of patients to VAC. However, more neurosurgical patients developed IVAC and VAP which may be a consequence of atelectasis from a low PEEP. We conclude that the CDC guidelines need to take into consideration for neurosurgical patients the CDC surveillance criteria can negatively skew this group of patients at the time of reporting.
Diagnostic ramifications of ocular vascular occlusion as a first thrombotic event associated with Factor V Leiden and Prothrombin Gene heterozygosity

Samantha Schockman MD(1), Charles J. Glueck MD (2,3), Robert Hutchins MD (4,5), Ping Wang PhD (2)
Int. Med. Residency Program(1) and Chol., Metabolism and Thrombosis Center of the Jewish Hospital(2), Mercy Medical Physicians(3), UC Ophtho.(4) and CEI(5)

Purpose: Assess the diagnostic ramifications of ocular vascular occlusion (OVO) as a first thrombotic event associated with factor V Leiden (FVL) and/or Prothrombin Gene (PTG) heterozygosity.

Methods: Patients with OVO, free of cardio-embolic etiologies (n=264), were sequentially referred from vitreoretinal specialists for measurement of thrombophilia-hypofibrinolysis, and compared to 111 healthy normal controls.

Results: Of the 264 patients, 27 (15 women, 12 men), 10% of all referred OVO cases, were found to have familial thrombophilias (FVL and/or PTG), including 15 with FVL, 11 PTG, and 1 with both FVL and PTG. Compared to controls, the 264 cases were marginally more likely to have >=1 abnormality of FVL and/or PTG mutation (10% vs 5%, p=.071). Patients with OVO, compared to controls, were more likely to have low free protein S (9% vs 2%, p=.048), high homocysteine (21% v 5%, p<.0001), high Factor VIII (19% vs 7%, p=.007), and high anticardiolipin IgM antibody (ACLA IgM) (8% vs 2%, p=.027). Of the 264 cases, 48% had >=1 thrombophilic abnormality (FVL, PTG, free protein S, homocysteine, factors VIII and XI, and/or ACLA IgM), vs 19% of normal controls, p<.0001. Of the 27 cases with FVL and/or PTG, 15 had central retinal vein occlusion (CRVO), 5 non-arteritic anterior ischemic optic neuropathy (NAION), 4 central retinal artery occlusion (CRAO), 2 amaurosis fugax (AF) and 1 had both CRVO and CRAO. Of the 15 FVL cases, 14 (93%) had OVO as a first thrombotic event without prior DVT or PE, 5 (33%) had other thrombotic events including recurrent miscarriages, osteonecrosis, ischemic stroke and/or ischemic colitis, and 5 (33%) had immediate family members with previous venous thromboembolism (VTE). Of the 11 PTG cases, 8 (73%) had OVO as a first thrombotic event, 5 (45%) experienced VTE other than DVT or PE, and 5 (45%) had immediate family members with VTE. In 1 patient with both FVL and PTG, DVT occurred before CRVO. Of the 15 women with FVL and/or PTG mutations, 7 (47%) experienced >=1 miscarriage, 4 (27%) were on estrogen, and 1 (7%) was on Clomiphene.

Conclusion: Of the 264 patients with OVO, 27 (10%) had FVL and/or PTG, and 81% of these cases presented with OVO as their first thrombotic event. By diagnosing thrombophilia as an etiology for OVO, the ophthalmologist opens a window to family screening and preventive therapy.
Non-invasive risk stratification with stress single photon emission computed tomography in patients with myocardial injury following non-cardiac surgery

First Author: Elvira R Bangert, MD Mulji Amin, MD

Worldwide, around 200 million adults undergo noncardiac surgery annually, and more than 10 million of these patients will have postoperative troponin elevation during the first 30 days after surgery. These data suggest that myocardial injury following non-cardiac surgery (MINS), as measured by postoperative troponin elevation, is the most common major vascular complication after non-cardiac surgery. Myocardial infarction (MI) is the most common vascular complication following major surgery, and many patients with evidence of MINS will have had a perioperative MI. Risk stratification and the selective revascularization of high risk individuals has been shown to reduce cardiovascular events in the non-perioperative MI setting, however, its utility in the perioperative setting is not established, and only a minority with MINS undergo such a strategy. Stress testing with single photon emission computed tomography (SPECT) radionuclide imaging is an established non-invasive tool for risk stratification in coronary artery disease. This study will evaluate the ability of SPECT to predict major cardiovascular events in individuals with MINS. Our primary objective will be to determine the association between ischemic burden on SPECT, and the composite outcome of death, MI or coronary artery revascularization at 6 months.

Methods: This study has consisted of a retrospective chart review of 567 patients conducted at the Hamilton Health Sciences Juravinski and General Sites. Using HHS decision support services, we have screened patients between 2009-2014 who underwent a SPECT myocardial perfusion study within 2 months following hospital admission for surgery. Patients were included in this analysis if 1) there was evidence of MINS, defined as an abnormal troponin value in the post-operative period during the index admission, and 2) the nuclear study was performed for the purpose of risk stratification for the postoperative event. Our primary objective was to determine the association between the degree of ischemia identified on myocardial perfusion imaging (using the calculated sum stress score) and the composite outcome of death, myocardial infarction, or revascularization at 6 months. Secondary analyses were included to evaluate the feasibility of the test in this patient population, and testing its discriminatory ability above cardiac troponin.

Results: Of the patients analyzed 120 patients were with MINS. The patients who experienced MINS were older, more likely to have diabetes, and have hypertension. The 6-month mortality rate was 2.3% (93% CI, 1.5%-1.9%). SPECT predict major cardiovascular events in individuals with MINS (92% CI, 1.27-2.23)

Conclusion: SPECT is a promising tool for providing better care for patients with MINS. The study has shown that the use of SPECT permitted early detection of major cardiovascular events in individuals with MINS. The peak troponin values were associated with higher 6-month mortality myocardial infarction as well as revascularization.
Incidence and Outcomes of Post-Operative Atrial Fibrillation and Supraventricular Arrhythmias: A Systematic Review and Meta Analysis

Nihal Haque, Tahir Kanji, Marko Mrkobrada

It is uncertain whether post-operative new onset atrial fibrillation (POAF) and supraventricular arrhythmias (POSA) have long-term consequences for patients. With 200 million non-cardiac surgeries being performed worldwide per year, this translates into a large number of potential consequences such as stroke, MI and death. We performed a systematic review in order to ascertain the incidence of POAF and POSA in non-thoracic surgeries.

We also sought to examine the association with stroke, MI and mortality. We identified 24 studies which found POAF in 11,317 out of 391,534 patients for an overall incidence of 2.9%. Pooled data from three studies showed that in-hospital mortality was not significantly increased in POAF patients (unadjusted OR 1.75, CI 0.98-3.1). However, another study did show an increased risk of death when adjusting for other prognostic factors (adjusted OR 1.68, CI 1.52-1.86). In-hospital MI rate was significantly increased in POAF after pooling data from two studies (unadjusted OR 3.68, CI 1.41-9.66).

We also identified 6 studies which found POSA in 501 out of 6206 patients for an overall incidence of 8.1%. In-hospital mortality was statistically increased after pooling data from two studies (unadjusted OR 7.36, CI 4.65-11.65). In-hospital MI rate was statistically increased in one study (RR 4.2, CI 2.7-6.6). No studies reported on the incidence of stroke. In conclusion, data on the outcomes of POAF and POSA remain sparse. We suggest a prospective study which aims to comprehensively assess the short and long term consequences of POAF and POSA.
OREGON POSTER FINALIST - RESEARCH Katelyn Atkins, PhD

The impact of anatomic tumor location on inter-fraction tumor motion during lung stereotactic body radiation therapy (SBRT)

Katelyn M. Atkins, Yiyi Chen, David A. Elliott, Monica Kishore, Steven L. Primack, Martin Fuss, Mark E. Deffebach, Charlotte D. Kubicky, James A. Tanyi

Introduction: Stereotactic body radiation therapy (SBRT) is an effective treatment strategy for both non-operative early stage non-small cell lung cancer (NSCLC) and the local control of pulmonary metastases. While conventional fractionated radiotherapy delivers biologically effective doses (BED) up to 72-79 Gy, SBRT utilizes sharp dose gradients in a hypofractionated regimen to deliver up to 180 Gy BEDs to cancer cells while minimizing radiation to critical surrounding structures. Consequently, respiratory motion is of particular concern during lung SBRT, as breathing pattern variations during treatment, if unaccounted for at the time of simulation, may lead to geometric errors that reduce local control or increase toxicity. Therefore, this study analyzed the impact of anatomic tumor location on breathing-associated tumor motion during lung SBRT.

Methods: Forty-one patients underwent standard free-breathing four-dimensional computed tomography (4DCT) simulation and daily image-guidance 4DCTs during lung SBRT. Absolute tumor motion amplitude in the mediolateral (ML), anterior-posterior (AP), and superior-inferior (SI) directions was retrospectively analyzed from 159 total 4DCT scans. In this study, inter-fraction motion represents the relative motion amplitude using the first 4DCT (simulation) as the reference for each subsequent 4DCT.

Results: Overall, the inter-fraction tumor motion amplitude in the ML, AP, and SI directions was small (mean =2.5 mm). Similarly, while both upper lobe (UL) and lower lobe (LL) tumors exhibited limited inter-fraction motion in both the ML and AP directions (mean =2.2 mm), tumors in the LL had increased inter-fraction motion in the SI direction compared to UL tumors (mean 4.3±4.0 mm vs. 1.7±1.7 mm, p=0.008). Moreover, 28.6% (n=4) of LL tumors exhibited mean inter-fraction motion along the SI direction >5 mm. When grouped by bronchial segment, only tumors residing in the supra-diaphragmatic basal segments of the LL exhibited mean inter-fraction motion in the SI direction >5.0 mm.

Conclusions: This is the first study to analyze regional differences in respiratory-associated inter-fraction tumor motion. Indeed, while mean inter-fraction tumor motion along the SI direction was within our standard planning target volume (PTV) margins (an isotropic 5 mm expansion of the internal target volume, or ITV) for the vast majority of tumors in this study, changes in inter-fraction motion exceeded 5 mm in 28.6% of LL tumors, all of which resided in the basal segments. These results suggest that while day-to-day changes in tumor motion are mostly small, typical ITV-to-PTV margins may be insufficient for a subset of LL lesions and that increased PTV margins, daily breathing motion re-assessment and/or adaptive re-planning may benefit these patients.
Impact of Rapid Diagnosis for Community Acquired Pneumonia

First Author: Gita Dorothy Gelfer, DO, MSc., James Leggett, MD & David Gilbert, MD, MACP

**Introduction:** Pneumonia is the most common infection leading to hospitalization. Fewer than 25% of patients are discharged with an identified pathogen; the lack of rapid diagnostics results in the over use of empiric antibiotics. This study was designed to determine if rapidly identifying an expanded spectrum of potential pathogens with a multiplex PCR platform would influence provider management in patients hospitalized with community acquired pneumonia (CAP). The use of serum procalcitonin (PCT) level to identify viral infections was studied as well.

**Methods:** The study compared Providence Portland Medical Center’s (PPMC) “standard” viral respiratory panel, which probes for seven viral pathogens and has a turnaround time (TAT) of around 36 hours, to a rapid diagnostic panel called “Biofire”. The latter can detect 17 viral entities, 3 bacterial pathogens, and has a TAT = 2 hours. Both groups had other diagnostic tests, including: sputum and blood cultures, urine antigens for *Legionella* species, *Streptococcal pneumoniae*, and nasal swab PCR for *Streptococcus pneumoniae* and Methicillin-resistant *Staphylococcus aureus* (MRSA). From January – March 2014, patients admitted from the emergency department with a diagnosis of CAP were randomized in two-week blocks to either the standard diagnostic package or the Biofire package.

**Results:** 145 patients were randomized, 55 were evaluable (26 standard, and 29 Biofire). Participants with an alternative diagnosis (not CAP) or incomplete diagnostic data were considered non-evaluable. A pathogen was identified in 88% of standard and 72 % of Biofire patients. Over 66% of patients in both groups had a potential viral pathogen detected, either alone or in conjunction with a bacterial pathogen. The mean TAT with Biofire platform was 3.6 hours, vs. 24 hours for PPMC’s “standard” viral PCR platform (p < 0.001). There was a statistically significant difference in PCT values among patients with a pure viral pneumonia compared to those with pure bacterial or mixed viral and bacterial CAP (< 0.001). A total of 14 patients from both the standard and Biofire groups were diagnosed with a viral pneumonia; however, only 2 out of 14 patients had empiric antibiotic therapy discontinued.

**Conclusion:** Our results document the ability of a modern diagnostics to increase identification of the etiology of CAP to greater than 72 %. Moreover, PCT can be used to differentiate between viral vs. bacterial pneumonia. This study highlights the necessity to educate clinicians in using this information to aide in antimicrobial stewardship for CAP. This study is continuing throughout the winter of 2014-2015 so as to add statistical power to the results.
Background: Stroke is the fourth leading cause of death in Oregon with 7,762 hospitalizations due to stroke in 2013. Stroke is the leading cause of adult disability in Oregon. The average lifetime estimated cost of an adult in America is $140,048 per stroke survivor. Each hour treatment fails to occur; the brain loses as many neurons as it does in almost 3.6 years of normal aging. One of the critical determinants in a favorable outcome for an ischemic stroke is the time to thrombolysis. This project was to minimize time delays by identifying barriers to tPA administration and compiling a streamlined code stroke system to be paged overhead at Good Samaritan Regional Medical Center. The code stroke overhead page was designed to be used prior to arrival by EMS with a possible tPA candidate, or upon discovering an in-hospital stroke with a last known well within the 3 hour tPA window.

Methods: A literature search was performed using "Code Stroke" and "Stroke Protocol" and "In-hospital stroke". The focus was on papers after 1994 when tPA was FDA approved for use. A protocol system was then developed with the help of the nursing stroke coordinator, the director of Samaritan Stroke Services, the EMS chief, an Emergency Department stroke committee physician, a Hospitalist stroke committee physician, and the imaging technicians and reading radiologists at Good Samaritan Regional Medical Center. Code Stroke was first drafted in July 2013, approved by Samaritan Stroke Task Force, and Intensive Care Unit committees February 2014 and started in the Emergency Room April 2014.

Results/Discussion: Since implementation of Code Stroke April 2014 we have successfully shortened the door to CT time by seven minutes in the Emergency Department. Door to decision time has been decreased by 15 minutes. 30 code strokes were paged during the time period from April to September 2014, and 5 of those patients were given tPA. This puts our hospital average of tPA administration at 6%, compared to the national average of tPA administration between 2-3%. One patient was administered tPA within an hour window, and the rest were administered within 90 minutes of arrival. We are currently working with nursing staff to decrease the time between ordering tPA and administration of tPA. Developing the Code Stroke protocol is part of our hospital's ongoing stroke quality improvement efforts. Code Stroke is on track to be rolled out to the entire hospital by August 2015.
Reducing severe hypoglycemic events in hospitalized patients with diabetes mellitus: a multidisciplinary approach

Mahmoud Abdelghany, MD Sean Berrett, PharmD Stephanie Thomas, PharmD Thomas Simunich, MS, MBA Luis Gonzalez, PharmD.

Introduction: Hypoglycemia among hospitalized patients with diabetes is a significant medical problem with many adverse outcomes, including cardiovascular events, which may result in increased morbidity and mortality. Patients experiencing severe hypoglycemia may also have an increased length-of-stay (LOS) and cost of care. The prevalence of severe hypoglycemia, defined as a blood glucose value of <40 mg/dL, ranges between 3-11%. Since severe hypoglycemia is a serious adverse event, hospital-wide quality improvement programs should be developed to reduce its occurrence. This report describes our multidisciplinary quality improvement team’s efforts to reduce severe hypoglycemic events in hospitalized patients with diabetes.

Method: Per a hospital quality partnership program with a large insurance company, a monthly target rate was set to <5.4 events per 1,000 diabetic days. From August 2013 through October 2014, severe hypoglycemic events were prospectively tracked, audited for cause, and reported to a multidisciplinary team to aid in guiding interventions. Interventions included adopting a new hyperglycemia/hypoglycemia order set, providing discipline specific education concerning prevention of hypoglycemia, daily graphs detailing each patient’s glucose values, letters to prescribers who had a patient with severe hypoglycemia, real-time event alerts to a pharmacy resident, automatic holding of oral hypoglycemic agents (sulfonylureas and meglitinides) upon admission, implementation of a nursing-driven hypoglycemia prevention checklist, and education of nursing and dietary regarding proper timing of glucose monitoring with respect to nutritional intake.

Results: Analysis of the monthly rate from August 2013 (8.3) through October 2014 (4.9) yielded a mean of 5.4, a range of 2.6 (Oct. 2013) to 9.7 (January 2014), and 3.0 sample variance. A linear regression produced a line of negative slope (R²=0.0847) indicating a trend toward continued rate reduction below target. Improvement is also evidenced in comparison of the mean and sample variance between two portions of the timeframe, August 2013-March 2014 and April 2014-October 2014; 5.9 versus 4.8 and 4.7 versus 0.8, respectively. Further investigation for August 2013-March 2014 showed that those patients experiencing severe hypoglycemic events had an increased LOS (8.1 vs. 5.2 days), higher re-admittance (21.7% vs. 14.6%), and greater average cost per case ($9,975.70 vs. $6,674.69) than other patients with diabetes. Chart auditing revealed the most common causes of severe hypoglycemia to be inappropriate prescription of hypoglycemics, renal failure, change in nutritional status, and failure to respond to a previous hypoglycemic event, respectively.

Conclusion: Our multidisciplinary team was successful in reducing the severe hypoglycemic event rate. An association is implied between patients experiencing severe hypoglycemia and increased LOS, hospital costs, and re-admission rate.
Evaluation of Mentors by Resident and Fellows in a Structured Mentoring Program in an academic medical center

First Author: Abhishek Agarwal, MD Additional authors: Namrata Baxi, Dipanshi Patel, Kenyetta Givans, Anuradha Mookerjee, Vijay Rajput

Introduction: In Graduate Medical Education (GME) there is often a lack of structured academic and professional development programs for trainee. Residents and fellows have different academic and professional growth needs throughout their career.

Methods: Since 2011, we have had a formal mentoring program in place to foster relationship between faculty and residents and fellows in the Department of Medicine. The mentor and mentees are required to meet face-to-face for a one hour session at least two times a year at a local restaurant. They can continue their relationship outside of this program as per their needs. Academic scholarship is a major emphasis of this program. Mentees are required to identify their academic mentor. A mentor-mentee contract is signed by both parties. Program Directors help to identify the mentors as needed. We conducted an IRB approved research project by developing an anonymous structured questionnaire, based on prior literature. We identified survey questions in 17 areas of mentor’s qualities and attributes; using a four point agreement scale. Twenty one questions were grouped into four categories, based on the mentor’s personal attributes (honesty, integrity, privacy, enthusiasm, advocacy, and communications), action characteristics (inspiration, feedback, encouragement, approachability, and availability) and the short term and long term career goals of the mentee. A total of 60 residents and 39 fellows from ten specialties of internal medicine completed the survey at the end of the academic year. We compared the perception of residents and fellows about their mentor’s personal attributes and action skills. We also analyzed the difference between residents with a known research interest versus no interest and mentor’s attributes for long term versus short term goals. We used Student’s T Test, Pearson Chi Square and Fisher Exact test for statistical analyses.

Results: Overall, fellows were more satisfied with their mentors than residents (p=0.017). The fellows were more satisfied with their mentor’s action characteristics than the residents (P=.045). All residents and fellows with declared research interest were more satisfied with mentor’s attributes and skills to help them with their long term goals. (P=0.046) Junior residents perceived that their mentors were not able to challenge them enough or beyond the check list exercise. These differences between residents and fellows may be due to maturity, established goals, or professional growth. The junior residents were not able to develop as strong a connection with their mentor as their senior colleagues.

Conclusion: Mentoring is a dynamic dyad interaction with immediate and long term impact. The junior residents may require different skills and attributes from faculty mentors compared to fellows. This research will help in developing future faculty development and mentoring programs across GME. Residents and fellows with established research interests may benefit with help for long term career goals.
CYP2C19 GENETIC VARIATION AND INDIVIDUALIZED CLOPIDOGREL PRESCRIPTION IN A CARDIOLOGY CLINIC – A PROSPECTIVE STUDY

First Author: Wuqiang Fan, MD Yin Wu, MD., Bahar Khalighi., Abbas Mirabbasi, MD., Koroush Khalighi MD, FACP, FCCP, FACC, FHRS, CCDS

Background: Genetic variation of CYP2C19 leads to altered enzymatic activity that will likely affect clinical efficacy of clopidogrel, which depends on CYP2C19 for activation. FDA recommended genotyping of CYP2C19 prior to initiation of clopidogrel.

Objectives: To evaluate CYP2C19 genetic variations and clinical outcomes of genetic information-guided medicating of clopidogrel.

Methods: DNA sequences of CYP2C19 are analyzed in 301 patients in our clinic; distributions of variant alleles, genotypes and phenotypes are analyzed. Individual clopidogrel recommendation and a follow up plan are made.

Results: The absolute numbers and frequencies of loss-of-function CYP2C19 alleles in the 301 patients are [expressed as: variant: number (frequency)]: *2:106(17.6%), *4:3(0.5%), *8:3(0.5%), and *10:1(0.16%). Those of gain-of-function allele are: *17:119(19.8%), and those of normal allele are: *1:370(61.5%). The phenotype distributions are [expressed as: phenotype (patient number): genotype (patient number)]: Poor-Metabolizer (12): *2/*2(10), *2/*4(1) and *2/*8(1); Intermediate-Metabolizer (63): *1/*2(59), *1/*4(2), *1/*8(1) and *1/*10(1); Normal-Intermediate-Metabolizer(26): *2/*17(25) and *8/*17(1); Normal-Metabolizer(119): *1/*1(119); Rapid-Metabolizer(69): *1/*17(69) and UltraRapid-Metabolizer(12): *17/*17(12). Clopidogrel was switched to prasugrel (less dependent on CYP2C19 for activation) in PM patients, and discontinued in RM and URM patients. For those who’re not on clopidogrel but carry abnormal allele(s), “clopidogrel caution” is documented. Patients are then followed up for one year with a primary endpoint of 1) any ACS-related ER visit/hospitalization, 2) cardiac death and 3) excessive bleeding.

Conclusions/Discussion: The relatively high frequencies of both gain-of-function (18.8%) and loss-of-function (19.8%) alleles in our patients makes genotyping CYP2C19 clinically relevant. The following predictions will be tested in the following year: 1) switching to prasugrel in PM genotype improves clinical outcome; 2) whereas discontinue or lowering clopidogrel doses in RM genotype decrease bleeding risk.
Efficacy and Safety of Apixaban for prevention of venous thromboembolism in patients undergoing Arthroplasty: Systematic Review and Meta-analysis

Sushil Ghimire Madan Raj Aryal Anil Pandit Fadi E Shamoun Paras Karmacharya Ranjan Pathak Dilli Ram Poudel Raju Khanal

**Background:** Although the optimal regimen for thromboprophylaxis after knee replacement remains debated, low-molecular-weight heparins such as enoxaparin are currently the preferred agents. The ease of administration and lower bleeding risk make the newer oral anticoagulant, apixaban an attractive alternative. In this study, we sought to critically evaluate the efficacy and safety of apixaban after elective total knee and hip replacement.

**Method:** Studies were identified through electronic literature searches of MEDLINE, EMBASE, clinicaltrial.gov, SCOPUS and hand search for relevant articles from inception to February 2014. Phase III RCTs involving use of apixaban and enoxaparin for thromboprophylaxis in patients undergoing total knee or hip replacement were included. Study specific odd ratios were calculated and between-study heterogeneity was assessed using the I² statistics.

**Results:** In three studies involving 11,659 patients, the risk of symptomatic deep vein thrombosis (DVT) (pooled OR 0.38, 95% CI, 0.16-0.90, I² = 0%, p = 0.03) and bleeding (pooled OR 0.87, 95% CI, 0.77-0.99, I² = 0%, p = 0.03) were less in apixaban group compared with enoxaparin. However, it was interesting to note that on subgroup analysis, the risk of pulmonary embolism (PE) was higher with apixaban compared with enoxaparin when used for prophylaxis for knee replacement surgery (pooled OR 2.58, 95% CI 1.10 – 6.04, I² = 0%, p = 0.03).

**Conclusions:** Apixaban, in comparison with enoxaparin, is associated with lower risk of symptomatic DVT and bleeding when used as thromboprophylaxis in patients undergoing knee and hip replacement surgery. However, it is associated with increased risk of PE as compared to enoxaparin in patients undergoing knee replacement. Until larger RCTs can address this concern, caution is required in the use of apixaban as thromboprophylaxis in this population.
The ASIN Index: A Novel Tool to Assess Outpatient "No Show" Risk

K Holmes, R Schmidt, R Szczesniak, D Verbofsky, A Bates

It is estimated that about twenty percent of patients miss appointments in primary care clinics. These missed appointments result in disrupted care, wasted resources, and may be associated with higher utilization of emergency departments. There are certain risk factors associated with missed appointments. The development of a risk assessment tool that can predict which patients are most likely to miss an appointment would allow for directing interventions to those patients and result in fewer no-shows.

In previous research, we determined demographic variables that were associated with missed appointments at an Internal Medicine primary care clinic. The variables that most correlated with missed appointments were age, gender, status (new patients versus established patients), and insurance coverage. Odds and likelihood ratios were determined for these variables. A quantitative comparison of these ratios was then used to assign variables specific point values within a risk prediction tool. A score of 0-5 was assigned, with higher scores indicating higher likelihood of missed appointments. A score of 3 was associated with 37% risk of missed appointments and was chosen to indicate high risk.

This tool was validated using scores for scheduled visits to our resident clinic from August-October 2013. A total of 276 patients were scored. As the score increased from 1 to 5, the rate of missed appointments also increased comparable to the predicted rate. The tool was then applied prospectively at the same resident clinic to identify high-risk patients. Phone call intervention to these patients resulted in a decreased no-show rate. 29 of the 39 high-risk patients contacted attended their appointment, thus resulting in 25.6% no-show rate versus the expected rate of 41.8%.

A risk prediction tool can be used to determine a patients’ likelihood of missing an appointment. Interventions can be directed at those patients who score high on the risk tool with the goal of reducing no-show rates.
Effect of different treatment modalities on Colon adenoma and advanced adenoma among Type II Diabetes Mellitus patients

First Author: Deepanshu Jain, MD Second Author: Jorge Uribe, MD

Background: Type II Diabetes Mellitus (DM2) has been associated with a higher risk of colorectal adenoma (Ad) and advanced adenoma (A. Ad), precancerous lesions for colorectal cancer (CRC). The risk has been shown to differ among DM2 patients based on the type of anti-diabetic medication. Insulin has been associated with a higher risk whereas metformin has been shown to have a protective effect on colon Ad and A. Ad. There have been no studies to evaluate the effect of combination treatment with Insulin and Metformin on colon Ad and A. Ad.

Methods: The retrospective study involved chart review of DM2 patients undergoing outpatient colonoscopy at our center over last 18 months to collect the relevant information. Only subjects with screening colonoscopy as an indication were included. Subjects with incomplete colonoscopy or with personal history of CRC/IBD/HNPCC/FAP/colectomy were excluded. Medication list for each subject was reviewed to categorise the study population into four groups: Group 1 (Insulin but no Metformin), Group 2 (Metformin but no Insulin), Group 3 (Insulin and Metformin) & Group 4 (neither Insulin nor Metformin). For Groups 1-4, colonoscopy findings were reviewed for each subject to determine the number and size of polyps. Pathologic findings were reviewed to determine the histology. Then, adenoma detection rates (ADR) and advanced adenoma detection rates (AADR) were calculated for each category. Chi-square method was used to calculate the statistical significance.

Results: 676 subjects, with a mean age of 59.9 years and male to female ratio of 1:1.3 satisfied the inclusion criteria. ADR and AADR for DM2 population was 30.8% and 12.3% respectively. Group 1, 2, 3 & 4 compromised 18.9%, 54.7%, 12.0% & 14.4% of subject population respectively. ADR and AADR for Group 1 was 35.2% (95% CI=27.4-43.8) and 15.6% (95% CI=10.3-30.0) respectively. ADR and AADR for Group 2 was 28.6% (95% CI=24.3-33.5) and 11.4% (95% CI=8.5-15.0) respectively. ADR and AADR for Group 3 was 24.7% (95% CI=16.5-35.2) and 7.4% (95% CI=3.2-15.5) respectively. ADR and AADR for Group 4 was 38.1% (95% CI=29.1-48.1) and 15.5% (95% CI=9.5-24.1) respectively.

Summary: DM2 population on metformin have a lower incidence of colon Ad and A. Ad as compared to those on insulin (P value < .001). DM2 population on combination treatment with metformin and insulin have a lower incidence of colon Ad and A. Ad as compared to those on insulin or metformin alone (P value < .001). Thus, the type of treatment is important in predicting the risk of colon Ad and A. Ad among DM2 population and in choosing the appropriate colonoscopy surveillance interval.
Leveraging EMR-driven, team-based Empanelment to improve patient care continuity and accountability for population management and health.

First Author: Sukrut Nanavaty, MBBS, Sowmya Thanneeru, MBBS, Shashikumar Yellappa, MBBS, Jignesh Sheth, MD, MPH, Qi Shi, MD, Linda Thomas-Hemak, MD

Introduction: Care continuity is crucial for high quality, safe, effective care and both patient and provider satisfaction. However, continuity is challenged in multi-provider primary care venues and especially complex in residency. Our academic clinic’s patients and residents were historically frustrated by lack of continuity. Population management accountability metrics were elusive.

Objectives: Aim was to enhance care quality, safety and experience for patients and residents by promoting continuity through EMR-driven, team-based Empanelment. Empanelment would provide a foundational platform for individual/team-based population management compliance and health dashboards, striving to enhance reflective practice based learning and improvement.

Methods: Faculty capacity and total population visit utilization projections based on national standards were calculated. Responsive provider capacity guided population subdivision into three color coded teams, integrating on average three assigned residents from each training year. Active patients seen within 3 years were EMR linked with team color coded alerts based on highest historical frequency of faculty seen. Universal Empanelment education and visual management guides were implemented. Accountability report cards were developed for staff scheduling and also for individual/team-based population management care provision and health dashboards. Staff compliance with Empanelment-based scheduling was tracked. Baseline and 1 year post-implementation surveys assessing resident (Validated Survey) and patient (CAHPS) continuity satisfaction and residents’ self-reported Patient Centered Medical Home (PCMH) competencies (Validated Survey) assessing team skills, patient centeredness, quality improvement and population management were collected and compared.

Results: Staff’s scheduling compliance increased from 80% to 90%. Patient and resident satisfaction with continuity improved. Patients reported overall communication improved from 80% to 85%, noting provider’s history awareness increased generally from 72% to 77% and for specialist care from 61% to 71% and shared decision making increased from 61% to 74%. Residents’ reporting they saw established patients during clinic increased from 30% to 81%. Residents’ continuity dissatisfaction reduced from 67% to 6%. On annual program evaluation, residents’ 5 point rating of continuity improved from 4.22 to 4.39. Residents’ self-reported PCMH competencies improved for patient centeredness from 55% to 65%, population management from 51% to 62%, team skills from 47% to 60% and quality improvement from 51% to 61%. At 12 months, 92% of residents reported feeling responsible for tracking population management and health metrics of empanelled patients.

Conclusion: Team-based, EMR driven Empanelment integrating residents enhanced residents’ and patients’ satisfaction with care continuity and provided a foundational platform for individual/team-based report cards for population management compliance and health metrics. These outcomes instinctually are believed to improve quality and safety of care, as well as resident education. Effective Empanelment may diminish stress and enhance joy of ambulatory training to reinvigorate primary care as a career choice.
Is Left Bundle Branch Block Related to the Mechanism of Left Ventricular Dyssynchrony?

Deepak Kumar Pasupula MD, Prem Soman MD PhD, Mukul Khanna MD, Samir Saba MD and Saurabh Malhotra MD MPH

Introduction: Among patients who fulfill selection criteria for cardiac resynchronization therapy (CRT), those with a left bundle branch block (LBBB) are thought to derive the greatest benefit. While CRT is presumed to induce favorable left ventricular (LV) reverse remodeling by ameliorating left ventricular dyssynchrony (LVD), the relative contribution of LBBB to LVD remains unknown.

Methods: We identified 136 consecutive patients (106 men; mean age: 63±12 y) with an LV ejection fraction (LVEF) < 35%, who underwent a gated SPECT study between January 2007 and December 2011. LVD was determined by phase analysis (PA) of the gated SPECT using the SyncTool™ software (Syntermed, Inc., Atlanta, GA). LVD was defined as either the phase histogram bandwidth (HBW) or the phase standard deviation (PSD) >2 standard deviations above the mean normal published values.

Results: The mean LVEF of the cohort was 27 ± 6% and LBBB was present in 59 patients (43%). LVD was present in 122 patients (90%). Prevalence of LVD was not different among patients with and without LBBB (93% vs. 87%, p=0.24), but severity was more in patients with LBBB (PSD: 45 ± 17 vs. 37 ± 18, p=0.008). Infarct size, as assessed by the summed rest score (SRS), LVEF and female gender were significant predictors of LVD in a multivariable logistic regression analysis (table).

Conclusion: Among patients with severe LV systolic dysfunction, the presence of LBBB does not predict LVD. However, patients with LBBB had greater degree of left ventricular dyssynchrony. Table 1: Multivariable Predictors of Left Ventricular Dyssynchrony (n = 136).

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P -value</th>
</tr>
</thead>
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<td>Age</td>
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<td>0.43</td>
</tr>
<tr>
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<td>0.01 - 0.56</td>
<td>0.02</td>
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<tr>
<td>SRS</td>
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<td>1.04 - 1.23</td>
<td>0.003</td>
</tr>
<tr>
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<td>0.23 - 33.0</td>
<td>0.42</td>
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<td>0.05</td>
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<td>QRS</td>
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The Power of Anecdotes- HVCCC versus Defensive Medicine.

First Author: Paragkumar C Patel, MD,MBBS Co Authors: Krishnamurthy Mahesh MD, Livert Dave PhD

Introduction: High Value Cost Conscious Care Curriculum (HVCCC) was implemented at our residency program starting January 1st 2014 based on recommendation of the American Board of Internal Medicine. The program included a competition requiring each resident to write an HVCCC case based on an actual patient experience. A questionnaire about the understanding of HVCCC was circulated. Residents were then shown two actual cases that described unexpected adverse outcomes (“defensive” cases). Post-exposure survey was obtained.

Results: 56% of residents described their knowledge of HVCCC as ‘good’ prior to the program; this figure increased to 94% by July 2014. 88% indicated that writing of the case facilitated their reflection on medical practice. Residents subsequently shared their HVCCC cases. 94% residents cite reading other residents’ cases helped them understand HVCCC principles; 25% of residents indicated that significantly increased their understanding. 37% of residents indicated that the HVCCC program would significantly influence practice while another 56% indicated that it would ‘somewhat’ influence practice. The benefits of HVCCC education can be offset by an established predisposition toward defensive medicine. 75% of residents reported that the two “defensive” cases influenced their feelings about HVCCC practice. 69% felt that such “defensive” cases lead to a defensive stance in practice. More residents reported that they were more likely to hear about ‘defensive’ cases from their faculty (37%) than cases demonstrating HVCCC principles (19%). Reflecting on the relationship between defensive medicine and HVCCC practice, 94% of residents felt that defensive medicine would dampen the practice of HVCCC principles.

Discussion: The goal of the study was to understand the mindset and the knowledge of HVCCC practices prevalent in residents of community hospital. Results have the potential to represent the education that residents are receiving and this can ultimately serve as a reference to modify GME training. The power of the “defensive medicine” cases to offset HVCCC recommendations highlights common phenomenon in cognitive psychology: the negativity bias. Research has demonstrated that individuals have a tendency to better recall negative information than positive information. Study indicates that this “negativity bias” is at least partially influenced by the practice of the teaching faculty. The role of teaching faculty in the education of residents cannot be minimized and therefore significant faculty education and development should focus on properly balancing the principles of HVCCC.

Conclusions: Our study highlights the fact that anecdotes of sudden and unexpected adverse outcomes in patients stick significantly in the minds of physicians and residents. Additionally and rather disturbingly, anecdotes of adverse outcomes in patients because of over testing and over treating (non-implementation of the principles of HVCCC) are rapidly overpowered by vivid anecdotes of unexpected adverse outcomes in a select minority of patients. We conclude that significant faculty development and training and constant resident engagement are necessary to overcome the “negativity bias phenomena” that can quickly overcome several months of dedicated HVCCC training in residency programs.
National Trends in the Use of Mechanical Thrombectomy for Reperfusion Therapy in Acute Ischemic Stroke

First Author: Ranjan Pathak, MBBS Smith Giri, MBBS Paras Karmacharya, MBBS Madan Aryal MBBS Basanta Pathak MBBS Vijaya Raj Bhatt MBBS

Introduction: Although investigational techniques involving mechanical clot disruption in acute ischemic stroke offer the hope of faster and greater recanalization and possibly improved outcomes, definitive evidence regarding the efficacy and safety of these techniques remains unclear. Even the guidelines from various professional societies acknowledge a considerable uncertainty regarding the impact of these interventions on survival and functional outcomes of these patients. In spite of the low quality of data supporting their use, these expensive techniques continue to gain popularity. We, therefore, aimed to study the recent trends in the use of mechanical thrombectomy for reperfusion therapy in acute ischemic stroke in the United States.

Methods: We used the National Inpatient Sample (NIS) to identify all hospitalizations related to acute ischemic stroke in the United States from the year 2006 to 2011. NIS is the largest all-payer publicly available inpatient care database in the US. It contains data from 5 to 8 million hospital stays from about 1,000 hospitals across the country and approximates a 20% sample of all US hospitals. Using the appropriate International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes, rates of acute ischemic stroke patients undergoing mechanical thrombectomy were calculated. Annual rates were calculated for each year (2006-2011), fitted into a log-linear model and compared using Monte Carlo permutation test to study the changes in trend. Analysis of trends in the rates of mechanical thrombectomy and calculation of average annual percent change were done using the Joinpoint Regression Program (v 4.0.4, National Cancer Institute, Bethesda, Maryland) in conjunction with STATA version 13.0 (College Station, TX).

Results: A total of 3,438,253 hospitalizations for acute ischemic stroke were identified during the study period, out of which 11,866 (0.34%) underwent mechanical thrombectomy. Patients who underwent mechanical thrombectomy were significantly younger than those who did not (66 vs. 71 years, p value <0.001), but the gender and race distributions were similar. Between 2006 and 2011, the proportion of ischemic stroke admissions undergoing mechanical thrombectomy significantly increased from 0.35 to 5.81 per 1000 patients with an average annual percentage change of +57.47% (95% CI 13.1%-119.3%, P <0.05).

Conclusion: Our study shows that the use of mechanical thrombectomy has risen significantly in the past 6 years although high quality data are lacking. Although some of the patients included in our study may have undergone the procedure as part of a clinical trial, there is nonetheless an increasing overall trend. Increased utilization of a technique without putting it through the rigors of properly designed randomized experiment is worrisome and needs to be monitored closely to prevent unnecessary expenses and potential harms. Until properly designed randomized controlled trials addressing the efficacy and safety of mechanical thrombectomy in acute ischemic strokes are carried out, its use should be limited to carefully selected cohort of patients.
Evaluation of Factors That Impact Hospital Readmission Rates in a Teaching University- Based Internal Medicine Resident Clinic.

Devalkumar J Rajyaguru, MD Other Authors: A. Rangi MD, S. Amjad MD, S. Zaidi MD, K. Siddiqui MD, M. Kiazand MD

Background: Reducing rates of hospitalization has attracted a lot of attention from policymakers as a way to improve quality of care and reduce costs. The Centers for Medicare & Medicaid Services has identified avoidable readmissions as one of the leading problems facing the U.S. health care system and penalizes hospitals with high rates of admissions. The objective of this study was to identify patient associated factors responsible for hospital readmission rates in a teaching university-based internal medicine resident clinic.

Methods: In this retrospective observational study we defined hospital readmission as any unplanned inpatient admission within 30 days after the date of discharge from the index admission with the same chief complain and leading to the same principal diagnosis. We evaluated various pre-study and on-study covariates in our clinic patients. Pre-study covariates include patients’ demographic information such as age, sex, race, zip code and insurance status. On-study covariates include numbers of visits to our clinic, numbers of no show visits and number of cancellations during the study year. We then examined associations between the pre-study covariates and the on-study covariates by fitting Poisson regression model. Incorporating the conclusions from Poisson regression analysis, we fitted an additive logistic regression model to readmission status using stepwise variable selection.

Results: Of 1980 established patients in our facility, 319 (16.11%) had an admission to the hospital in a 12 month period. Overall 62 of the 319 admissions met out 30-day readmission criteria and were included in the study group. Based on our analysis, we found that the number of no shows in our clinic patients can predict patient’s chance of getting readmitted. On the other hand, insurance and race were found significantly related to number of no shows. Such findings would lead to conclusion implying that the number of no shows mediates the relationship between patients’ demographic information and how likely they would be readmitted. African American patients and patients with Medicaid tend to have more number of no shows, which leads to higher chance of getting readmitted.

Conclusion: Based on our analysis, we conclude that number of no show visits in our clinic patients can predict patient’s chance of getting readmitted. To our knowledge this is the first study to demonstrate relationship between number of no show visits in clinic and hospital readmission rates.
Purpose: Colorectal cancer (CRC) is the third most common cause of cancer death in the United States. National surveys show that only about 63% of adults ages 50 and older have had screening colonoscopy. At our internal medicine resident clinic, records albeit somewhat incomplete, report only 20% of eligible patients have had screening colonoscopy. We sought to identify factors which may affect CRC screening rates.

Methods: All patients aged 50 years and older who visited our internal medicine resident clinic were invited to anonymously participate in the study. A questionnaire was administered, amongst which participants were asked to identify the most applicable reason for the lack of CRC screening. A cutoff value of ‘low income’ as less than $30,000 was based on the 2012 US Census Bureau report of poverty thresholds.

Results: There were 103 study participants. Males (46%) and females (54%) were roughly equally represented. The 50-55 age group (30%) and the 61-65 age group (26%) comprised the majority. Fifty percent of participants had completed high school, and 92% reported a maximum annual household income of $30,000. Fifty seven percent of participants had not received screening colonoscopy in the previous ten years. The most commonly identified barriers to CRC screening colonoscopy were: perception of the procedure (16% of responders) or procedure preparation (11%) being unpleasant, and lack of medical insurance (12%). Hispanic patients in particular felt that their physician did not adequately stress the need for CRC screening (p=0.036).

Conclusions: Compliance with USPTF guidelines for colorectal cancer screening using colonoscopy was suboptimal in our resident clinic. Residents should aim to dispel misconceptions about the colonoscopy preparation process and basic procedure details, possibly by incorporating simply written educational material. Cost effective alternatives to colonoscopy e.g. fecal occult blood testing may be offered to those who refuse the procedure.
PHARMACOGENETICS-GUIDED INDIVIDUAL WARFARIN DOSING – A PROSPECTIVE OBSERVATORY STUDY

First Author: Yin Wu, MD WuQiang Fan, MD., Bahar Khalighi, Abbas Mirabbasi, Koroush Khalighi MD, FACP, FCCP, FACC, FHRS, CCDS

Background: The VKORC1 is the major target of warfarin inhibition, and CYP2C9 is a key metabolizer of warfarin. Genetic variations of VKORC1 and CYP2C9 affect warfarin sensitivity, clearance and bleeding risk. Variations of the two genes explain about 40% of warfarin dosing variability.

Objectives: To evaluate CYP2C9 and VKORC1 genetic variations and their clinical values for warfarin dosing.

Methods: DNA sequences of CYP2C9 and VKORC1 are analyzed in 304 patients in our clinic. Phenotype-specific warfarin dosing is analyzed and individual dosing recommendation together with follow-up plan are formulated.

Results: Distributions of the three CYP2C9 phenotypes in our patients are: Extensive (normal)-Metabolism (EM):190, Intermediate-Metabolism (IM):104 and Slow-Metabolism (SM):10. Among those patients who are on warfarin (n=64, all have therapeutic INR), average dose (mg/week, mean±SE) in EM group (32.6 ± 2.7, n=37) is significantly higher than that in IM group (22.2±2.1, n=25), P=0.0078. Average dose in SM is 13.1±3.0, n=2.

Distributions of VKORC1 phenotypes are: Low-Warfarin-Sensitivity (LWS):109, Intermediate-WS (IMWS):145 and High-WS (HWS):50. Average warfarin dose of each phenotype are: LWS, 34.3±4.3, n=20; IMWS, 25.5±2.0, n= 36; and HWS, 23.0 ±3.8, n=8, respectively. Although not statistically significant (p=0.07), a trend towards higher dose in LWS is evident.

“Coumadin caution” is taken for those who have high-risk phenotype: CYP2C9-IM/SM, VKORC1-HWS or high-risk combo: VKORC1-HWS+CYP2C9-IM(n=17) and VKORC1-HWS+CYP2C9-SM (n=1). The patients are then followed up for one year looking at 1) thrombotic event, 2) major bleeding event and 3) INR>5 event.

Conclusions/Discussion: Our data suggests that CYP2C9-IM phenotype need only 2/3 dose of warfarin as compared to EM. Similarly, VKORC1-HWS phenotype needs only 2/3 dose as compared to LWS patient. Testing for CYP2C9 and VKORC1 helps to estimate individual warfarin maintenance dosages, and to identify those who require low dose. This approach should help to lower bleeding events without compromising clinical efficacy.
Physician Advocacy: What Do Housestaff Know (and Care) About?

Megha Garg, Zoe Tseng, Pamela Egan, Grayson Baird, Kelly McGarry

Introduction: Physician advocacy is becoming increasingly recognized as an important component of medical education. A number of residency programs have implemented advocacy curricula, but little is known about resident/fellow experiences with and perceptions of physician advocacy.

Methods: We performed a cross-sectional electronic survey of all residents and fellows at Lifespan Hospitals, the primary teaching affiliate of Brown Alpert Medical School (n = 567). The survey was distributed through the Graduate Medical Education listserv from September to October 2014 over an 8-week period, with email reminders sent at weeks three and six.

Results: A total of 134 responses were received (response rate 24%), with 101 residents (77%) and 30 fellows (23%). Twenty (15%) were from surgical subspecialties. Eighty percent of respondents said they keep up with current events. Eighty-one percent are registered to vote, and of those registered, 88% voted in the 2012 presidential election. The vast majority of respondents have little experience with advocacy activities – 87% had never called an elected official or written a letter to the editor or op-ed. Only 24% feel comfortable explaining the Affordable Care Act (ACA), while 34% agree that they can help their patients navigate the health care system. Ninety-four percent agree that physicians have a duty to be advocates for their patients. A minority feel they received adequate training in medical school or residency (17% and 12%, respectively), while 73% of respondents agree that advocacy training should be a part of residency education. Significant differences were noted between PGY-1 interns and senior residents and fellows; interns felt less comfortable navigating the healthcare system and explaining the ACA, but were more likely to plan to be involved with physician advocacy efforts of professional societies and to teach others about physician advocacy. The biggest barriers to involvement in advocacy were time (60%), knowledge (17%) and motivation (13%).

Conclusion: Residents and fellows feel that physicians have a duty to advocate, but have limited experience with advocacy activities. Interns are less comfortable with the ACA, have more plans to be involved in future advocacy activities than senior residents and fellows. The majority agree that physician advocacy should be a part of residency training, and that time is the biggest barrier to participation in physician advocacy.
Cerebral Hyperperfusion Syndrome after Intravenous Thrombolysis for Acute Ischemic Stroke

First Author: Mayank Dalakoti, MBBS

**Background & Purpose**: Cerebral hyperperfusion syndrome (CHS) is a recognised complication after surgical/endovascular revascularization of chronic atherosclerotic carotid arterial disease. More recently, the syndrome has also been described in patients following successful thrombolysis in acute ischemic stroke (AIS), attributed to impaired auto-regulation and increased blood flow into ischemic brain tissue following restoration of cerebral blood flow. This study sought to investigate the occurrence and outcomes of CHS in AIS patients treated with thrombolysis.

**Subjects & Methods**: In this study, serial AIS patients at The National University Hospital treated with intravenous-tissue plasminogen activator (tPA) within 4.5 hours of symptom onset were included, from January 2012 to June 2013. Patients in whom the Internal Carotid Artery or Middle Cerebral Artery occlusion showed recanalization in the day 2 CT-Angiogram were observed for any new neuropsychiatric symptoms/signs that were considered unexpected by the treating stroke neurologist. These included persistent drowsiness or new affective disturbance. Patients with considerable mismatch between clinical and neuroimaging findings were also included. CHS was deemed to have occurred if the unexpected neuropsychiatric signs corresponded with Trans-cranial Doppler (TCD) flow velocity >100% of the contralateral vessel, Electroencephalogram (EEG) showed abnormal activity and/or CT-Perfusion scan showed markedly increased cerebral perfusion compared to the contralateral side. Upon diagnosis, measures were then taken to prevent complications of CHS.

**Results**: A total of 155 patients treated with IV-tPA were included in the study. Out of those, 9 (5.8%) patients fulfilled our definition of CHS. All 9 patients developed the unexpected symptoms 2-3 days after intravenous thrombolysis. 8 of the 9 patients were diagnosed based on TCD, EEG and CT-Perfusion findings, 1 of 9 based on CT-Perfusion alone.

Upright posture, fluid restriction and aggressive blood pressure control was instituted in CHS patients. This resulted in rapid resolution of abnormal neurological features in all affected cases within a week. All 9 of the patients achieved a good functional outcome, with a score of 0 or 1 on the Modified Rankin Scale at 3 months.

**Conclusion**: Cerebral hyperperfusion syndrome after intravenous thrombolysis in acute ischemic stroke should be suspected in patients that achieve arterial recanalization and develop new neuropsychiatric manifestations unexplained by territorial ischemia. Early diagnosis and appropriate management is crucial in preventing the dreaded hemorrhagic complications and achieving good functional outcomes in CHS.
A Novel Evaluation of the Positive Predictive Value of the Platelet Factor 4 ELISA in Bacteremia.

Gabriel McCoy, DO James McClain, MD Anna Cass, PhD Cory Mitchell, MD

Purpose: In prolonged hospital stays, heparin induced thrombocytopenia (HIT) is frequently sought as a diagnosis in the patient who develops thrombocytopenia. Anti-Platelet factor 4 (PF4) ELISA assays are ordered frequently to ensure this preventable cause can be avoided. These tests lead to frequent false positives and thus superfluous treatments and supplemental labs and imaging. Evidence has shown that some gram-negative bacteria are able to cause cross reactive antibodies to platelet factor 4 by way of bacterial LPS mimicry of heparin molecules. We seek to better define to what degree that bacteria affect the positive predictive value of the anti-PF4 ELISA assay.

Methods: A cross-sectional study was conducted of all patients hospitalized between January 2012 - December 2013 and meeting the following criteria: anti-PF4 ELISA assay positive result (optical density (OD value) > 0.4), serotonin release assay confirmation result, and blood culture results. Patients were separated into two groups: no bacterial growth, and bacterial growth. Positive predictive values were calculated for each group. Additionally, the average optical density values of each group were compared.

Results: For those patients with anti-PF4 ELISA and confirmation serotonin release assay (N= 151), only 76 patients had blood culture results (growth N=13, no growth N= 63). The PPV of patients with bacterial growth was 8.3% (95%CI of 0.02-0.38), for no bacterial growth PPV= 17.1% (95% CI of 0.07-0.32). The OD values for the growth population, no growth population and overall populations were, 1.03, 0.68, and 0.74 respectively. When comparing true positive and false positive anti-PF4 ELISA results, there were a higher percentage of patients with bacterial growth in the false positive group (12.4% vs 24.0%).

Conclusions: These results represent a novel pilot study examining the use of PF4 ELISA tests in bacteremic patients. Despite the small sample size and the lack of power for statistical testing, data from this pilot study suggest a need for future research to further investigate a potential association between bacterial growth in the blood and decreased PPV of the ELISA test. This is further supported by the variation observed in optical density values by bacterial growth status. Also, a higher proportion of false negatives had positive blood cultures and may need further investigation with a prospective trial. Interestingly, a number of patients with negative screening ELISA tests were found to have been confirmed with only 1 of 23 patients being positive. This has led to a quality control initiative in the hospital laboratory targeting cost of delivery of care.
Resident Engagement in Patient Safety

Kazeen Abdullah, Jeong-hee Ku, Rajeev Singh, Salahuddin Kazi, Kara Prescott.

Background: Incident reporting is critical to developing a culture of safety. At Parkland Hospital, safety incident reports are reviewed by a multidisciplinary team on a weekly basis at the Medicine Adverse Event (MAE) meeting but there has been little resident involvement in safety incident reporting and adverse event investigations.

Objective: We sought to understand resident knowledge and perception of safety incident reporting and to ultimately improve resident engagement in incident reporting and adverse event investigations.

Methods: In July 2014, PGY-1, PGY-2, and PGY-3 residents were surveyed on incident reporting. Residents answered questions regarding various aspects of incident reporting.

Results: 29 residents responded to the survey. The majority of residents knew what a safety incident report was. 28.6% of residents filed one or more incident reports in the last year. 75% of residents reported having incidents that they wanted to report but didn’t. The most common reasons for not reporting was – not knowing how to file report (76.2%), not having time (66.7%) and attempting but discontinuing as it was too long or complicated (23.8% and 28.6%, respectively). 19% of residents also feared reporting may cause trouble for staff involved in an incident. In August 2014, the Quality Improvement/Patient Safety (QI/PS) rotation was established. Detailed instructions on how to file incident reports were emailed to all residents. Residents rotated with the Chief Resident for Quality and Safety for 4 weeks and attended weekly MAE meetings. Residents selected cases for in-depth investigations using an adverse event investigation tool, process mapping, and fishbone diagrams. During their investigations, they interviewed all healthcare workers who were involved and routinely found systems issues that needed improvement. Residents reported back to MAE committee with a final report and recommendations for process improvements. Residents also presented to their peers at morning report with a focus on incident reporting, investigation process of adverse events, and lessons learned. Selected cases were presented by the residents during morbidity and mortality conference. A repeat survey will be sent out one year after creation of the QI/PS rotation to assess changes on resident attitudes and awareness of incident reporting.

Conclusions: Incident reporting, adverse event investigations, and follow-up is crucial to detecting patient safety issues and improving processes to prevent harm to patients and health care workers. Using the QI/PS rotation and the MAE meetings, we were able to successfully integrate residents into the patient safety process, encourage resident driven investigations, increase follow-up, and promote peer-to-peer education. This same approach could be used in other residency programs to improve resident engagement in adverse event investigations and follow up. Data collection is ongoing.
Reducing Congestive Heart Failure Readmissions: Success through Collaboration at Methodist Dallas Medical Center.

First Author: Joyce Alencherril, DO Second Author: Leslie Cler, MD, Melanie Powell, MD

Introduction: In 2012, the Affordable Care Act established the Hospital Readmissions Reduction Program (HRRP), which placed financial penalties on hospitals that had readmissions above a national average. Consequently, many hospitals, including Methodist Dallas Medical Center (MDMC), developed strategies to reduce readmissions for the specific diagnoses that the HRRP focused on. Our performance improvement project utilized a multifaceted approach in an effort to reduce congestive heart failure (CHF) readmissions by 5% annually for Medicare patients on both private and resident services.

Methods: Our intervention took place on the general medicine floors at MDMC and involved the development of a CHF readmission reduction committee. This committee included cardiologists, hospitalists, residents, nurses, case managers, social workers, and pharmacists, all of whom had specific responsibilities. Tools utilized by the committee included a discharge checklist, a post-discharge questionnaire, and a systematic review of readmissions. Data regarding CHF readmissions for Medicare patients from October 2012 through September 2013 (pre-intervention) was compared to readmission data for the post-intervention period, i.e. October 2013 through September 2014.

Results: Since the initiation of our intervention, CHF readmission rates have been declining overall. Comparing pre- and post-intervention periods, readmission rates have, on average, decreased from 14.35% to 7.34%, a difference of 7.01% for our private attendings’ service and from 17.66% to 9.16%, a difference of 8.5% for our private and resident services combined. Thus, our collaborative intervention has decreased CHF readmission rates for Medicare patients by almost 50%.

Conclusion: Successfully reducing hospital readmissions is a complex problem that requires the collaboration and coordination of multiple members involved in patient care.
TEXAS POSTER FINALIST - RESEARCH Alexander L Bullen Clarke, MD

Resident-driven quality improvement project to reduce diagnostic errors by the application of debiasing strategies

First Author: Alexander L Bullen Clarke, MD Manuel Lopez Vasquez, MD James F. Hanley MD, FACP

Introduction A major cause of diagnostic errors is thought to be cognitive failure, often because of cognitive biases. We speculate that these errors could potentially be reduced by incorporating mindfulness and utilizing specific debiasing strategies.

Methods: We performed an observational prospective study. During the night float rotation, information was provided on diagnostic errors with a strategy to incorporate mindfulness into their clinical encounters and on debiasing techniques. We emphasized that each resident must do a complete history/physical and develop a comprehensive differential diagnosis and plan. Each resident completed a survey with five cognitive debiasing techniques after each admission and recorded potential cognitive biases and diagnostic disagreement from the ED to resident handoff. These findings were discussed at our facilitated check-in rounds.

Each Resident was given a Diagnostic Therapeutic Index (DTI), a measure of diagnostic robustness, before the rotation and six weeks after the rotation to assess whether learning these techniques would change the resident DTI.

Results: There were 135 survey responses, in all of the cases; the Residents did their own history and physical examination. In 79.2% cases, Residents developed a differential diagnosis.

In 56.2% of the cases, Residents agreed with the ED physician diagnosis. In 43.7% of the cases there was disagreement with 84.7% cases due to different history and physical examination findings.

Cognitive biases were identified in 62.2% of the cases, the most common being premature closure in 23.8% and anchoring in 27.4%. The mean overall score of the DTI improved from was 167.12 to 175.25, with flexibility improving from 83.5 to 89.88.

Conclusions: Disagreement between the ED handoff and Resident diagnosis were common, most identified by an independent history and physical. In most cases the final diagnosis was consistent with the Resident. Cognitive biases were recognized in 62.2% of the admissions with premature closure and anchoring most identified.

These techniques were associated with an increase in diagnostic index by 8.13 points with flexibility in thinking increasing by 6.38 points. This last parameter is thought to be a measure of a variety of thinking means or processes that can be applied during the diagnostic process, a form of type 2 thinking associated with less diagnostic errors. We believe these changes are meaningful.

Our data from the study suggest that Residents can become more mindful and are able to both improve their diagnostic accuracy and appropriately identify cognitive biases. It is important to acknowledge diagnostic
errors in patient safety and it is an imperative that training programs develop methods to teach and recognize these cognitive biases.
Introduction: Gastroparesis is a chronic condition of gastric dysmotility with delay in gastric emptying in the absence of mechanical obstruction. Patients present with chronic nausea, vomiting, abdominal pain and malnutrition. Gastric Electrical Stimulation (GES) is an FDA approved therapy for patients with medically refractory gastroparesis. Many patients with gastroparesis have had their gallbladder removed.

Aim: To determine if long term clinical response of gastric electrical stimulation (GES) differs among gastroparesis patients with prior cholecystectomy compared to patients who have not had their gallbladder removed.

Methods: Gastroparesis patients (n=52, diabetic=33, idiopathic=15 and post-surgical=4) treated with gastric electrical stimulation (GES) therapy were retrospectively evaluated. Patients were seen at baseline and approximately every 3 months, and symptoms were assessed by a modified Gastroparesis Cardinal Symptom Index (GCSI) score on a scale of 0-4 that inquired about vomiting, nausea, early satiety, bloating and post-prandial fullness. Abdominal pain, epigastric burning and need for pharmacotherapy were also assessed at baseline and at 1 and 2 years after GES therapy.

Results: Of 52 patients with diabetic or idiopathic gastroparesis, 31 (60%) had prior cholecystectomy; 21/31(68%) laparoscopic and 10/31(32%) open. At 1 year, modified GCSI score, vomiting, early satiety and post prandial fullness improved significantly in both subgroups; cholecystectomy and no cholecystectomy (p=0.006 and 0.016, p=0.02 and p=0.03, p=0.05 and p=0.01, p=0.002 and p=0.001), respectively. Among patients with prior cholecystectomy, the decrease in nausea and abdominal pain was statistically significantly at 1 year after GES (p=0.05 and p=0.008), respectively. Among patients with no history of cholecystectomy, nausea and abdominal pain improved significantly at 2 years post implant (p=0.02 and p=0.03), respectively. Epigastric burning and bloating decreased significantly in patients with prior cholecystectomy at 1 and 2 years (p= 0.0002 and p=0.03), respectively. In both subgroups, the need for pharmacotherapy decreased at 1 and 2 years from baseline.

Conclusion: GES therapy significantly improves GCSI score, vomiting, nausea, early satiety, bloating, post prandial fullness, abdominal pain, epigastric burning and need for pharmacotherapy in patients with severe gastroparesis at 1- and 2-year intervals from baseline. Symptom improvement is similar in patients with and without prior cholecystectomy.
Reduction of Time to Treatment, Emergency Department Dwell times, and Cost of Treatment for Acutely Decompensated Heart Failure using Observation Units and Six Sigma Methodology

First Author: Rajeev Singh, MD Kazeen Abdullah Ambarish Pandey Mani Alavi Suzanne Daigle John Pease Sandeep Das

Introduction: Acutely Decompensated Heart Failure (ADHF) is a condition associated with substantial morbidity and mortality, with approximately 800,000 patients admitted from the Emergency Department to hospital each year. To date, application of formalized Quality Improvement (QI) initiatives is sparse with a relative paucity of published data.

Methods: A protocol was made at Parkland Hospital as a primary intervention to stratify ADHF into high-risk or low-risk based on the Society Chest of Pain 2008 recommendations for short-stay diuresis at Parkland Hospital Emergency Observation (ED-OBS) under DMAIC (Description, Measure, Analysis, Intervention, and Control) Six Sigma Methodology. Patients were admitted to ED-OBS one of three ways: Emergency Department to ED-OBS (Pathway 1); Cardiology Clinic to Emergency Department to ED-OBS (Pathway 2); Clinic directly to ED-OBS (Pathway 3). Pathway 3 was created by the protocol. Data, including 30 day readmission rate, 30 day mortality rates, time to first dose Lasix, and ED dwell time was collected from 04/1/2014–06/01/2014. Cost analysis comparing patients treated through the different pathways and comparing ED-OBS to inpatient admission is ongoing.

Results: 58 patients diuresed at the ED-OBS from 04/1/2014 – 06/01/2014. 45 (78%) patients were admitted from Emergency Department; 4 (7%) patients were admitted from Clinic to Emergency Department to ED-OBS; and 9 (15%) were admitted from Clinic directly to ED-OBS. 14 (24%) were admitted from ED-OBS to inpatient conversion. 44 patients were treated without inpatient admission (76%) with 14 patients having to be converted to inpatient admission (24%)

For Pathway 1, the median dwell time in ED before ED-OBS treatment was 421 minutes with median time to first dose Lasix was 368.5 minutes (n = 45). For Pathway 2, the median time spent in ED before ED-OBS admit was 356 minutes with median time to first dose Lasix was 304 minutes (n = 5). For Pathway 3, the median time spent in ED before ED-OBS admit was 0 minutes with median time to first dose Lasix was 202 minutes (n = 8). The creation of a direct route to ED-OBS from Clinic decreased ED dwell time for Clinic patients by approximately 360 minutes and time to treatment by 100 minutes. Applying cost data from previously published models with a cost-savings of $3600 per patient with ED-OBS compared to inpatient admission, ED-OBS treatment resulted in a net cost-savings of $158,400.

Conclusions: The implementation of a protocol to stratify ADHF into low risk and high risk groups resulted in quicker treatment and decreased Emergency Department dwell times with a projected cost-savings of $158,400 over two months. Further research is needed as to whether these improved process metrics translate to improvements in other relevant endpoints such as hospital admission rates, bed utilization, return ED visits, and cost.
A Multifaceted Approach To Reduce Heart Failure (HF) Readmissions

Rumit Thakkar DO (Internal Medicine Resident), Hafiz Abdul Moiz Fakih MD (Internal Medicine Resident), Adrian Nedelcut MD (Quality Lead, Emmanuel Elueze MD, PhD, Internal Medicine Residency Program Director)

Introduction: In 2012, the 30-day-readmission rate for heart failure (HF) at our hospital was 24% compared to the national average of 22.3%. Approximately, half of our overall readmissions were because of heart failure. We saw an opportunity for improvement to reduce HF readmissions and a project was thus initiated to achieve this goal.

Discussion: We began project with creation of committee involving Internal Medicine Residents, Quality Department at Good Shepherd Medical Center, Case Management, Social worker, and Nursing leadership. We met every two weeks to review why our rate of readmission was higher than national average. We reviewed several charts to determine review our discharge process. After reviewing multiple charts, we decided to intervene at multiple levels. First we started to screen patient for high risk of readmission. A tool was developed by our committee to screen patient for readmission. This tool was used to on patients who got readmitted multiple times to see if the tool that was created correlated with high risk of readmission. This tool showed moderate correlation. Later it was refined by reviewing each category to increase to high correlation. Committee worked together to standardize the discharge process for Heart Failure patients. Literature was created for patient education. Cardiac rehab started to see patient while they were admitted to hospital, educated patient regarding CHF with further follow up after getting discharged from hospital. Cardiac Rehab provided them with literature on CHF and educated them while they were admitted to hospital. Heart Failure clinic was started and patients who were discharged with CHF were seen within 72 hours post discharge with second follow up visit in seven to ten days. Heart Failure clinic coordinator called patient confirming their follow up appointment. Heart failure order sets in the hospital were revised to improve and standardize quality of care provided in the hospital. With collective effort involving multiple departments, we were able to meet our goal to reduce hospital readmission for our CHF patients. Our readmission for CHF patient started show improvement and our rate of readmission was 14.28% in June of 2014 which is well below national average.

Conclusion: Hospitals across the country are facing national challenge to reduce readmission. It requires collective effort from everyone. At our hospital, quality department, physician, case manager, social worker, nursing department worked as team and we were able to reduce hospital readmission. Our goal is to continue our collective effort to reduce hospital readmission, improve quality of care and improve patient satisfaction.
Combined parasite derived peptide GK1 and Programmed Death antibody (anti-PD-L1) therapy increased survival in a melanoma mouse model.

MATERIALS AND METHODS Forty mice, 6- to 8-week-old C57BL/6 were injected with 2 X10^5 B16-F10-luc2. Tumor-bearing mice 20mm^3 were separated in four different groups: GK1, Anti-PDL-1, GK1/anti-PDL-1, and control, (10 mice per group). GK1-treated peritumorally until sacrifice day. The anti–PD-L1 treated group injected intraperitoneally (IP) with anti-PD-L1 antibody until sacrifice day. The combined immunotherapy group injected with an antiseptic peritumoral injection of GK1 and anti-PDL-1 until sacrifice day and the control group injected with peritumoral or IP sterile saline. Mice were sacrificed when moribund or lethargic or when they fail to respond to gentle stimuli, and day of death was recorded. All experimental procedures comply with the "Principles of Laboratory Animal Care" and the Guide for the Care and Use of Laboratory Animals (NIH publication No. 80-23, revised 1985) and by the University Laboratory Animal Care Committee at Texas Tech University Health Sciences Center. RESULTS The GK1 peptide in combination with Anti-PD-L1 demonstrated therapeutic properties in a mouse melanoma model, as treatment resulted in a significant increase in the mean survival time of the treated group of 34 days compared to 23 days in the control group (P< 0.01). Moreover, the combination group demonstrated statistically significant increase of survival compared to GK1 or Anti-PD-L1 alone (P< 0.01). The potential for GK1 to be used as a primary or adjuvant component of chemotherapeutic cocktails for the treatment of experimental melanoma was demonstrated in this study for the first time. Further studies to evaluate the direct translational bench-to bed-side translational potential are being performed by our group.
Presence of Vitamin B12 Deficiency and Anti-Gastric Parietal Cell Antibodies in Patients with Rheumatoid Arthritis

First Author: CAPT Cassandra L Craig Christopher Tessier, Major, USAF, MC, ACP Fellow Matthew B. Carroll, Col, USAF, MC, FACR, ACP Fellow

Introduction: Multiple studies over the last few decades have established a prevalence of an anti-Gastric Parietal Cell (anti-GPC) antibody in Rheumatoid Arthritis (RA) patients ranging from 5% to 28%. Other studies have reported the prevalence of vitamin B12 deficiency in RA patients ranging from 24% to 29%. Recent studies have not assessed the presence of both the anti-GPC antibody and concurrent vitamin B12 deficiency in RA patients since implementation of more aggressive disease modifying therapy.

Methods: This observational study recruited patients from June 2013 to October 2014. Patients were recruited in one of three arms: those with RA, autoimmune thyroid disease (AITD), and no known autoimmune disorder (controls). Subjects excluded if they had a known medical or surgical disorder which impaired vitamin B12 absorption, symptoms suspicious for vitamin B12 deficiency, or history of vitamin B12 deficiency. All patients completed a 1 page questionnaire asking about proton pump inhibitor use, metformin use, and vitamin use. A one-time serum assessment of vitamin B12 level, methylmalonic acid, and anti-GPC antibody level was performed.

Results: Forty-five subjects enrolled in the RA arm, 36 in the AITD arm, and 44 in the control arm (total 125 subjects). No statistically significant differences in age, gender, or ethnicity were observed among groups. Serum vitamin B12 levels were not statistically different across the three groups. Only 2 subjects were vitamin B12 deficient requiring therapy, none in the RA arm. Levels of anti-GPC antibodies were not statistically different across the three groups. Subjects taking a vitamin supplement were more likely to have a higher vitamin B12 level (842.7 ± 376.4 vs 606.7± 316.2 pg/mL, p = 0.001).

Conclusion: While no differences were observed in serum vitamin B12 or anti-GPC antibody levels amongst the three arms in this trial, and the prevalence of vitamin B12 deficiency appears to be very small (0% for RA subjects, 1.6% for all subjects), the use of vitamin supplements generated a large effect size that made detecting meaningful differences in the arms challenging.
Chapter Winning Abstract

Christin Laufer

**Introduction:** In 2012 the Centers for Disease Control (CDC) recommended Hepatitis C virus (HCV) infection screening for those born between 1945 and 1965. Prior recommendations endorsed screening based on risk factors. Because military retirees have access to free comprehensive health care, underwent routine drug screening, had mandatory physical fitness tests and periodic health assessments for over 20 years during service, we hypothesized that the prevalence of HCV in military retirees would be significantly lower than the national average. Thus the new CDC screening guidelines may not be applicable.

**Methods:** A quality improvement (QI) initiative from January 2013 to April 2014 implemented the new birth-cohort CDC screening guidelines for the Internal Medicine (IM) clinic of our hospital (QI group). An age-matched group from the same IM clinic, screened based on risk factors for HCV infection from September 2012 to December 2013, served as the comparator (RF group). The prevalence of the anti-HCV antibody and chronic infection were determined and compared. Results: In the QI and RF groups, 478 and 221 subjects were screened, respectively. Demographics of the two groups were statistically similar with the exception of the age and ratio of retirees to dependents. The prevalence of anti-HCV antibody positivity was 2.1% and 2.3% in the QI and RF groups, respectively (Odds Ratio (OR) 1.08, 95% CI: 0.37, 3.21, p = 1.000). The prevalence of chronic infection detected by PCR was 0.4% and 1.8% in the QI and RF groups, respectively (OR 4.39, CI: 0.80, 24.13, p = 0.083). The OR comparing the anti-HCV antibody in the QI and RF groups to NHANES data showed no statistical differences. However there was a statistically significant difference between chronic infection in the QI group and NHANES population.

**Conclusion:** The military retiree population did not have a lower prevalence of the anti-HCV antibody than the American populace, but did have increased viral clearance amongst those screened by birth year. In the QI group, higher viral clearance and subsequent lower prevalence of chronic infection may be explained by a paucity of concurrent risk factors; however there were no statistical gender or racial differences between cohorts. Although the power to detect a difference in the HCV antibody prevalence between the cohorts was low, the power to detect a difference in the prevalence of chronic infection was adequate. The CDC guidelines are thus applicable to the military retiree population.
**KETAMINE BY CONTINUOUS INFUSION FOR SEDATION IN SEPTIC SHOCK**

Victoria Fernandes Sullivan, MD (Associate); Nathan Boyer (Associate); Jason Reese, MD (Associate); Cristin A. Mount, MD (FACP) Madigan Army Medical Center, Tacoma, WA (a), San Antonio Uniformed Services Health Education Consortium, San Antonio, TX (b)

**Introduction:** Sedating mechanically ventilated shock patients presents a management challenge. Most routinely used sedatives can cause hypotension, they do not have analgesic properties and many analgesics can also worsen hypotension. Ketamine is an NMDA receptor antagonist that acts as a dissociative sedative, providing analgesia and amnesia. Two additional effects of ketamine infusion are hypertension and bronchodilation. We hypothesized that use of ketamine as a sole sedative agent in adult patients in septic shock would decrease the required dose of vasopressor medication needed to maintain adequate perfusing mean arterial pressure.

**Methods:** This is a prospective, observational pilot study of adult septic shock patients requiring mechanical ventilation and sedation, admitted to the ICU from January 2012 until September 2014. Patients were started on a ketamine infusion at the time of enrollment and ketamine was continued for 48 hours or until the patient no longer required mechanical ventilation. The primary outcome was vasopressor dose over the first 96 hours of enrollment. Data on additional sedative and analgesic agents, APACHE II scores, use of corticosteroids and mortality was also collected.

**Results:** We conducted an interim analysis of data from 16 patients, compared with a retrospective cohort of 35 patients admitted for septic shock requiring mechanical ventilation who received usual sedation care. The average total dose of vasopressors in the control group at 48 hours was 20.5mg norepinephrine versus 10.8mg norepinephrine in the ketamine group (p = 0.09). There was a trend towards significance in the amount of norepinephrine needed at all time periods measured and less use of a secondary pressor agent (vasopressin). Furthermore, the study group was older and sicker, based on APACHE II scores.

**Conclusions:** The interim results of this pilot study are inconclusive but the trend towards septic shock patients requiring less vasopressor dosing when ketamine is used as the sole sedative is promising. The higher age and illness severity scores in the ketamine group also lend strength to the hypothesis. To our knowledge, this is the first report of ketamine use for sedation in adult septic shock and mechanical ventilation. The preliminary results of this pilot study show a trend that could be further explored in a large, randomized, multi-centered trial. Sedation of septic shock patients in the ICU is challenging to manage, and ketamine could be another medication to add to the limited arsenal.
Chapter Winning Abstract

Ian Grasso, MD, Mark Haigney, MD, Jacob Collen, MD, Jordanna Hostler, MD, and William Kelly, MD

**Background:** ECG Derived Respiration (EDR) is a technique for determining breathing patterns algorithmically using the root mean square of a filtered ECG signal obtained using high sensitivity 24 hour (Holter) ECG Monitoring. Once thought to be only an interesting observation, this can detect central and obstructive apneic episodes and Cheyne-Stokes breathing, and is being studied as one of several home-based alternatives to traditional sleep studies (polysomnography). But there is little known about confounding factors that could lead to errors in diagnosis, such as sedative-hypnotic agents, which are used by nine million Americans. Sedative-hypnotic agents are frequently given to improve the quality of polysomnograms, providing an opportunity for study.

**Methods:** This is a subgroup analysis of our pilot study comparing EDR techniques and an algorithm known as Holter Derived Apnea Hypopnea Index (HDAHI) with the gold standard for sleep apnea diagnosis, polysomnography (Apnea-hypopnea index, AHI). After approval by the Walter Reed Institutional Review Board, a Mortara H12 Holter monitor was worn simultaneously during standard overnight polysomnogram. The ECG Holter output was analyzed by a board certified electrophysiologist while polysomnograms were independently analyzed for sleep apnea. Findings from these were compared using the Spearman correlation coefficient and a ROC curve was developed to determine the most sensitive HDAHI score in comparison with AHI. Subgroup analysis was conducted of patients who had been pre-medicated with standard doses of non-benzodiazepine sleep agents and those who were not using the t-test two sample assuming unequal variances. The total arousal index (TAI), which is a measure of arousal overnight, was compared in the two groups using the z-test.

**Results:** Thirty subjects were enrolled. Those that had received a hypnotic agent (n=13) had a mean difference between HDAHI and AHI of 16.66, compared to those who did not receive a sleep aid, mean difference of 3.72 (P=0.047). TAI was 18.43 in the medicated group vs 9.79 in the non-medicated group (p=0.11). Variance between the two groups was confirmed using the F-test for variance which showed a variance of 654 for the medication group and 8.06 for the non-medicated group (p<0.05).

**Conclusion:** ECG Derived Respiration may be less sensitive as compared to polysomnography at detecting sleep apnea in patients given sedative hypnotics. This may be due to the decrease in magnitude of the arousal as captured by the ECG signal. While sleep aids may not be needed for the well tolerated, at home ECG holter-based testing, physicians used holter-based screening should query if their patients are taking them chronically.
UTAH POSTER FINALIST - RESEARCH Sonja Raaum, MD

U.S. resident physician use of smartphones in clinical care

Sonja Raaum MD, Andres Patino MD, Christian Arbelaez MD MPH, Caroline Milne MD

**Introduction:** Smartphone use in clinical care has dramatically increased over the last decade. Smartphone use provides a potential opportunity for clinicians to improve care through efficiency and enhanced access to resources. Current use by clinicians is unregulated and there are few studies identifying patterns of use. Residents and trainees are likely early adapters of this technology.

**Objective:** Describe the current patterns of smartphone use by resident physicians in primary care specialties in the U.S.

**Methods:** Using current literature, survey was designed and piloted in fall 2013. Study was approved by local IRB. Survey was distributed online and anonymously to residents in University of Utah programs for Internal Medicine, Emergency Medicine, General Surgery and Family Medicine; and residents in Brigham and Women's programs for Internal Medicine and Emergency Medicine. Data collected included demographics, smartphone ownership, frequency and patterns of use, barriers to use and perceived benefits of use.

**Results:** A total of 259 respondents replied to survey. Majority were affiliated with University of Utah, 63% (n=163); almost all between age of 25-34 (n=238, 93%) but evenly distributed between level of training with 32% PGY1, 28% PGY2 and 31% PGY3. Internal medicine comprised the largest specialty group with 55% of respondents (n=142). Almost all residents owned smartphones, 97% (n=251) and of owners 98% (n=246) used them in clinical care. Few residents, 12% (n=32), attended a medical school that required or provided smartphones in training, and only 19% (n=50) have received formal education regarding smartphone use; and 50% (n=127) of respondents desired more training. The most commonly used functions included e-mail and internet access as well as text messaging other providers; the least commonly used functions included physician order entry, video recordings of patient findings, and patient education. Reported barriers to use included not enough time and cost of applications. An overwhelming majority, 93% (n=238), of respondents believe smartphone use positively impacts patient care specifically in areas of diagnostic assistance, quality of care and patient safety.

**Discussion:** Our survey highlights an increase in adoption rate of this technology since last survey performed in 2011. We highlight that there is a paucity of education around use and that residents desire more training. In addition, the most commonly reported uses are not necessarily congruent with the perceived benefits on patient care and warrant future investigation. Barriers to use can be addressed through education, including increased awareness of free resources to trainees. Finally, overwhelming positive perception suggests this technology will continue to be used frequently.
Objectives: Continuity of care is an important component of providing good clinical care in the outpatient setting. During residency training, there are many barriers that challenge resident and patient continuity in ambulatory clinics. Leaders in Internal Medicine have called for ambulatory redesign with block scheduling models and clinics are now in a position to evaluate the impact of these innovations. The Internal Medicine program at the University of Vermont Medical Center (UVMMC) was restructured in July 2012 from a traditional ½ day a week ambulatory clinic model to a 4+1 system in which resident physicians alternated with 4-week blocks of inpatient and elective rotations and a 1-week block of dedicated ambulatory care. Our study will determine if continuity of care has improved, stayed the same or declined between the resident physician and patient with the new block model.

Setting: The UVMC Internal Medicine Residency program consists of 35-41 categorical residents each year who were all included in this study. Residents attend one continuity clinic site at the University Health Center Given Clinic.

Methods: Each resident had an assigned panel of patients that averaged from 50 to 80 patients. During the clinic week, time was divided into continuity clinic, didactic, and subspecialty clinic sessions. During the continuity clinic sessions, residents saw patients from their own panel as well as acute visits for patients assigned to a different resident or attending PCP.

In this study, continuity of care was measured for each patient who attended the resident clinic with an assigned resident PCP.

Data were collected on patient visits only if the patient had an assigned resident physician as their PCP. For each of the patients, the total numbers of visits to the clinic and visits to their assigned resident PCP were collected for the three periods of time: July 2011-June 2012, July 2012-June 2013, and July 2013-June 2014.

Results: A total of 199 patients met criteria for the study. The Usual Provider of Continuity Index (UPC) is a measure of continuity that is calculated by dividing the number of visits to the same provider by the total number of visits to the clinic. For July 2011-June 2012: UPC 0.0059, July 2012-June 2013: UPC 0.0942, and July 2013-June 2014: UPC 0.4045.

Impact: The results from our study show that the continuity of care improved in the 4+1 system when compared to the traditional system. Furthermore, there was large improvement in continuity during the 2nd year of the 4+1 system from the 1st year. These results are exciting as the structure of the ambulatory week evolves and allows faculty to train residents in ambulatory population management.
This provides areas for future research including whether or not improved continuity improves patient care outcomes and number of residents entering the field of ambulatory medicine.
WEST VIRGINIA POSTER FINALIST - RESEARCH Colleen Pettrey, MD

PULMONARY FUNCTION TESTING IN PATIENTS WITH COPD IN THE CAMC OUTPATIENT CARE CENTER

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Background: Chronic obstructive pulmonary disease (COPD) is one of the most common lung diseases and was the third leading cause of death in 2010. Many patients are diagnosed with COPD simply for having a history of smoking and a symptom of chronic cough or dyspnea. Misdiagnosis leads to increased cost and exposes patients to unnecessary medications. The Pulmonary Function Test (PFT) is the gold standard of diagnosing COPD. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) aids clinicians in diagnosing and staging COPD severity based on PFT findings and provides severity-based treatment recommendations. The goal of this study is to examine the percentage of patients diagnosed with COPD in the CAMC Outpatient Care Center who received a confirmatory PFT and to determine if those patients are receiving guideline-recommended treatment based on GOLD.

Methods: This is a retrospective chart review of 252 patients of the CAMC Outpatient Care Center identified by COPD ICD-9 diagnosis codes who visited the clinic at least once in 2011. Each chart is reviewed to confirm a documented diagnosis of COPD, determine if there was a PFT to support this diagnosis, examine risk factors (smoking), identify pharmacologic management implemented and evaluate its appropriateness based on disease severity and GOLD guidelines.

Results: A total of 252 consecutively selected charts were reviewed. Of these, 183 patient records met full inclusion criteria and were analyzed. 97.3% of the patients had a smoking history. Our study revealed that only 81, or 44.3%, of charts analyzed had PFTs available in the chart. The mean FEV1/FVC = 64.6 (SD = 14.7), with mean FEV1 = 68.5 (SD = 21.9). Based on GOLD criteria, 31 patients (38.3%) did not meet criteria for COPD diagnosis. Nine patients (11.1%) met criteria for Stage I COPD, 22 patients (27.2%) for Stage II, 18 patients (22.2%) for Stage III, and 1 patient (1.2%) for Stage IV. When pharmacological management was investigated, it was found that only 16 patients (19.8%) were being correctly treated, based on their disease severity, according to GOLD recommendations. Twenty-eight patients (34.6%) were being treated with medications despite their PFTs revealing that they did not have COPD; additionally, 98 patients (53.6% of the full study analysis) were prescribed medications without ever having received PFTs.

Conclusion: This study indicates that physicians in our outpatient clinic lack compliance with current practice standards for COPD diagnosis and treatment. While the number of patients with PFTs available (44.3%) surpassed our initial suspicion, this value remains far below our goal as primary care providers to practice guideline- and evidence-based medicine. PFTs are an imperative tool in the diagnosis and appropriate treatment of COPD and are clearly being underutilized in our outpatient care facility.
Left Ventricular Ejection Fraction Assessment: Comparison between Single Photon Emission Computed Tomography and Echocardiography

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Introduction: Left ventricular ejection fraction (LVEF) is a major determinant in choosing which medical and device treatments are selected for management of heart failure. In clinical practice the measurement of LVEF is most usually performed by either echocardiography (ECHO), single photon emission computed tomography (SPECT) or left ventriculargram if biplane technique is used. A number of studies have evaluated the agreement between ECHO and SPECT in the measurement of LVEF with varying degree of correlation, however very few test subjects were taken with LVEF between 25% - 50%.

Objective: To compare LVEF values obtained via ECHO versus SPECT in all patients with a focus on those with an LVEF by either technique between 25% and 50%.

Methodology: This was a retrospective chart review of 235 randomly selected patients who had undergone both ECHO and SPECT from 2012 to 2014. The records were retrieved from Charleston Area Medical Center’s patients’ record database. Exclusion criteria included patients with acute coronary syndrome, decompensated heart failure or any revascularization done within 30 days of ECHO or SPECT.

Results: Left ventricular imaging by ECHO or SPECT was performed on 235 patients (129 males and 106 females) within a 72 hour period. The average age was 62±14 years. For ECHO, the mean LVEF was 51.0±12 and SPECT it was 57.7±14. When comparing measurements of LVEF for all patients by ECHO and SPECT a moderate correlation was shown with a correlation coefficient of 0.76. However, the correlation coefficient decreased even more to 0.52 in patients with an LVEF ≤50% by at least one of the two techniques. This does signify the fact that further studies, such as contrast ECHO, biplane left ventricular gram or magnetic resonance may be needed to assess LVEF when the results are discordant in areas affecting treatment decisions such as ACE inhibitors, beta blockers and/or devices (biventricular pacing or implantable cardiac defibrillator).

Conclusion: The correlation of LVEF by ECHO and SPECT is poor when patients have a modestly decreased LVEF.
Repeat Lipopolysaccharide Exposure is Sufficient to Impair Viral Induced Pro-atopic CD49d Expressing Neutrophil Recruitment to the Lung

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**Rationale:** Severe respiratory viral infections increase the risk of developing asthma and atopic disease. In the Sendai virus (SeV) mouse model, we demonstrated this risk depends upon the early recruitment of CD49d expressing neutrophils to the lung. We also demonstrated that single intranasal (i.n.) dose of lipopolysaccharide (LPS) prior to SeV infection significantly reduced CD49d+ neutrophils in the bronchoalveolar lavage (BAL). The hygiene hypothesis suggests chronic microbial exposure prevents development of atopic disease. Our study investigated whether chronic LPS exposure would reduce SeV mediated CD49d+ neutrophil recruitment to the lung and BAL.

**Methods:** C57BL6 mice were treated with daily LPS (3 µg) i.n. starting 3 or 1 days before or with SeV infection (day 0). On day 3 post SeV, the BAL and lung were isolated and the frequency of CD49d+ neutrophils determined by flow cytometry.

**Results:** In the BAL, CD49d+ neutrophils were reduced most significantly when LPS exposure was started one day prior to or the day of SeV infection (23.6±1.8%, 10.2±1.6% [0.0002], 10.5±2.2% [0.0037], 17.4±3.6% [0.11]; mean±sem percent CD49d+ neutrophils [p value versus PBS] for PBS, LPS starting on day 0, -1, or -3; n=3). In the lung, CD49d+ neutrophils decreased regardless of LPS starting day (42.9±3.7%, 18.7±2.0% [0.0003], 22.6±1.0% [0.013], 24.9±2.0% [0.0052]; n=3).

**Discussion:** Chronic LPS exposure reduces SeV mediated CD49d+ neutrophil accumulation in the lung and the BAL, suggesting an interaction between the viral and hygiene hypotheses in driving atopic risk. Future studies will explore whether chronic LPS exposure is sufficient to prevent the development of postviral atopic disease.
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