AMERICAN COLLEGE OF PHYSICIANS STUDENT ABSTRACTS COMPETITION

Contents

CLINICAL VIGNETTE PODIUM PRESENTATIONS

COLORADO PODIUM PRESENTATION - Anna Kuropatkina

Led Astray: Diagnosing Granulomatosis with Polyangiitis in a Patient with Complex Risk Factor Profile and Negative Serology

First Author: Anna Kuropatkina, MS3 Jill Gersh, MD

Introduction: Granulomatosis with Polyangiitis (GPA), previously known as Wegener's Granulomatosis, is a systemic small-vessel vasculitic disorder associated with anti-neutrophill cytoplasmic antibodies (ANCA), specifically proteinase 3 and myeloperoxidase; however 10-30% patients are ANCA-negative. GPA can present a diagnostic challenge as many of its symptoms and signs are non-specific and can be falsely attributed to other etiologies, especially when serology is negative.

Case Description: A 37-year old previously healthy Caucasian male presented with two days of dyspnea, cough, hemoptysis and night sweats, preceded by two months of migratory arthralgias improved with oral steroids. Social history was pertinent for 18-pack year history of tobacco use, intravenous drug use, employment in a state prison, and self-tatooing.

On initial presentation, the patient demonstrated decreased breath sounds in the left lung field. A CT chest showed bilateral multifocal cavitary lung nodules. The patient was started on IV antibiotics. An extensive microbiologic work-up was negative except for anaerobic organisms in the sputum. Notably, serology for ANCA was negative. Transbronchial biopsy showed acute and chronic inflammation, with possible capillaritis. Despite antibiotic therapy, the patient decompensated, requiring hemodialysis and eventual escalation of care for respiratory distress, necessitating intubation. A VATS biopsy showed extensive necrosis, granulomas, medium and small vessel vasculitis, and foreign material within vessel lumen with foreign body giant cell reaction, attributable to amphetamine response or pulmonary vasculitis. He was started on high-dose steroids with significant improvement, subsequently taken off dialysis and extubated. Kidney biopsy showed pauci-immune necrotizing glomerulonephritis. The patient was diagnosed with ANCA-negative GPA, started on prednisone taper, and given his first dose of rituximab.

Discussion: ANCA-negative GPA can be seen in younger patients, and is associated with less pulmonary involvement than ANCA-positive disease. Our patient initially presented with pulmonary manifestations in the absence of signs of glomerulonephritis with negative serology, obscuring the diagnosis. A differential supported by the patient's risk factors - infectious emboli from IV drug use or dental infection, tuberculosis, Lemierre's disease, foreign body reaction to IV drug use – was pursued. However, this extensive work-up was negative, requiring a kidney biopsy on hospital day 17 for definitive diagnosis. In fact, median time to kidney biopsy from initial symptom presentation is 2 months in ANCA-negative GPA patients. The underlying process of tissue destruction appears to be neutrophil-mediated in both ANCA-positive and ANCA-negative disease. Increased intraalveolar neutrophils on transbronchial biopsy in our patient thus also supported GPA as the diagnosis at tissue level. ANCA-negative GPA has been associated with worse renal outcomes than ANCA-positive disease, however this trend can be a result of negative serology delaying diagnosis and treatment initiation. Thus in patients with pulmonary disease, negative serology, and persistent suspicion for small vessel vasculitis, a prompt attempt at definitive tissue diagnosis can be of benefit despite the invasive nature of diagnostic procedures, allowing providers to initiate definitive treatment to achieve the most favorable outcomes.

MICHIGAN PODIUM PRESENTATION - Aaron Sacheli

Influenza vaccine induced CNS demyelination in a fifty year old male.

First Author: Aaron Sacheli, Raymond Bauer M.D. (St. John Hospital & Medical Center, Detroit MI)

Acute disseminated encephalomyelitis (ADEM) describes a demyelinating condition of the central nervous system. It is known that 75% of cases arise from post-infectious and post-immunization events with annual incidence rates ranging from 0.4 to 0.8 per 100,000. While rare, it remains an important clinical consideration in patients with neurologic symptoms in the context of recent vaccination.

A fifty year-old, Caucasian male, presented with a course of progressive, focal, left-sided neurologic deficits within twenty-four hours after influenza vaccination. The patient has a non-contributory past medical history. Physical examination demonstrated no significant findings, except for definitive left sided weakness (3/5) and hypertonicity. Sensation to pain, temperature and vibration was intact.

The full evaluative course initially focused on a working diagnosis of acute stroke. Chest X-ray, computed tomography (CT) of the head, and CT angiography of the head and neck were all unremarkable. Carotid duplex demonstrated carotid stenosis less than 40% on the right and the left. Subsequent magnetic resonance imaging (MRI) of the brain showed scattered non-specific foci of white matter gliosis, from possible arteriopathy or venopathy. MRI of the cervical, thoracic and lumbar spine proved benign.

Cerebrospinal fluid (CSF) sample was completely normal by laboratory evaluation, and gram stain was negative with no growth on culture after seven days. Additionally, cytological analysis showed no evidence of malignancy, and there were no oligoclonal bands. Cardiology work-up, including an EKG and an echocardiogram, was normal. Post-vaccination ADEM appeared to best encompass this patient's clinical picture.

A five day course of, twice daily, intravenous methylprednisone (500mg) was prescribed, followed by a 12 day tapered course of, once daily, oral prednisone (20mg). Additionally, the patient was referred for comprehensive inpatient rehabilitation. The 12 day course of rehabilitation treatment consisted of intense Activities of Daily Living, gait, and transfer training, as well as strengthening exercises. His Functional Independence Measure score improved from 74 to 106.

Few case reports of ADEM have been noted following influenza vaccination, but only in the young and in the elderly. This report, to our knowledge, in addition to being a rare clinical occurrence, is the first to describe ADEM within twenty-four hours of influenza vaccination and the first in a middle aged patient. Though uncommon, ADEM may be encountered at both the in-patient and primary care level given the wide contingent of influenza vaccinated patients. Prompt medical management and plans for comprehensive and focused rehabilitation are pivotal to favourable clinical outcomes in these patients.

NEW JERSEY PODIUM PRESENTATION - Matthew P Deek

Extensive Arterial and Venous Thrombi as a Presentation of Hypereosinophilic Syndrome with a Unique Complication of Hemolytic Anemia and Poor Response to Treatment

First Author: Matthew P Deek* First Author: Mansi Shah* Lauren C Hogshire MD *Equal contribution

Idiopathic hypereosinophilic syndrome (HES) is defined as persistent eosinophilia with end organ damage in the absence of a neoplastic process or reactive eosinophilia. Major organ damage can occur due to eosinophil infiltration, which may manifest as fibrosis, thrombosis with or without thromboembolism, cutaneous or mucosal involvement, edema, and neurologic deficits. Amongst idiopathic HES is a lymphocytic variant caused by an aberrant T cell lymphocyte population that overproduces the cytokine interleukin-5. Some patients with the lymphocytic variant HES may eventually develop T-cell lymphoma.

A previously healthy 46 year old man, who recently emigrated from Dominican Republic with a diagnosis of bilateral lower extremity DVT on warfarin therapy, presented with progressively worsening bilateral lower extremity pain, cyanosis of his right foot, and 18lb unintentional weight loss over three weeks. On exam, the patient was tachycardic with bilateral lower extremity edema, had dusky discoloration of the digits of hands and feet with weak peripheral pulses. No rash, lymphadenopathy, respiratory wheezes, masses or organomegaly were present. Initial diagnostic tests revealed severe eosinophilia (WBC, $30.4x10^3$; eosinophils $20.7x10^3$) and anemia (Hgb 9.6g/dL). Results of vascular studies confirmed with CT showed extensive arterial thrombi of the right upper, left upper, and right lower extremity and venous thrombi of the IVC, right peroneal, right posterior tibial, right popliteal, right femoral, right external iliac, left popliteal, left femoral, left external iliac, and hepatic vein. An extensive investigation was pursued and ruled out infectious etiologies including parasites, HIV, and hepatitis. His hospital course was further complicated by the development of hemolytic anemia for which he was treated with IVIG and required transfusion support. Subsequent hematological work up including bone marrow biopsy revealed a monoclonal T-cell population, and the patient was diagnosed with hypereosinophilic syndrome with a clonal T-cell mediated lymphoproliferative disorder (CD3-/CD4-/FIP1L1-PDGFRA-). He was treated with a trial of high dose corticosteroids and adequate control of eosinophilia was achieved. Due to his widespread arterial and venous thrombi, he was discharged on warfarin. Two weeks after discharge, the patient returned with a gangrenous right foot and was found to have refractory hypereosinophilia (WBC, $21x10^3$; eosinophils $5.3x10^3$) with recurrent thrombosis, which required a transmetatarsal amputation. Weekly methotrexate 20 mg/m2 IV and dexamethasone 40mg IV were initiated as treatment. Despite continued treatment with steroids and warfarin over the next two months, his hypereosinophilia persisted and symptoms of the disease continued to progress—eventually involving his fingers.

This case represents a unique presentation of T-cell mediated HES with a lymphocytic variant. The extent of eosinophil-mediated venous and arterial thrombi is greater than typically found in the literature. Moreover, the presence of complications such as hemolytic anemia may be a marker for disease refractoriness and prognosis, and should be considered when determining treatment options.

RHODE ISLAND PODIUM PRESENTATION - Ella Anne Damiano

Infliximab Induced Severe Hypertriglyceridemia and Eruptive Xanthomas

First Author: Ella Anne Damiano Second Author: William Rafelson, MD Third Author: Arkadiy Finn, MD

Introduction: Infliximab is an anti-tumor necrosis factor-alpha (TNF-a) therapeutic agent for treatment of inflammatory diseases such as Crohn's disease and rheumatoid arthritis. Hypertriglyceridemia has been reported twice after anti-TNF-a therapy in patients with psoriatic arthritis. Severe hypertriglyceridemia results in lipemic serum and is a clinical emergency due to risk of pancreatitis, stroke or myocardial infarction. In this case report, we present an additional and most severe case.

Case Report: A 26-year-old woman with Crohn's Disease presented to the emergency department with diffuse pearly papular rash of three weeks duration. Upon arriving at the emergency department, she endorsed painful skin lesions, but denied chest pain, changes in vision, muscle weakness, abdominal pain, or vomiting. She had restarted infliximab six weeks prior after a six-month hiatus from the medication due to a Crohn's flare that resulted in an ileocolic resection. She had previously received infliximab for one year without any adverse effect. Her other medication was cholestyramine powder, started post-surgically for diarrhea. She had no family history of dyslipidemia, rarely consumed alcohol, and denies changes in diet. On physical exam, she had central obesity with normal cardiopulmonary, abdominal, and neurologic examinations. The rash included dozens of 1-2mm pearly papular lesions on her bilateral arms, legs, neck, chest, and back.

Biopsy of her skin lesions confirmed eruptive xanthomas. Her non-fasting lipid panel revealed triglycerides 14802 mg/dL, total cholesterol 1538 mg/dL, and HDL <10mg/dL. Apolipoprotein B was 193 mg/dL (normal range 49-103) and apolipoprotein A1 188 mg/dL (normal 101-198). A urine HCG was negative. Serum lipase was 20 U/L.

She was treated with insulin and dextrose infusion along with gemfibrozil, fish oil, and pravastatin. Infliximab and cholestyramine were discontinued. She was discharged on hospital day fifteen with triglycerides of 102 mg/dl.

Discussion: Although a diagnosis of exclusion, it is likely that the severe hypertriglyceridemia was due to an adverse drug reaction to infliximab. There are two previous reports of hypertriglyceridemia following anti-TNF-a therapy in patients with psoriatic arthritis – one with triglycerides of 1129 mg/dL after infliximab and another with triglycerides of 689 mg/dL after adalimumab. It is postulated that blocking TNF-alpha could up-regulate production of other cytokines, which would act on the liver to increase synthesis of triglycerides. Increased liver production of VLDL or chylomicron-remnants is consistent with our patient's high total cholesterol, high apolipoprotein B, and low HDL.

This is the third and most severe report of severe hypertriglyceridemia in the setting of anti-TNF-a therapy. TNF-a has a complex regulatory role in lipid metabolism with an unknown mechanism for this adverse reaction. We recommend increased vigilance for dyslipidemia after administration of anti-TNF-a, especially in those with a personal or family history of hypertriglyceridemia.

CLINICAL VIGNETTE POSTER FINALISTS

ARKANSAS POSTER FINALIST – M Phillip C Fejleh

Brodie's Abscess Caused by Salmonella oranienburg

First Author: M. Phillip Fejleh, Carlos G. Romo, Katrina Coulter, Corey O. Montgomery, Michael Saccente

Hematogenous seeding of bacteria into bone can cause osteomyelitis, with a higher incidence in prepubertal children who usually present with signs and symptoms of bacteremia. A Brodie's abscess is a subacute form of osteomyelitis usually caused by hematogenous dissemination of bacteria that is commonly localized in the metaphyses of tubular bones. The incidence of osteomyelitis by *Salmonella* species is very low, and it is more frequently reported in patients with hemoglobinopathies or immunocompromised states. We describe an unusual case of a Brodies's abscess caused by *Salmonella* oranienburg in a man with poorly controlled diabetes mellitus.

A 52-year-old white man presented with complaints of fever, malaise and pain in his left shin that had been present for around ten years and had worsened in recent weeks. His past medical history was significant for type 2 diabetes mellitus and the removal of a benign osseous cyst from his left tibia ten years ago. Further questioning revealed recent night sweats and weight loss of an unknown amount. Physical examination revealed a fever, warmth and tenderness to palpation of his left proximal tibia, and restricted range of motion due to pain. Laboratory workup revealed a white blood cell count of 15.2 x 10^9/L, a platelet count of 389 x10^9/L, an erythrocyte sedimentation rate of 72 mm/hr, and a C-reactive protein of 15.2mg/dL. Imaging revealed an intraosseous mass suggestive of an abscess.

Open biopsy and debridement of nonviable bone and purulent material were performed. Intravenous vancomycin and ceftriaxone were administered immediately after sample collection. Tissue and bone cultures grew *Salmonella* oranienburg susceptible to ampicillin, levofloxacin, and ceftriaxone. Vancomycin was discontinued in light of this new information. Histopathology was consistent with acute and chronic osteomyelitis. The patient was discharged after 4 days of hospitalization with significant improvement of his symptoms. He received daily intravenous ceftriaxone for six weeks. Follow-up revealed improvement of symptoms, a normal physical exam, and ESR and CRP measurements within normal limits.

The insidious onset of pain, fever, chills, and malaise described in this patient along with the radiologic and intraoperative findings are consistent with the diagnosis of a Brodie's abscess. Diabetes has been associated with an increased risk of extraintestinal manifestations of *Salmonella* infections, including bacteremia[1]. The White-Kauffman-Le Minor scheme is the most widely accepted classification of *Salmonella* serovars. It includes *S.* oranienburg in the subspecies enterica. In 2011 the CDC recorded 721 cases of S. oranienburg infections in humans, representing 1.6% of infections by *Salmonella* species[2]. The gold standard for diagnosis of chronic osteomyelitis is bone culture. Treatment of a Brodie's abscess requires radical surgical debridement and long-term intravenous antimicrobial therapy selected based on susceptibilities, bioavailability and bone penetration. Follow up should include a plain film and measurement of CRP, which appears to be more reliable than ESR for evaluation of response to treatment.

CALIFORNIA POSTER FINALIST - YouRong Sophie Su

Seeing the Big Picture: IIH as the presenting symptom of VHK

First Author: YouRong Sophie Su, BS, John Truong, MD, Clifford Wang, MD

Case Description: A 37 year-old obese, Hispanic female with a history of chronic headaches presented with one week of acute left-sided headaches and decreased, blurry vision secondary to bilateral papilledema found at an optometry appointment. She denied any pulsatile pain, exacerbations when supine, diplopia, or tinnitus. Review of systems was notable for drowsiness, menstrual irregularities and amenorrhea for 1 year. Physical exam revealed a somnolent woman with a Cushingnoid body habitus, hirsutism, alopecia in the left temporal region, and bilateral injection of the conjunctiva. Initial imaging, including CT and MRI, was normal and lumbar puncture (LP) was only remarkable for a mildly elevated intracranial pressure of 240 mmH_2O. Patient was diagnosed with pseudotumor cerebrii due to idiopathic intracranial hypertension (IIH) and discharged with acetazolamide. Unfortunately, the patient returned three days later with continued headaches and worsening of her vision, which she described as "dark" with occasional spherical shadows obscuring her vision. Physical exam at this time revealed bilateral pan-uveitis, unreactive pupils to light, staccato ocular eye movements, and disconjugate superior, lateral deviation of both eyes. The findings of pan-uveitis made IIH less likely to be the diagnosis and increased an infectious or inflammatory etiology. Repeat LP with opening pressure decreased to 180 mmH_2O further supported this thinking. An inflammatory and infectious workup for uveitis was thus initiated that was negative for anti-nuclear antibodies, HLA-B27, tuberculosis, syphilis, West Nile, HSV, and EBV. Repeat Head CT and MRI only showed thickening of the posterior aspect of the globes in the retina/choroid/sclera that was consistent with uveitis. A full ophthalmology exam was eventually performed that revealed serous retinal detachments, which when combined with the patient's race, pan-uveitis, headache, and alopecia, helped to diagnose Vogt-Koyanagi-Harada (VKH) syndrome.

Discussion: VKH syndrome is a rare disease commonly seen in Asians and Hispanics that presents with bilateral pan-uveitis, retinal detachments, headache, malaise, hearing loss, alopecia, and vitiligo. It is thought that VKH is an autoimmune reaction against melanocytes found in the eyes, skin, and meninges. Treatment largely consists of anti-inflammatory medications such as corticosteroids. This patient presented with complaints and symptoms very consistent with VKH, but was initially thought to have IIH given her body habitus and negative imaging for a source of her headaches and papilledema. In this case, her ocular symptoms were thought to be secondary to her neurological complaints rather than two parallel symptoms. Only with worsening of her vision and eye exam, despite treatment for IIH, provided clues that IIH was only a component of her disease. This case serves to highlight that primary causes for IIH should be more vigorously explored, especially with a good ophthalmology exam, and that IIH may in fact be part of the bigger picture.

CALIFORNIA POSTER FINALIST - Lauren Marshall

Protein-Losing Enteropathy and Lytic Bone Lesions in an HIV-positive male

First Author: Lauren S Marshall Wilson Tong, M.D. John G Lee, M.D. Chaitali S Nangia, M.D.

Kaposi's sarcoma is considered one of the most common neoplasms in HIV-positive patients. However, since the advent of highly active anti-retroviral therapy (HAART) in the mid-1990s, there has been a significant decrease in both the risk of developing Kaposi's sarcoma as well as the incidence of this disease. Numerous reports of AIDS-related Kaposi's sarcoma demonstrate its diffuse nature as it can involve the skin, lungs, gastrointestinal tract, liver, spleen, and bones. We report a case of an HIV-positive male diagnosed 6 years prior who had never received HAART presenting with anasarca and cutaneous Kaposi's sarcoma.

A CT scan demonstrated multiple low-density lesions in the liver and spleen, small bowel wall edema, and multifocal osseous lytic lesions in the spine and ribs which were concerning for lymphoma. When Kaposi's sarcoma involves the gastrointestinal tract, it can lead to significant protein loss. Protein loss can be detected by measuring fecal alpha-1 antitrypsin as this protein is neither degraded nor reabsorbed in the gastrointestinal tract. Biopsies taken during an esophogastroduodenoscopy (EGD) were positive for Kaposi's sarcoma, and the patient had a significantly elevated fecal alpha-1 antitrypsin level. Thus, the patient's anasarca was attributed a protein-losing enteropathy secondary to gastrointestinal involvement of Kaposi's sarcoma as both kidney and liver function were normal. Based on the CT findings of lytic bone lesions, the patient underwent bone marrow and vertebral body biopsies.

Both biopsies were negative for lymphoma, and the vertebral body was positive for Kaposi's sarcoma. Osseous involvement of Kaposi's sarcoma in AIDS patients is fairly uncommon. It usually develops secondary to local spread from an adjacent structure, and the axial skeleton is most often affected. Our patient provides an interesting case of diffuse Kaposi's sarcoma with cutaneous, gastrointestinal, and osseous involvement which is now a fairly uncommon presentation as many patients receive HAART. During his hospitalization, he was started on HAART and chemotherapy with pegylated liposomal Doxorubicin at 20 mg/m^2 .

CALIFORNIA POSTER FINALIST – Michael Liu

Testosterone-induced erythrocytosis can cause reversible Aquagenic Pruritus

First Author: Michael Liu BS, Kanade Shinkai MD PhD

Aquagenic pruritus (AP) is severe itching induced by contact with water of any temperature, and does not present with any visible cutaneous signs. It is classically associated with polycythemia vera (PCV), but little is known about the pathophysiology of AP. Here we describe a case of testosterone-induced erythrocytosis associated with aquagenic pruritus that highlights a common pathway resulting in this rare form of pruritus.

A healthy 59 year old man presented with new onset aquagenic pruritus. He started 200mg daily injections of testosterone replacement therapy seven months prior for low testosterone of unknown etiology. Four months after beginning testosterone replacement therapy, he noticed skin pruritus during and after showering, without any cutaneous signs. Emollients or antifungal creams did not alleviate the pruritus, and antihistamines were not tolerated due to drowsiness. Hematologic studies to rule out PCV revealed an elevated hematocrit of 51.2%, higher than his normal baseline of 46.5%. His other hematologic and metabolic tests were normal.

Since the AP tightly coincided with his testosterone replacement therapy, the patient started to taper his injections down to 50% of his original dose, and noticed a marked improvement of his symptoms and a return to baseline hematocrit levels. Because his erythrocytosis and his pruritus were improving, the patient was recommended to continue ongoing monitoring of his hematocrit levels and did not have further diagnostic evaluation for hematologic malignancy.

Aquagenic pruritus is reported in approximately 5-69% of PCV patients, but the mechanism of AP remains largely unknown. Biopsy studies from PCV patients with AP have shown an increased number of skin mast cells, mononuclear cells, and eosinophils. Other studies have shown increased levels of pruritogenic mediators such as interleukin-31, leukotrienes, and histamine.

Treatment options specifically for AP have been largely empiric and often contradictory. Conventional treatments include sodium bicarbonate baths, antihistamines, and UVB therapy. Sodium bicarbonate baths have shown to be effective in some cases, but they do not provide a lasting effect and are not beneficial for aquagenic pruritus elicited by other means, such as sweating. Antihistamines can cause intolerable drowsiness, and UVB therapy must be ongoing to remain effective. More recently, case reports have shown that propranolol and naltrexone can be potentially effective treatments for AP.

Testosterone replacement therapy has been associated with erythrocytosis because of its ability to stimulate erythropoietin and its direct effect on erythroblasts in bone marrow. However, PCV-like dermatologic manifestations stemming from testosterone-induced erythrocytosis have not been previously reported. This case highlights the concept that erythrocytosis in a setting other than PCV may also cause aquagenic pruritus; simply removing the underlying cause of erythrocytosis with no additional treatment can reverse the symptoms.

CALIFORNIA POSTER FINALIST – Clare Richardson

An Undifferentiated Cause of Epistaxis

First Author: Clare Richardson, BS, Milind Parikh, DO, Nicholas Roueiheb, DO, Morteza Chitsazan, DO

Sinonasal undifferentiated carcinoma is a rare, highly malignant neoplasm arising from the Schneiderian mucosa of the paranasal sinuses. It often presents at advanced stages due to its subtle and nonspecific clinical symptoms and it generally has a grim prognosis.

A 22-year-old male presented to the Emergency Department with complaints of headache, dizziness and recurrent epistaxis. He had seen several physicians for these symptoms over an eight month period and was diagnosed with conditions ranging from sinusitis to nasal polyps, but was never referred for further testing or treatment. A MRI and CT of the head showed a large mass infiltrating his ethmoid, maxillary and sphenoid sinuses with extension through the cribriform plate, orbital floors and intracranial extension abutting the right frontal lobe. Initially, squamous cell carcinoma was suspected due to the age of the patient and the relative frequency of that type of malignancy among paranasal tumors. However, upon immunohistochemical analysis, it was determined that the mass was in fact a case of sinonasal undifferentiated carcinoma. In addition, subsequent CT of the abdomen showed extensive metastasis as large as 8.3cm to the liver. Liver biopsy of the masses was conducted and confirmed as metastasized sinonasal undifferentiated carcinoma. This finding was particularly interesting in light of the fact that the patient reported no abdominal symptoms, had no elevated liver enzymes, and had no metastases to the lungs or bone (the usual destination for this rare carcinoma) as evidenced by chest CT and bone scan. Throughout the course of his hospital stay, the patient continued to experience headache, anosmia and visual changes. Due to the location of the tumor and its advanced stage, it was determined that he was not a surgical candidate and had a bleak prognosis even with chemotherapy and radiation. Eventually, his acute symptoms were controlled with steroids and pain medication and he left the hospital to seek a second opinion.

This case illustrates an atypical case of the already rare sinonasal undifferentiated carcinoma. While it generally presents with vague symptoms as in the case of this patient, it more frequently affects older individuals and has seldom been reported to metastasize anywhere other than the lungs or bone. It is important to consider and search for malignancy in a patient complaining of recurrent headache and sinus symptoms, even when a patient does not classically fit the mold of a particular disease. There is still much to learn about oncologic physiology, especially in the case of rare malignancies such as sinonasal undifferentiated carcinoma. Additional research in this field is imperative to improve early detection methods and treatment options.

CALIFORNIA POSTER FINALIST – Michael D Ramirez

Cotton Fever: A Transient Self-Limiting Syndrome in IV Drug Abusers

First Author: Michael Ramirez , Brenda Marsh, MD

Cotton fever, a post-injection complication familiar to many intravenous drug users, has been poorly described in the medical literature. It is a self-limited, sepsis-like syndrome that affects users after they inject heroin reclaimed from previously used cotton filters. The exact cause remains unclear, but it has been postulated that re-use of cotton filters leads to fiber breakdown and subsequent injection of fiber particles. Here, we describe a case of cotton fever in a young heroin user.

The patient, a 19-year-old female, presented with subjective fevers, chills, nausea, abdominal pain, vomiting, and general weakness of 3 days duration. Her symptoms began abruptly after her last intravenous heroin injection during which she had reused 10-day-old cotton filters. Upon presentation, the patient was febrile to 100°F, diaphoretic, and tachycardic with a heart rate of 112. She had a blood pressure of 101/69, respiratory rate of 18, and oxygen saturation of 98%. Her physical exam was significant for severe right upper quadrant abdominal tenderness without hepatosplenomegally or palpable mass. Laboratory evaluation revealed a white blood cell count of 34,000 with 69% neutrophils and 29% bands. Her liver function tests were elevated in a nonspecific pattern, with alkaline phosphatase 192, ALT 115, AST 107, and total bilirubin 1.7. EKG revealed sinus tachycardia with no abnormalities, and a transthoracic echocardiogram was negative for any valvular abnormalities or vegetations. Chest X-ray showed no cardiopulmonary illness. CT scan of the abdomen showed slight enlargement of the liver with periportal edema with a small amount of ascites. Two sets of blood cultures were obtained and the patient was empirically started on intravenous Vancomycin and Zosyn for SIRS and suspected sepsis. She was fluid resuscitated with 4L normal saline and admitted to the medicine ward with a preliminary differential diagnosis of sepsis vs. acute withdrawal vs. acute drug reaction. Within 8 hours of admission, the patient's heart rate and temperature normalized, her strength returned, and her abdominal pain and malaise resolved. This case demonstrates the importance of obtaining a thorough history regarding the drug habits and practices of patients with a history of IV drug use.

One diagnostic difficulty lies in differentiating the relatively benign course of cotton fever from more critical infectious diseases, such as sepsis, endocarditis, or abscess. A detailed understanding of common techniques used by recreational intravenous drug users can help prepare physicians to make this distinction. Admission to short-term observational units rather than medicine units may improve patient outcomes, provide better patient-centered care, decrease hospital costs, and limit unnecessary, invasive diagnostic studies.

CALIFORNIA POSTER FINALIST – Anita Wong

Disseminated Varicella Zoster Virus with Asymptomatic Central Nervous System Involvement as the Initial Presentation of Acquired Immunodeficiency Syndrome

First Author: Anita Wong BA, Sara-Megumi Naylor MD

Herpes zoster is caused by the reactivation of varicella zoster virus (VZV) in the dorsal root ganglia. In the immunocompetent patient, it typically presents as a vesicular rash affecting a single dermatome that often becomes painful. However, in an immunocompromised patient, the virus can disseminate causing severe dermatologic, pulmonary, and neurologic complications.

A 42 year old Hispanic male gardener with no known past medical history presented to the emergency department with a rash on his left arm for six days. On exam, he had coalesced clear vesicles with surrounding erythema on all fingers and the dorsum of his left arm up to the biceps region, as well as similar scattered vesicles on his abdomen. Neurologic exam showed no deficits. A presumptive diagnosis of multi-dermatomal zoster was made. The patient was placed on contact and respiratory precautions and started on high dose IV acyclovir. The patient could not recall a history of primary varicella. The patient's vesicular fluid was sampled and was positive for VZV PCR. He was also found to be HIV positive with a CD4 count of 123. On further work-up, cryptococcal antigen was positive in the blood, thus he was started on amphotericin B and flucytosine. A lumbar puncture was performed to assess for cryptococcal meningitis. CSF was negative for cryptococcal antigen, but positive for VZV PCR. Therefore, the decision was made to continue IV acyclovir for two weeks given the presence of VZV in the CSF. Although the patient did not have evidence of cryptococcal meningitis, amphotericin B and flucytosine were continued as induction therapy because of the positive serum cryptococcal antigen. He was subsequently started on consolidation and maintenance therapy with fluconazole. The patient tolerated anti-viral and anti-fungal therapy well without complications. Serial neurologic exams were stable without deficits. He was discharged with follow-up to initiate anti-retroviral therapy as an outpatient in the Infectious Diseases clinic.

This case reinforces the need to suspect an underlying immunodeficiency when a patient presents with multi-dermatomal zoster. There is very little literature regarding the evaluation for and management of asymptomatic CNS VZV. Currently, no guidelines exist for whether a LP should be done in patients with disseminated VZV without neurologic symptoms to assess for CSF involvement. There is data to support that untreated VZV can lead to increased risk of cerebrovascular accidents, thus supporting a possible role for LP in patients with disseminated VZV regardless of the presence of neurologic symptoms. Lastly, a clinician should evaluate for active VZV infection in any HIV-positive patient, especially with skin, pulmonary or neurologic findings.

COLORADO POSTER FINALIST - Carlie Field

Necrotizing Retinitis in an Atypical Presentation of Disseminated Coccidioidomycosis

First Author: Timothy Hegeman, DO, University of Colorado Michelle Neice, MD, University of Colorado Carlie Field, MS3, University of Colorado Philip Fung, MD, University of Colorado and Denver Health and Hospital Authority

Coccidioidomycosis infection is rarely encountered outside of its typical endemic region in the southwestern United States, Central, and South America. Disseminated coccidioidomycosis is even less common and is often associated with immunosuppression secondary to HIV/AIDS, transplant recipients, and medical therapies intended to impair cellular immunity (ie, tumor necrosis factor-alpha antagonists). Diabetes mellitus is rarely implicated in the occurrence of disseminated coccidioidomycosis. In this case report, we present atypical presentation of disseminated coccidioidomycosis in a diabetic man.

A 46-year-old African American male with uncontrolled diabetes mellitus (hemoglobin A1c of 15%), hypertension, alcohol abuse and monthly crack cocaine use presented to an outpatient clinic with worsening unilateral blurry vision, eye redness and pain for 3 weeks. The patient was evaluated by ophthalmology and found to have an acute unilateral necrotizing retinitis. He was immediately hospitalized for pain and fever control and further work up including a retinal biopsy. Upon further questioning, the patient also endorsed night sweats and a wart-like growth on his right index finger. Of note, the patient had moved to Colorado from Arizona about five months ago. The patient was otherwise healthy and denied any cardiovascular, respiratory or neurologic symptoms. His only medication was metformin, which he had not taken in over a month. Laboratory studies revealed a negative HIV serology and viral load. On hospital day three, histopathology of his retinal tissue and vitreal fluid returned revealing coccidiomycosis infection. Further imaging including a CT chest, MRI brain and nuclear bone scan showed dissemination to skin, bone, lungs and cerebellum. A right hand MRI confirmed osteomyelitis of the distal index finger and a biopsy of the overlying verrucous tissue grew coccidioides, MRSA and streptococcus. Intravitreal injections of voriconazole were started empirically during his initial retinal biopsy and after the final histologic diagnosis, injections were continued every third day in an attempt to preserve the left retina and eye. The patient was discharged in stable condition on oral voriconazole with close infectious disease follow up for repeat imaging of his cerebellar lesion at one month to check for disease progression or regression.

This case emphasizes the importance of considering disseminated coccidioidomycosis in patients with uncontrolled diabetes and atypical ocular or skin findings, particularly if they have endorse a history of being in a coccidioides endemic region. Cellular immunity, namely T cell response, averts disseminated coccidioidomycosis in most cases of exposure. While some sources cite uncontrolled diabetes mellitus as a risk factor for severe coccidioidomycosis infections, it is not well described in the literature.

COLORADO POSTER FINALIST - Warren Woodrich Pettine

Coexisting primary Hyperparathyroidism and Parathyroid Hormone-related Peptide producing Endothelioid Angiosarcoma causing Malignant Hypercalcemia

First Author: Warren W. Pettine, MS II, ACP Medical Student Member; University of Colorado School of Medicine Second Author: Carl V. Barnes, MD, FACP; Denver VA Medical Center

Introduction: Primary hyperparathyroidism (PHP) portends an increased risk of malignancy. Malignant hypercalcemia often results from parathyroid hormone-related peptide (PTH-rP) producing tumors. Many cancers are known to produce PTH-rP; however, this association has not been documented in endotheliod angiosarcomas.

Case: A 72-year-old African-American male smoker, who is status-post left total hip arthroplasty, was brought to the emergency department due to confusion and weight loss. His physical exam revealed only altered mental status. Laboratory testing was normal except for normocytic anemia and a serum calcium level of 16.1mg/dL corrected for hypoalbuminemia, and an ionized calcium level of 1.75mmol/L (1.15-1.29). X-rays of the chest and left hip were unremarkable. An intact PTH (iPTH) level was 140pg/ml (10-56), PTH-rP level was 4.0pmol/L (<2.0) and 1,25-dihydroxyvitamin D level was 129pg/ml (10-75). He was treated with fluid hydration, IV pamidronate and calcitonin. CT imaging of his head, chest, abdomen and pelvis revealed only non-specific soft-tissue enhancement adjacent to his hip prosthesis stable in appearance to a study done three months prior, but limited by metal artifact. Urine and serum protein electrophoresis, skeletal bone survey and bone marrow biopsy were normal. A parathyroid scan demonstrated increased uptake in a single gland. Parathyroidectomy revealed a hyperplastic adenoma. His iPTH and 1,25-dihydroxyvitamin D levels normalized post-operatively and the calcium level decreased to 10.9mg/dL. However, shortly thereafter it began to rise and the PTH-rP level doubled. A metal-suppressed hip MRI revealed an enlarging mass surrounding the hip prosthesis. Tissue biopsy confirmed a high-grade endothelioid angiosarcoma. Palliative radiation was initiated.

Discussion: PHP is associated with an increased risk of malignancy, with one recent study noting a 1.4 standarized incidence ratio between PHP and coexisting cancer. Risk factors such as age, unexplained weight loss, new onset anemia, smoking history, and significantly elevated presenting calcium level should prompt evaluation for occult malignancy regardless of the presence of PHP. In up to 80% of cases, malignant hypercalcemia may result from production of PTH-rP, referred to as humoral hypercalcemia of malignancy (HHM). PTH-rP is most commonly associated with squamous cell carcinoma of the lung, head and neck, genitorurinary cancers, and breast and ovarian cancers. Endotheliod angiosarcoma is a rare, often aggressive tumor of mesenchymal origin. Reports of epitheliod angiosarcoma causing PTH-rP-associated HHM are lacking.

Conclusion: Coexisting PHP may confound the diagnosis of malignant hypercalcemia. PTH-rP is produced by many tumors, but not noted in endotheliod angiosarcoma. We report a case of malignant hypercalcemia caused by a PTH-rp producing endotheliod angiosarcoma

FLORIDA POSTER FINALIST - Christine McLaughlin

Insidious Subacute Endocarditis

First Author: Christine McLaughlin Christine McLaughlin, Medical Student, Florida State University College of Medicine Tallahassee, FL

Subacute bacterial endocarditis (SBE) can have an insidious onset leading even experienced clinicians to make indeterminate diagnoses before finding the root cause of a patient's symptoms and signs.
A 57-year-old North Florida woman with a past medical history of mitral valve regurgitation developed fever, nausea, myalgias and arthralgias without an obvious etiology. That night, she was wakened by night sweats and went to the emergency department. Physical examination showed a temperature of 99.9 degrees Fahrenheit, a blood pressure of 98/70 mmHg, and a regular heart rhythm at a rate of 89 beats per minute. Lungs were clear to auscultation. She had a soft, non-tender abdomen with no hepatosplenomegaly. Cardiac examination revealed a 2/6 systolic murmur heard at the left fifth intercostal space but was otherwise unremarkable. She was given a presumptive diagnosis of a viral infection with a possible bacterial superinfection, treated with intravenous antibiotics, and discharged to home.

The following day she returned to the ER with substernal, non-radiating chest pain that was positional in nature. A low platelet count was present along with elevated liver enzymes and troponin level. Her EKG showed normal sinus rhythm and no acute signs of ischemia. Cardiac catheterization showed moderate mitral regurgitation with normal left ventricular function. She was discharged with the diagnosis of an adverse reaction to the antibiotics that had been prescribed.

Her generalized weakness and fatigue continued for a week when she waked with chest pain, dyspnea, tachycardia, chills, and bilateral subscapular pain. Her physical examination showed a temperature of 100.5 degrees Fahrenheit, a blood pressure of 100/74 mmHg, lungs with diffuse crackles, a friction rub heard over the left anterior chest, and a 4/6 systolic murmur heard at the left fifth intercostal space with radiation to the left axilla. Laboratory studies revealed elevated pro-BNP and troponin levels. She was diagnosed with pericarditis and returned to her baseline weakness and fatigue. Cultures remained sterile except for enterococcus growing in the urine.

One month after her initial visit, trans-esophageal echocardiogram (TEE) was performed showing a 1cm x 1cm density on the posterior mitral valve leaflet. She is scheduled for mitral valve replacement.

Patient history and a focused physical examination are critical in diagnosing vague cases such as this. Most patients with pre-existing cardiac valve disease have increased susceptibility for infective endocarditis. TEE is important in having strong clinical support for or against SBE. The presence of enterococcus warrants further studies as well as other causative agents of SBE including strep viridans. SBE can present with any combination of progressive weakness, weight loss, fever, anemia, night sweats, and splenomegaly.

FLORIDA POSTER FINALIST - Andrew Kozlov

Treatment of refractory hematuria secondary to benign prostatic hypertrophy (BPH) with prostatic artery embolization (PAE)

First Author: Andrew Kozlov, BA Second Author: Beau Toskich, MD

PAE is an experimental, minimally-invasive procedure to treat BPH with promising short and medium term follow up data.[1],[2] The patient undergoes CT angiogram to evaluate for technically amenable pelvic vasculature and the absence of significant atherosclerotic disease prior to offering PAE. The patient is treated with a prophylactic cephalosporin pre- and post- procedure, analgesia, and NSAIDs.[3] PAE can be offered to patients who cannot tolerate surgical or medical management.

A 73-year old male with a history of BPH, Waldenstrom Macroglobulinemia (WM), and acquired von Willebrand disease (VWD) presented to the emergency department with anemia, thrombocytopenia, and gross hematuria. He was treated with apheresis, 4 units of PRBCs, aminocaproic acid, IV fluid resuscitation, and continuous bladder irrigation (CBI) by the hospitalist service. Cystoscopy and urine cytology revealed no infectious or malignant cause but suggested a hypertrophic, friable prostate was responsible for his hematuria and exacerbating his anemia. His WM, and VWD made him an unsuitable candidate for surgical resection of the prostate. The patient consented to medical management of BPH with finasteride 5-alpha reductase inhibition and tamulosin alpha-adrenergic receptor antagonism; however, it was believed that the prolonged therapeutic latency of these medications would provide inadequate improvement, given his deteriorating clinical status. Androgen deprivation therapy was contraindicated, as he had clinically significant anemia. After a 27-day hospital course, a formal consultation was made to the vascular interventional radiology service for evaluation for PAE. The patient was deemed a suitable candidate and consented to the procedure. The patient tolerated PAE with 700 micron embozene embolization microspheres without intra- or post-procedural complication. Specifically, there were no complications at the common femoral arterial access site or non-target embolization. Post-PAE, CBI was discontinued with persistently clear Foley-bag drainage, hemoglobin and hematocrit stabilized, and the patient was discharged post-PAE day 4. Upon 1-month clinic follow up, the patient reports no episodes of frank hematuria and has continued outpatient medical management.

The promising outcome of this case highlights the potential of PAE as a treatment for patients with BPH who cannot tolerate conventional therapy.

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FLORIDA POSTER FINALIST - Milla Kviatkovsky

The Bloody Aortic Stenosis: A Case of Heyde Snydrome.

First Author: Milla Kviatkovsky

Introduction: In 1958, Heyde published 10 cases describing the association of aortic stenosis (AS) and iron deficiency anemia due to arteriovenous malformations (AVMs) of the gastrointestinal tract. The postulated link between AS and anemia is secondary to an acquired type IIA von Willebrand's Disease (vwD) via breakdown of high molecular weight mul timers of von Willebrand Factor (HvwF) across the stenotic valve with subsequent anemia secondary to the development of Gastrointestinal (GI) bleeding from angiodysplasia. Although this association is still controversial, research suggests an Odds Ratio of 4.5 for the association of angiodysplasia with AS and case reports demonstrate cessation of GI bleeding via Aortic Valve Replacement (AVR). Case Report: We present a case of a 74 year-old male who presented with chest pain and shortness of breath and found to be anemic (hemoglobin/ hemocrit (H/H): 9.8/28.6). Patient had a history of frequent admissions for angina exacerbated by Hb <10 which consistently improved via blood transfusion. His GI bleeds were treated via cauterization multiple times with suspected diagnoses ranging from hematopoietic disorder, myelodysplastic disorder to anemia secondary to renal failure. Further review of the patient's chart revealed that he received his first transfusion in June 2007 during initial presentation with the aforementioned symptoms when a transthoracic echocardiogram (TTE) from 2007 suggested only mild aortic valve sclerosis. During this hospital stay, he received blood transfusions with normalization of his H/H and temporary resolution of symptoms. During his admis sion in 2013, transesophageal echocardioagraphy (TEE) was performed which demonstrated an aortic valve area (AVA) of 0.8 cm2. Six years and 56 transfusions later, the newly diagnosed severe AS finally raised suspicion for the diagnosis of Heyde Syndrome. Additional laboratory findings revealed a prolongued collagen-epinephrine and collagen-ADP time suggestive for diagnosis of acquired vwD. This patient was subsequently treated via AVR with resolution of bleeding and now stable H/H. Discussion: Research shows that the mean trans-valvular pressure gradient is correlated with the degree of loss of HvwF multimers and studies indicate that aortic valve replacement (AVR) has reversed the aforementioned laboratory abnormalities by first postoperative day. Current indications for AVR include those patients with severe AS (defined by AVA <1.0 cm2) who are symptomatic or those with severe stenosis who fulfill various other criteria - none of which include patients suffering from an associated bleeding disorder. As evide nced in our patient, a bleeding disorder secondary to stenosis may present even with mild valvular disease. Because valve replacement is indicated as curative in this population, severity of stenosis and/ or gradient should not be sole criteria for patient selection. We recommend further review of symptoms and clinical parameters to establish separate criteria for AVR in this population with efforts to raise early clinical suspicion and improve outcomes.

FLORIDA POSTER FINALIST - Sophia Ang Ma

Abdominal Pain, Jaundice, and Pancytopenia, A "Histo"-logic Diagnosis.

First Author: Sophia Ang Ma, Lisa Dixon

Histoplasma capsulatum is the most prevalent mycosis in the United States, most commonly found in soil contaminated with bird or bat excrements in the Mississippi, Ohio and St. Lawrence River valleys.[1] Transmission occurs through inhalation of the spores and may cause a self-limited or even asymptomatic pulmonary infection in immunocompetant individuals. There is of risk severe, disseminated disease in immunocompromised patients. Untreated acute disseminated infection can be fatal in 2-12 weeks.[2] The non-specific symptomatology and rarity if the disease, especially in non-endemic areas, make this diagnostic challenge.

A 50-year-old female from Florida with a history of alopecia and rheumatoid arthritis treated with methotrexate/adalimumab was admitted for evaluation and management for jaundice, abdominal pain, and altered mental status. On admission, the patient denied any dyspnea, fevers, chills, cough or diarrhea but complained of abdominal distention and RUQ pain. She was found to have hyperbilirubinemia with normal AST/ALT. Initially, the differential included infection, autoimmune hepatitis (AIH), and methotrexate related liver damage. Direct Coombs IgG + with antinuclear antibody and anti-smooth muscle antibody in the setting of autoimmune history was especially concerning for AIH. While hospitalized, she developed a coagulopathy with thrombocytopenia, low fibrinogen levels, elevated INR (2.5) concerning for DIC along with anemia. Given a clinical picture of hepatic injury, liver biopsy was performed and showed "panlobular hepatitis with bridging parenchymal collapse", which offered further evidence of AIH. She slowly recovered with prednisone and was discharged on a taper for a working diagnosis of AIH. One month later, she was readmitted with pancytopenia with ANC of 0.7, persistently elevated bilirubin, coagulopathy, anasarca and RUQ pain. She was admitted to the ICU and treated with leucovorin and neupogen with no response. Bone marrow biopsy revealed "GMS+ intracellular yeast forms consistent with *Histoplasma capsulatum*" and a re-evaluation of the liver biopsy confirmed disseminated histoplasmosis. The patient improved rapidly with Amphotericin B and Itraconazole therapy. Additional history revealed her neighbors keep chickens and guinea fowl separated from her yard by a chicken-wire fence.

This case illustrates the value of obtaining a complete history for infectious risk factors in a patient with known immunodeficiency, and serious consideration of less common diagnoses. Early recognition of histoplasmosis is vital to avoid rapid morbidity and mortality associated with disseminated disease.

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FLORIDA POSTER FINALIST - Michaela Gaffley

Elderly onset systemic lupus erythematosus in a male presenting with mental status changes and motor deficit: A diagnostic challenge

First Author: Michaela Gaffley, MS3 - Florida International University Herbert Wertheim College of Medicine (FIU HWCOM) Seema Chandra, MD, Hospitalist, Baptist Health South Florida, Voluntary Assistant Professor FIU HWCOM

While the initial presentation of systemic lupus erythematosus (SLE) is rarely neuropsychiatric, many individuals with SLE suffer from neuropsychiatric symptoms. SLE is not often on the initial differential diagnosis for a patient with acute mental status changes or stroke-like symptoms. We present an unusual case of a patient with atypical demographics for SLE who presented with altered mental status, an apparent loss of consciousness resulting in a motor vehicle accident, and MRI changes. The eventual diagnosis during his hospitalization was SLE.

A sixty-two year old white man was brought to the emergency room by ambulance after becoming disoriented and confused with left-sided weakness at the site of a motor vehicle accident. He reported a history of antiphosholipid syndrome (APS) diagnosed two years prior secondary to retinal vein thrombosis. He also stated that a full rheumatologic workup at that time assured him he did not have SLE. This was corroborated by discussion with his primary care physician. Initial laboratory values noted a subtherapeutic INR of 1.1 and the initial evaluation focused on either possible cerebrovascular accident (either arterial or venous) or seizure. The patient underwent MRI of the brain which showed vasogenic edema possibly consistent with a venous infarct, but repeat MR venograms failed to demonstrate any venous occlusion A full evaluation revealed he met American College of Rheumatology criteria for SLE diagnosis: positive antinuclear antibodies, double stranded DNA antibodies, low complement C3 and C4, anemia, leukopenia with lymphopenia, 1.5 grams of proteinuria, microscopic hematuria, Coombs positivity, and the known history of APS.

He later developed fevers and increased confusion with delirium. A full infectious workup was done including lumbar puncture, which only revealed elevated protein. With no infection identified, the patient was deemed stable for immunosuppression. He received high dose steroids followed eventually by cyclophosphamide for treatment of class 3 nephritis as diagnosed by renal biopsy.

The patient's neurologic symptoms improved dramatically and he was eventually transferred to acute rehabilitation.

This case highlights the protean manifestations of SLE. This disease must be considered even in patients whose demographics do not match the usual characterization of autoimmune disease. Notably lupus cerebritis can be the presenting feature which prompts the diagnosis of SLE. By exhaustively working through a broad list of differential diagnoses combined with careful history taking and excellent collaboration among many specialists, this patient was able to benefit greatly from appropriate treatment for his SLE.

FLORIDA POSTER FINALIST – Mohamad Zetir

"Straightening out SMA Syndrome"

First Author: Mohamad Zetir MS4, Erika Abel MD

Superior mesenteric artery (SMA) syndrome is an uncommon cause of bowel obstruction, causing nausea and vomiting after feeding. This syndrome is often difficult to diagnose, and can be chronic or acute following significant weight loss or spinal corrective surgery.

A 20 year old female patient S/P spinal corrective surgery for scoliosis 7 weeks prior; presents with a 3 week history of nausea, vomiting, diarrhea, diffuse abdominal pain, fatigue, and a 20 pound weight loss. Symptoms occur approximately twenty minutes after eating. Patient presented 10 days prior to an outside hospital with similar symptoms. She was diagnosed with withdrawal from opiate medications given to her after the surgery.

On physical examination, patient's vital signs were stable. Her Height was 160cm and weight was 36.29Kg, BMI 14.2. She was found to have diffuse abdominal tenderness in all quadrants, with no rebound or guarding. Bowel sounds were active. Abdominal CT showed marked distention of the stomach. An EGD indicated obliteration of the lumen of the third part of the duodenum with a pulsating mass consistent with SMA syndrome. G-J tube was placed and patient was educated on the importance of gaining weight to alleviate the obstruction.

SMA syndrome is caused by proximal intestinal obstruction and compression of the third part of the duodenum by the SMA due to fat pad loss between the SMA and aorta. Risk factors for SMA syndrome include significant weight loss brought on by medical or psychological conditions. Spinal corrective surgery for scoliosis is another well documented cause of SMA syndrome in the younger population. This procedure causes lengthening of the spine, which displaces the SMA origin reducing the distance between the aorta and the SMA. Patients with a low BMI prior to surgery are at a greater risk for developing the syndrome. Symptoms of SMA syndrome usually appear within a few days to a week following corrective spinal corrective surgery. This case was unusual secondary to the long length of time between surgery and presentation.

Given the patient's clinical course, and CT scan findings, her presentation is consistent with a chronic SMA induced duodenal obstruction which was exacerbated by the spinal corrective surgery and subsequent weight loss.

GEORGIA POSTER FINALIST – David Latov

The Importance of the History: A Run-of-the-Mill Case of Noncompliance of Dialysis

First Author: David Latov, Mikhail Akbashev, MD, Maria Lee, MD, Claire Underwood, Renee Thomas, Mohammad Razvi, MD, Kimberly Manning, MD

Too often, we find ourselves placing new patients into pre-existing constructs that we have developed from past experiences with similar patients. While this can save time and energy, the importance of obtaining a thorough history from each patient cannot be overstated.

A 58-year-old woman with ESRD and a history of right MCA stroke was brought to the ED with altered mental status after missing three dialysis sessions. Her son had found her at home that night screaming and not responding to him, and he called EMS. She had been discharged from the hospital two weeks earlier after a similar presentation that resolved with dialysis. Outpatient medications included amlodipine, metoprolol, tramadol, lisinopril, amitriptyline, and paroxetine. BP was 190/110, HR 130, her eyes were open, and she was uncooperative and crying. Labs showed K 6.2, BUN 75, Cr 15, and EKG showed QTc of 538. She was admitted for emergent dialysis, but suffered a two-minute generalized tonic-clonic seizure midway through. On repeat exam, she was unresponsive, her eyes were open, her face and eyelids were twitching, and her feet were writhing. She would periodically sit up and lean to the left while speaking incoherently. She had cogwheel rigidity in her arms, and her skin was warm. Neurology thought her altered mental status was due to toxic metabolic encephalopathy that required dialysis, but nephrology disagreed and did not want to dialyze her until the underlying cause of her altered mental status was elucidated. An EEG was obtained and showed nonconvulsive status epilepticus. She was given lorazepam and phenytoin, and the next day completed a full course of dialysis, resulting in full recovery of her mental status. Upon further questioning, her son stated that for the past three months, the patient had been experiencing increasingly frequent episodes in which she would stare off into space for an hour without responding to stimuli. Review of her medications revealed that amitriptyline, paroxetine, and tramadol all lower seizure threshold, and amitriptyline, which is primarily renally cleared, prolongs the QTc interval. According to the patient, she had been taken off of amitriptyline a year earlier but was placed back on it months ago by a physician who was filling in for her normal PCP. She was discharged with instructions to stop taking amitriptyline, paroxetine, and tramadol, and to follow up with her PCP and psychiatrist.

It would have been easy to think of her as a frequently noncompliant dialysis patient and discharge her after reminding her of the importance of dialysis, but this would not have helped. This case highlights the importance of obtaining a thorough history every time, as this patient was likely suffering from seizures as a result of her medications, causing her to miss dialysis.

HAWAII POSTER FINALIST – James Duca

Rare Presentation of Thiamine Deficiency as Cause for Lactic Acidosis and Gastrointestinal Symptoms

First Author: James Duca BS, Corey J. Lum DO, Angela Lo MD

Thiamine deficiency most commonly manifests as beriberi or Wernicke encephalopathy, and is a documented but easily overlooked cause of lactic acidosis. Rare accounts of thiamine deficiency causing a primary syndrome consisting of GI symptoms are described in the literature. The following report reviews the case of a patient with intractable nausea and vomiting, lactic acidosis and leukocytosis that resolved rapidly after thiamine infusion.A 30-year-old man was admitted with severe epigastric pain, nausea, and non-bloody vomiting for the previous week and abdominal pain for the previous 2 weeks. Past medical history was significant for a four-year history of intermittent abdominal pain, no alcohol use, and poor food intake for the previous week.

On physical examination he was a well-nourished male with normal vital signs aside from mild hypertension, mild tenderness to the abdomen without rebound/guarding and a completely normal neurological exam. Workup included CBC with leukocytosis to 21.06, BMP with anion gap metabolic acidosis, abdominal CT showing gastritis, and unremarkable right upper quadrant ultrasound and HIDA scan. The patient was treated for peptic ulcer disease and gastritis with bowel rest and antibiotics. His symptoms briefly improved by day 5, but he failed to tolerate sustained transition to a regular diet and was placed back on clear liquids for comfort. On day 7, an elevated lactic acid level of 6.8 mEq/L was noted. No infectious cause could be identified and increased intravenous fluids did not alleviate the acidosis. Extensive workup including Xray, repeat abdominal CT, and upper endoscopy found a deep duodenal ulcer but failed to reveal a cause of the lactic acidosis or any signs of infection. On day 12 the patient reported tingling on his chest but a complete neurological exam continued to be normal. Despite the patient not having been NPO for the prolonged period of time usually required for thiamine depletion induced lactic acidosis, a trial treatment of thiamine 100 mg IV daily was initiated. Lactate levels that increased to 8.7 dropped to 2.3 within 24 hours, and the leukocytosis, nausea, and vomiting also concurrently resolved. The patient was discharged on day 13. Thiamine levels drawn on day 12 later returned low at 44 nmol/L (normal 78-185). Thiamine deficiency as a cause of lactic acidosis is described in the literature, but prior reports have typically included a prolonged period of the patient being without nutrition, being extremely ill (often requiring ICU level of care), and/or having neurological changes.Thiamine functions as a cofactor for the enzymes pyruvate dehydrogenase and alpha-ketoglutarate dehydrogenase, which are essential components in the tricarboxylic acid cycle and aerobic carbohydrate metabolism. In deficient states where the body's 2-3 week supply is depleted, anaerobic metabolism predominates and lactate levels rise. Risk factors for deficiency include alcoholism, chronic wasting diseases, hyperemesis gravidarum, anorexia nervosa, total parenteral nutrition without vitamin supplementation, and gastric bypass surgery.

Deficiency is usually manifested as Wernicke encephalopathy, or wet or dry beriberi (1) though an under-recognized presentation of thiamine deficiency as gastrointestinal symptoms has been described (2), characterized by nausea, vomiting, abdominal pain and lactic acidosis.Insufficient thiamine as a cause of lactic acidosis is easily and inexpensively treated and should be considered in cases of

unexplained elevated lactate levels (3), especially those who concurrently present with gastroenterological symptoms not otherwise explained. The described patient was difficult to diagnose due to a lack of risk factors for thiamine deficiency, the concurrent presence of a duodenal ulcer, and a lack of presentation of Wernicke encephalopathy, beriberi or any other neurological findings besides subjective chest tingling. While he did have significantly decreased nutritional intake during his hospitalization and preceding it, he was not completely without thiamine rich sources for the 2-3 weeks usually required. Outcomes of delayed diagnosis of thiamine deficiency as a cause of lactic acidosis and gastroenterological symptoms can include unnecessary laparotomy and death (4,5). Physicians should be aware that neurological abnormalities, complete lack of thiamine intake for 2-3 weeks, and severe illness requiring intensive care is not always necessary. Failure to properly diagnose and treat similar cases will result in further morbidity and mortality.

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ILLINOIS POSTER FINALIST - Virali Patel

From Portugal to India: A rare case of Machado-Joseph Disease

First Author: Virali Patel, MD. Co-authors: Vinitha Nair MSIV, Janushe Patel MSIV, Keval Patel, MD

Introduction: Spinocerebellar Ataxia type 3 (SCA) aka Machado-Joseph disease (MJD) is usually a rare inherited autosomal dominant disorder caused by a mutation that results in CAG repeats on the ATXN3 gene. MJD has highest prevalence in Portugal [1]. Here we present a case in which the patient is non-Portuguese with no family history of the disease. The case demonstrates the progressive nature of the disease.

Case: 55 year old Indian female with past medical history of DM2, hypertension, and interstitial lung disease was noticed to have unsteady broad based gait, which at this time was not given much attention. As years passed, her gait disturbance progressed and she encountered several falls. She also developed intermittent urinary retention. Along with symmetric ataxia, she had proximal limb and pelvic girdle weakness, distal early hand wasting with hyper-reflexia, intention tremor, and moderate level of dementia. She had involuntary extra-ocular eye movements and blurred vision along with slurred speech. By age 62 she was wheelchair bound.
During the course of the disease, several studies had been done including a thorough family history. No family history of such symptoms was found therefore no genetic studies were done. Routine tests like CBC, CMP, thyroid tests, Chest X-rays, and EKGs done throughout the years were normal. Blood lactate and pyruvate levels to screen for mitochondrial disease were also normal. MRI of the brain showed moderate to high degree of cerebellar atrophy as well as 4th ventricular dilation. A clinical diagnosis of late onset Sporadic SCA 3 (MJD) was made at age 62. Although no cure exists for MJD, patient was placed on symptomatic medical treatment such as Baclofen, montelukast, Salbutamol, Bethanechol, and pantoprazole as well as physiotherapy and speech-language therapy. By age 70, she was bedbound with dysphagia, speech difficulty and underwent urinary catheterization. Patient refused PEG/tube insertion and was placed on palliative care at age 73 with a DNR order. She passed away from aspiration pneumonia at age 75.

Discussion: The symptoms of MJD can commonly be mistaken for Parkinson's disease, especially in a sporadic late onset case such as this one. Chronic symmetric ataxias such as this suggest an inherited ataxia, metabolic problem, or a chronic infection[2], the latter two were ruled out. Although the definitive diagnosis for MJD is genetic testing, a good family history and recognition of symptoms can lead to an earlier diagnosis of MJD. Mortality in MJD is usually from pulmonary complications[1]. The unique sporadic nature of this case caused the question to arise whether or not genetic testing should be done on the patient's children due to 50% inheritance pattern in children[1].

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ILLINOIS POSTER FINALIST – Jessica George

Lumps, Bumps, and Constipation: Exploring the Differential of Constipation in Immunocompromised

PatientsFirst Author: Jessica George , Additional Authors: Ryan Gindi and Betty Chung

Introduction: Infection and malignancy are common in immunocompromised patients. These entities can be challenging to tease apart due to constitutional symptoms and variable presentations. This case illustrates the importance of keeping a broad differential and considering unlikely manifestations of illnesses in immunocompromised patients.

Case Description: A 34–year–old male with history of HIV infection non-adherent to antiretroviral therapy presented to the Emergency Department with 6 days of constipation and 3 days of passing dark clots with bright red streaking when attempting to defecate. Symptoms were preceded by intermittent diarrhea. He reported fever for 5 weeks, chills, drenching sweats, unintentional weight loss, generalized weakness, headache, abdominal pain, bloating and increasing back pain. Physical exam revealed palpable paraspinal and cervical lymphadenopathy and decreased bowel sounds. The patient was admitted, administered intravenous fluids, and started on empiric ciprofloxacin and metronidazole. Computed tomagraphy (CT) of the abdomen showed inflammation of the descending colon, splenomegaly, and diffuse lymphadenopathy. CT of the chest showed no signs of disease. Cervical lymph node biopsy was performed with preliminary report revealing reactive lymphadenopathy with abundant microorganisms. Urine was positive for Histoplasma and Blastomyces antigens. Serology was negative for Blastomyces, and blood cultures were negative. HIV viral load was 216,000 and CD4 count was 14. The final biopsy report showed histoplasmosis without evidence of malignancy. Lumbar puncture was attempted to evaluate central nervous system involvement, but was not tolerated. The patient was treated with IV Amphotericin B and transitioned to oral itraconazole before discharge home.

Discussion: Based on the patient's initial presentation, the differential diagnosis of malignancy vs. infection was explored with specific focus on colon cancer, lymphoma, cytomegalovirus, tuberculosis, and fungal infection. Lymph node biopsy was performed and imaging was pursued to assess the extent of disease. Because urine antigens for Histoplasma and Blastomyces are cross reactive, positive results for both suggested a disseminated fungal infection, but did not rule out an additional lymphoma or give a specific diagnosis. Dissemeninated histoplasmosis is more likely to present with gastrointestinal complications than blastomycosis; however, the absence of pulmonary disease generally seen in both mycoses was atypical. Although rare, there are reports of histoplasmosis presenting exclusively with gastrointestinal symptoms that can mimic colon cancer. The final pathology confirmed the diagnosis of histoplasmosis and allowed definitive treatment.

ILLINOIS POSTER FINALIST - Janushe Patel

"Make My Heart Hole Again" A rare case of adult onset partial anomalous pulmonary venous return

First Author: Janushe Patel Co-Authors: Patel, Keval MD. Jethani, Manohar MD. Patel, Virali MD. Nair, Vinitha MD.

Introduction: Partial anomalous pulmonary venous return occurs when some of the pulmonary veins connect to the right atrium or one of its venous tributaries rather than the left atrium. This creates a partial left to right shunt. If left untreated, PAPVC may result in severe right ventricular failure and pulmonary vascular disease. [1]

Case: A 59 year old female with a past medical history of HTN, dyslipidemia,anxiety, presented to her primary care physician with complaints of an episode of near syncope and palpitations. The clinical presentation that led to her cardiac evaluation was transient visual blurring and a fluttering sensation in her chest while exercising on a treadmill in early May 2011. She did not lose consciousness, feel dyspneic or have chest pain. Her outpatient workup included an ambulatory ECG correlation to atrial and ventricular ectopy, 2D echo revealing pulmonary arterial hypertension, concentric LVH, RV enlargement with moderate tricuspid regurgitation and aortic insufficiency. Following a chest CT which showed an enlarged pulmonary trunk and main pulmonary artery, the patient had a TEE and MRI which subsequently revealed superior sinus venous type atrial septal defect with associated partial anomalous pulmonary venous connection involving two out of three right-sided pulmonary veins. In December of 2011, patient underwent a right atriotomy with an autologous pericardial patch closure of sinus venosus ASD and coverage of anomalous right upper and middle lobe pulmonary venous ostia within SVC such that those veins now drain to the left side of the ASD patch. Postoperatively, the patient had recurrent episodes of atrial fibrillation for which she was treated with antiarrythmics and enrolled in phase II outpatient cardiac rehabilitation. Patient was advised to follow up at an electrophysiology clinic and congenital heart surgery clinic thereafter. Since then, patient has not experienced any episodes of palpitations and has remitted from atrial fibrillation.

Discussion: Partial anomalous pulmonary venous connection is a congenital pulmonary venous anomaly that involves drainage of one to three pulmonary veins in to the right-sided circulation. [2] PAPVR has traditionally been associated with atrial septal defects and has often been clinically silent. [1] Diagnosis is often made with transesophageal echocardiography however cardiac MRI has more sensitivity and specificity for this diagnosis and gives more anatomical information before surgical correction. Repair of PAPVC can be completed successfully with low morbidity. Patients with left sided PAPVC, right-sided chamber enlargement, evidence of tricuspid regurgitation or clinical symptoms should undergo surgical repair.

Celiac disease (CD) is an immune-mediated enteropathy triggered by the ingestion of gluten proteins. Its presentation can range from asymptomatic individuals to "classical" with prominent gastrointestinal symptoms to “catastrophic” celiac crisis. Celiac crisis (CC) is a well-known entity in pediatric population, however, is not well described in adults. We describe a case of 59-year-old female who presented with 60-pound weight loss over six months who was

diagnosed with CC. Other symptoms included frequent vomiting and foul smelling, non-bloody loose stools. Her past medical history was significant for non-alcoholic steatohepatitis. She had no travel history or family history of chronic gastrointestinal diseases. Admission vital signs were notable for hypotension (98/60). Physical examination was remarkable for cachexia and tender hepatomegaly. Laboratory work-up revealed non-anion gap metabolic acidosis, multiple nutritional deficiencies including vitamin A, E zinc, and copper. Infectious work up was negative for Clostridium Difficile, Salmonella, Shigella, Campylobacter, and Shiga toxins. Stool studies were normal for fecal fat, elastase and alpha-1-antitrypsin. Previous colonoscopy was unremarkable. Celiac serologies, including Endomysial IgA antibody and tissue transglutaminase IgA antibody were positive. She underwent endoscopy revealing villous atrophy of the duodenal mucosa with scalloping of the mucosa. Pathology demonstrated total villous atrophy of the duodenal mucosa and marked intraepithelial lymphocytosis consistent with celiac disease. The patient was started on a Gluten free diet and oral budesonide. Within two weeks of discharge, she had complete resolution of her gastrointestinal symptoms and a 20-pound weight gain.

CD is the most common malabsorptive disorder in the western world with an estimated prevalence of 0.71%.[1] It has been associated with genetic haplotypes such as HLA-DQ2 or HLA-DQ8 and an immune response to gliadin leading to enteropathy. Given the wide spectrum of clinical presentation, it should be considered in patients with unexplained gastrointestinal complaints, particularly profound weight loss or nutritional deficiencies. CC, which also presents with profound metabolic disturbances, represents an uncommon manifestation of a disease being diagnosed with increasing frequency. However only a handful cases of CC in adults have been described. There is no consensus on a definition of CC although Jamma et al. proposed two of the following: signs of severe dehydration, electrolyte abnormalities, weight loss greater than 10 pounds, hypoproteinemia with an albumin less than 3.0 g/dL, metabolic acidosis with pH <7.35, and possible neurologic dysfunction.[2] Physicians should become aware of its hallmark manifestations as treatment initiation can have a marked improvement in outcome.

1. 1. Tack, Greetie J., Verbeek, et al. The Spectrum of Celiac Disease: Epidemiology, Clinical Aspects and treatment. Nat Rev Gastroenterol and Hepatol. 2010 Apr;7(4):204-213.
2. 2. Jamma S, Rubio-Tapia A, et al. Celiac crisis is a rare but serious complication of celiac disease in adults. Clin Gastroenterol Hepatol 2010 Jul;8(7):587-90.

ILLINOIS POSTER FINALIST - Corbin Rayfield

Anterograde Amnesia in the Oncology Setting

First Author: Corbin Rayfield

A 54 year-old gentleman presented to the general medicine service following hospitalization for nausea and vomiting for the past several weeks. Esophagogastricduodenoscopy revealed a large gastric adenocarcinoma obstructing passage into the small bowel. While discussing with the patient options for treatment, bizarre behavior and memory deficits were noted. Consultation with the family brought to light a similar pattern. The patient denied any memory deficits; when asked to recall details about team members or events of the previous day in the hospital, he would get agitated and end the interview. If the patient was asked about events that had occurred in the distant past such as previous addresses, work, or family, the patient answered accurately. On examination, the patient appeared slightly cachectic likely secondary to poor absorption due to the gastric outlet obstruction. The patient demonstrated a negative Romberg test, and tracking via the finger-to-nose test was intact. On ocular exam, the patient did not have any oculomotor findings or opthalmoplegia. The rest of the examination was benign.

Due to the unique nature of anterograde amnesia and a lack of history of structural deficits, the patient's differential was fairly narrow. It was eventually decided that Wernicke-Korsakoff Syndrome could be the potential cause despite no history of alcohol abuse. Classically described as the triad of anterograde memory deficits, ataxia, and opthalmoplegia, this portrayal is particularly misleading as only 18% demonstrate all 3 signs leading to 80% of cases being missed (Sechi 2007). With altered mental status occurring in 25% of hospitalized cancer patients, the effects of tumor metabolism, poor nutrition due to anorexia, and medication effects on neurological functioning can be particularly difficult to tease apart (Kuo 2009). Wernicke-Korsakoff is most often caused by thiamine deficiency and has been found to occur most frequently in patients with rapidly growing sarcomas, blood dyscrasias, and gastric cancers. Thiamine utilization occurs by all cells undertaking the citric acid cycle as a cofactor for the enzymes pyruvate dehydrogenase and alpha-ketoglutarate dehydrogenase. Additionally, it is used by neuronal cells for production of the neurotransmitters glutamic acid and GABA and in the production of myelin. Depletion can occur as rapidly as 3 weeks with nutritional restriction or with pathologies preventing thiamine absorption in the duodenum (Tanphaichitr 1999).

After several days of treatment with 1500 mg of thiamine daily, the patient demonstrated significant improvement in his memory, and he could recall his treatment team and previous day's procedures. His family felt that his memory never fully returned to baseline. As a potentially treatable source of altered mental status in oncology patients, thiamine deficiency resulting in Wernicke-Korsakoff Syndrome calls for a high degree of surveillance and suspicion.

ILLINOIS POSTER FINALIST – Rucha Mehta

Celiac Crisis: A 60 pound weight loss in a 59 year old female

First Author: Rucha Mehta Second Author: Dr. Joel Pekow

Celiac disease (CD) is an immune-mediated enteropathy triggered by the ingestion of gluten proteins. Its presentation can range from asymptomatic individuals to "classical" with prominent gastrointestinal symptoms to “catastrophic” celiac crisis. Celiac crisis (CC) is a well-known entity in pediatric population, however, is not well described in adults. We describe a case of 59-year-old female who presented with 60-pound weight loss over six months who was diagnosed with CC. Other symptoms included frequent vomiting and foul smelling, non-bloody loose stools. Her past medical history was significant for non-alcoholic steatohepatitis. She had no travel history or family history of chronic gastrointestinal diseases. Admission vital signs were notable for hypotension (98/60). Physical examination was remarkable for cachexia and tender hepatomegaly. Laboratory work-up revealed non-anion gap metabolic acidosis, multiple nutritional deficiencies including vitamin A, E zinc, and copper. Infectious work up was negative for Clostridium Difficile, Salmonella, Shigella, Campylobacter, and Shiga toxins. Stool studies were normal for fecal fat, elastase and alpha-1-antitrypsin. Previous colonoscopy was unremarkable. Celiac serologies, including Endomysial IgA antibody and tissue transglutaminase IgA antibody were positive. She underwent endoscopy revealing villous atrophy of the duodenal mucosa with scalloping of the mucosa. Pathology demonstrated total villous atrophy of the duodenal mucosa and marked intraepithelial lymphocytosis consistent with celiac disease. The patient was started on a Gluten free diet and oral budesonide. Within two weeks of discharge, she had complete resolution of her gastrointestinal symptoms and a 20-pound weight gain.

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ILLINOIS POSTER FINALIST - Harneet Kaur Gahley

The PATHology Less Traveled – Streptococcus Viridans Induced Liver Abscess

First Author: Harneet Gahley , Arjun Bhansali MD, Niket Sonpal MD

Streptococcus Viridans is an alpha-hemolytic gram positive cocci which is normal flora in 90% of patients and the leading cause of dental caries. It is usually a nonpathogenic bacterium but when it invades the bloodstream, can cause endocarditis in patients with damaged heart valves. We present an immunocompetent patient with a hepatic abscess causes by *Streptococcus Viridans.*

A 41 year old male was admitted for worsening cough for one week duration. The cough was associated with a low grade fever and dyspnea on exertion. He also complained of headache, nausea, and generalized weakness. His past medical history was significant for hypertension and morbid obesity. He also recently had a syncopal episode at work. On admission, his temp was 100.6°F, BP 167/97, PR of 110, and RR of 24. On exam, crepitations were heard of the right middle to lower lung fields and his abdomen was benign. Labs were significant for the following: Albumin 2.7g/dl, total bilirubin 2.4mg/dl, peaked levels of alkaline phosphatase 165 U/L, alanine transferase 85 U/L, and AST 91 U/L. His WBC count was 12.6 (peaking at 16.4), and his toxicology drug screen was negative. He tested nonreactive to all hepatitis markers. A chest x-ray delineated right basilar atelactasis while a head CT was unremarkable. An echocardiogram showed a normal EF and no valvular lesions. Given his clinical presentation, a CT angiography was performed which was negative for pulmonary emboli or DVT but did show 5.5cm heterogenous low-density mass in the right lobe of the liver. The lesions measured 3.5x4.5 cm and 5.6x6.0 cm within the dome and right lobe of the liver, demonstrating thick irregular enhancing capsules and central fluid intensity. It was concluded that these were probable abscess collections. The patient underwent CT guided drainage and liver abscess aspiration. 7 ml of pus was drained from the first abscess but the second was not anatomically amenable for drainage. The fluid drained was sent in for culture and was determined to be Streptococcus Viridans and was started on metronidazole and ceftriaxone. The patient was discharged on oral levofloxacin and metronidazole for ten days and is doing well.

Pyogenic abscesses account for nearly 2/3 of all liver lesions. The most common overall cause is through biliary disease such as cholangitis, followed by endocarditis; both of which were ruled out by diagnostic testing. Given the propensity for *Streptococcus Viridans* to cause dental caries and gingival infections, we recommend a thorough oral examination as this may be an underlying cause for pyogenic liver abscesses in patients without other etiologies. We plan to conduct a retrospective analysis of our microbiology database to query the incidence of oral flora in the pathogenesis of pyogenic liver abscesses.

IOWA POSTER FINALIST - Maria T Story

Ultrasound: Window to her Heart, Portal to my Soul

First Author: Maria T Story Second Author: Gregory Schmidt, MD

Miss NL is a 21 year old female admitted to the ICU with diffuse joint pain, dyspnea, and hypoxemia. Over the four years preceding admission, the small joints of her hands had become stiff and cold weather often caused her fingers to blanch and turn purple. For the last three months she felt increasingly poor and complained anorexia, 10 pound weight loss, and bilateral knee swelling, which eventually confined her to bed. When shortness of breath developed, she sought medical attention. Vital signs included blood pressure of 102/60 mmHg; heart rate 155/min; respiratory rate 34/min; and room air pulse oxygen saturation of 89%. Physical examination revealed an acutely ill, anxious-appearing young woman with a high work of breathing. Her neck veins were distended to 20cm and there were scattered crackles. The chest radiograph showed cardiomegaly and pleural effusions. Urgent, intensivist-conducted ultrasound confirmed the elevated jugular venous pressure, revealed a bilateral B-line-predominant pattern in the lungs, and showed large pericardial and pleural effusions and a grossly distended inferior vena cava. Although she was tearful from pain and fear, the patient watched the ultrasound screen carefully and asked, “Is that my heart?” Together we examined her struggling pump, otherwise signaled only by the fluttering I felt as I held the transducer over her precordium.

Cardiac tamponade; cardiopulmonary failure related to pulmonary hypertension; or massive fluid overload were leading diagnostic concerns. We explained our reasoning to the patient, integrating the ultrasound findings in the context of her symptoms and signs. She was taken for right heart catheterization which did not show equalization of diastolic pressures, but pericardiocentesis was performed for diagnostic purposes, yielding 300 cc’s of exudative fluid.

The history and physical examination findings on admission strongly pointed to systemic lupus erythematosus, a diagnosis confirmed when ANA, anti-dsDNA, and anti-Sm antibodies were found in high titers. She was treated with high-dose, intravenous methylprednisolone and active diuresis after which both dyspnea and hypoxemia improved rapidly.

In this case, bedside ultrasound was essential to unraveling the basis for cardiopulmonary failure, but also helped me connect with a terrified patient. As charting has moved to be primarily electronic, less and less time is spent with the patient, while orders are placed, results are examined, and images are viewed on the computer. Ultrasound reveals physiology in action, but also brings the physician back to the bedside and creates an intimate bridge of hand on body. I will long remember the image of our entire team of physicians, residents, and students gathered at the bedside for this examination and how, through its findings, we understood NL’s desperate situation. And I won’t forget how personally it touched me; perhaps because NL is, like me, a young woman with dreams of a long, healthy life.

MAINE POSTER FINALIST - John L Daggett Jr

Cryptic loin pain and hematuria: Thin basement membrane nephropathy as a putative etiology

First Author: John L Daggett Jr Second author: John Vella, MD

INTRODUCTION: Thin basement membrane nephropathy is classically associated with microscopic hematuria, minimal proteinuria, and rarely with abdominal and flank pain. Here, we present a case of a young man with persistent gross hematuria, preserved kidney function, and severe abdominal and flank pain, later found to have thin basement membrane disease complicated by Loin Pain Hematuria Syndrome.

CASE PRESENTATION: A 36 year old man with history of opioid dependence, obesity, cholecystectomy, and remote bilateral inguinal hernia repair presented with a six week history of persistent gross hematuria associated with intermittent severe flank and abdominal pain, fever, nausea with vomiting, and diarrhea. On exam, he was afebrile (37C) tachycardic (120 beats per minute), hypertensive (148/103), his lower abdomen and costopherenic angles were exquisitely tender to palpation. Laboratory data revealed anemia (Hgb 12.1g/dL, Hct 36.4%), normal white blood cell counts, normal kidney function (BUN 6mg/dL, creatinine 0.64mg/dL), and elevated inflammatory markers (ESR 49mm/hr, CRP 13.86mg/dL). Urinalysis revealed copious acanthocytic red blood cells, no signs of infection, and a normal protein to creatinine ratio. CT scan with contrast, renal ultrasound, cystoscopy were all unremarkable. His abdominal pain persisted despite opioid analgesics, and he later underwent both upper and lower endoscopies, which were normal. Infectious diarrheal causes, including leptospirosis, babesiosis, and erlichiosis were considered, all were negative, as was his stool cultures. Schistosomoaisis urinary antigen was negative, as were ANCA, and anti-GBM antibodies. Complement was within normal limits. Due to persistent hematuria he underwent renal biopsy, revealing both normal light microscopic findings, and immunostaining without evidence of antibody deposition. Electron microscopy confirmed thin basement membrane nephropathy as evidenced by glomerular basement membranes of 246 nanometers (nml >264 nm).

DISCUSSION: Loin Pain Hematuria Syndrome (LPHS), although controversial, is a recurrent complex pain syndrome associated with gross hematuria. Idiopathic LPHS is diagnosed once all causes of glomerular, non-glomerular anomalies have been excluded, yet the patient has ongoing recurrence of intermittent hematuria and severe abdominal and flank pain. In this vignette, our patient with thin basement disease has a structural source of glomerular hematuria that propagates the painful symptoms of LPHS, in this case prompting a gastrointestinal inflammatory and infectious work-up. There have been documented cases of patients with LPHS having both thin and thick basement membranes, thus implicating basement membrane anomalies as a likely precipitating factor. Early identification of patients with thin basement membrane disease allows for appropriate long term monitoring. Management of LPHS focuses largely on analgesia, but can include angiotensin converting enzyme therapy, renal autotransplantation, and/or denervation for refractory pain.

MAINE POSTER FINALIST - Amy E Riviere

Hemiballismus in an 86 Year-old Male with Type II Diabetes Mellitus

First Author: Amy E Riviere

Uncontrolled diabetes mellitus and hyperglycemia have well-known chronic effects on the body. Most notably, non-ketotic hyperglycemia has the potential to impact patients with type II diabetes. One of the most unique presentations of non-ketotic hyperglycemia is hemiballismus.

An 86 year-old male with a past medical history of Type II Diabetes, chronic kidney disease, hypertension, atrial fibrillation, lower extremity deep venous thromboses presents with a history of multiple falls over the last few weeks and prominent abnormal right-sided full body movements. Patient's primary care provider reports a recent office visit addressing his family's concerns about his frequent clumsy falls, uncontrolled diabetes, and poor self-administration of medications. Patient complained of very disturbing spontaneous movements of his right arm and leg, which began three weeks ago around the time of one of his falls. He also admitted to a tingling sensation in the tips of his right fingers but denied headache, dizziness, weakness, or associated pain. Vitals were stable with mild hypertension. On exam, the patient's right arm and leg were moving involuntarily in a continuous, abrupt movement pattern. Neurological exam was otherwise normal with a minor sensory defect on soles of feet to fine touch. Significant laboratory results showed an elevated glucose level of 373, creatinine of 1.66 and a recent hemoglobin A1C of 13.4. Urinalysis showed a glucose level of 1000. A CT scan of the head without contrast showed a non-deforming asymmetric attenuation of basal nuclear structures, cerebral brain atrophy and chronic small vessel ischemic or occlusive changes. The hyper-attenuation was thought to be a post-infarct left-sided basal nuclear petechial or recent hemorrhage. An MRI was subsequently performed and showed an abnormal T1 signal and enhancement of the left putamen and left caudate. This correlated with the area of hyper-attenuation on the prior CT and represented a petechial hemorrhage unlikely to be infarct and more likely to be due to non-ketotic hyperglycemia. Prior to this point of the investigation, the patient was placed on an aggressive sliding scale insulin regiment at the discovery of his elevated glucose. Concurrently, the patient's symptoms began to resolve within 24 hours of the insulin administration. Patient was discharged in a few days with no symptoms of hemiballismus and adequate glucose control.

Hemiballismus is a unique finding in a patient with uncontrolled diabetes mellitus. Non-ketotic hyperglycemia often presents in type II diabetics as their residual insulin secretion is sufficient to minimize ketosis. However, the hyperglycemia plays a significant role in disruption of function in the basal ganglia resulting in this rare physical finding of hemiballismus and other neurological presentations. The pathophysiological process is still not confirmed, but there are multiple mechanisms which have been investigated. One strong hypothesis is the shift in cerebral metabolism to an anaerobic pathway, which reduces the GABA and acetylcholine in the basal ganglia, causing dysfunction. It has been thought that the petechial hemorrhages causing the hyper-attenuation are a result of erythrocyte diapedesis due to the hyperglycemia-induced blood-brain barrier dysfunction.

MASSACHUSETTS POSTER FINALIST - Andrew J Piper

A Case of Domperidone Toxicity in a Mother Seeking Increased Milk Supply

First Author: Piper A. (MS3), Schultz S. (MD), Dossumbekova A. (MD, PhD), Narayanrao V. (MD)

INTRO: Domperidone is a peripherally acting dopamine antagonist banned in the United States due to concern for cardiotoxicity when used as an intravenous antiemetic and gastric motility agent. Still, its unsupervised use remains popular amongst mothers with low milk supply reassured by internet retailers of its safety.

CASE DESCRIPTION: A 22-year-old woman came to the emergency room due to an incident of predominantly right-sided weakness and limb heaviness associated with difficulty speaking, and dizziness that occurred while she was driving. Upon standing the patient was unsteady and slow moving. The patient was observed in the ED for 6 hours with complete resolution of her symptoms. Brain MRI and MRV with contrast were negative for ischemic or hemorrhagic damage and patient was discharged home. The next morning, an identical episode occurred prompting the patient to return to the ED, this time for admission.

History revealed that the patient had recently undergone vaginal delivery of her second child. Post-partum, she was having difficulty with her milk supply. The patient reported taking two supplements for lactation– Mother Love Special Blend 10mL TID and domperidone 30mg TID – and no other prescribed medication. She denied any recent environmental, toxic exposures, or any drug abuse. Her vital signs were normal. Physical exam was unremarkable. Initial differential diagnosis included TIA, cardiogenic emboli, hyper-coagulopathy, premature atherosclerosis, atypical migraine, or drug toxicity. Blood work – lipid profile, HbA1C, clotting disorders – were normal except for slightly elevated BUN and mild anemia. Urine toxicology screen was negative. Echocardiogram with bubble study was normal. Having ruled out other etiologies, we became concerned that the patient's extra-pyramidal-like symptoms may have been the result of domperidone toxicity. Within 4 days after stopping domperidone as instructed, her symptoms of difficulty in initiating movements were improved and all other symptoms were resolved by 2 weeks.

DISCUSSION: This case illustrates the potential dangers of using domperidone as a prolactin secretagogue. While banned in the US, a popular largely online movement seeks to increase usage of domperidone for its benefits in increasing milk supply. Advice obtained from these websites encourages unsupervised administration of larger doses of domperidone (30-40mg TID or QID) than that formerly recommended in its use as an anti-emetic or pro-motility agent. The literature promoting use of domperidone as a lactation aid seeks to assuring the drug's relative safety by dismissing the rare arrhythmic effects that result from much higher intravenous doses. Recognition of potential dangers of domperidone, highlighted in this case, is critical to counseling mothers seeking to safely increase their milk supply.

MASSACHUSETTS POSTER FINALIST – Sharon Li

Swallowing-induced Tachyarrhythmia

First Author: Sharon Li, MS3, Joel H. Popkin, MD

Introduction: Swallowing-induced bradyarrhythmias due to vagal mechanisms have been well documented and are relatively commonplace. However, tachyarrhythmias brought on by swallowing are extremely rare. We report a case of atrial fibrillation and SVT induced by swallowing solid foods.

Case Presentation: A 50-year-old Caucasian male presented with a three-day history of palpitations similar to his previous episodes of paroxysmal SVT, but now consistently associated with eating. The palpitations only occurred after he swallowed solid food, and ceased within a few seconds after eating. The only other activity which brings about similar, though milder symptoms, was burping. His past medical history is significant for SVT diagnosed six months ago, which was well controlled on metoprolol. On examination, his heart rate was 68 beats-per-minute and blood pressure 125/70. Systemic examination was thoroughly unremarkable. We were able to reproduce and document atrial fibrillation in the emergency department by observing his telemetry while he ate a sandwich. Laboratory investigations revealed normal cardiac enzymes, TSH, and resting ECG. Transesophageal echocardiography demonstrated no structural or functional abnormalities. The patient was placed on flecainide, with subsequent resolution of any inducible symptoms.

Discussion: Swallowing-induced tachyarrhythmia is a syndrome of unclear etiology that appears to affect predominately males over the age of 35 with no evidence of structural heart or esophageal problems. In previous cases of swallowing-induced tachyarrhythmias, several months of either Class Ia or Ic anti-arrhythmics were generally effective in permanently ablating the syndrome. Catheter ablation of the arrhythmogenic source has also been attempted successfully. There have been conflicting suggestions from various studies regarding whether the cause of the tachycardia is mechanical stimulation versus non-cholinergic vagal stimulation. Since there are variations in the trigger and type of the arrhythmias, we suspect that the cause of the arrhythmia may differ for each case. Our report emphasizes the fact that swallowing-induced tachyarrhythmia should be kept in mind with a set of symptoms unrelated to structural disease that have the sound of functional illness.

MICHIGAN POSTER FINALIST - Amanda Zukkoor

A case of Euglycemic Diabetic Ketoacidosis in a patient with type 1 Diabetes Mellitus

First Author: Amanda Zukkoor Second Author: Adnan Kassier, MD

Diabetic ketoacidosis (DKA) is a common complication of uncontrolled serum glucose. Typically patients with diabetic ketoacidosis have a triad of hyperglycemia, high anion gap metabolic acidosis, and ketonemia. In rare cases, however, patients with DKA may present similarly, yet are euglycemic.

A 34 year old female with a past medical history significant for type 1 diabetes mellitus presented to the emergency center with heart palpitations, abdominal pain, nausea, and vomiting. She began to experience these symptoms a few days prior and was unable to eat. Due to poor oral intake, she stopped taking her insulin. Upon arrival, she was acidotic and had elevated beta hydroxybutyrate; however, she was found to be euglycemic. She was then started on intravenous fluids. The following morning, her blood sugar rose to 508 mg/dL and she had worsening acidosis and ketonemia. She was immediately transferred to the Intensive Care Unit (ICU) and was started on an insulin infusion. Her symptoms improved with insulin and she was later discharged home safely.

In patients with diabetes, it is imperative to consider ketoacidosis, despite normal serum glucose. Euglycemic DKA has been reported in cases of patients with poor oral intake and pregnancy. As this case shows, close monitoring of serum glucose and electrolytes is important as worsening of acidosis and hyperglycemia is expected after dehydration is corrected. Therefore, ICU admission may be preferable in these patients.

MICHIGAN POSTER FINALIST - John David

Mitochondrial Encephalopathy, Lactic Acidosis, and Stroke (MELAS)

First Author: John David MSIII Second Author: Syed Ahmed Hussain M.D.

Mitochondrial encephalopathy, lactic acidosis, and stroke (MELAS) is categorized as a neurodegenerative disorder with mitochondrial inheritance, giving rise to multiple strokes accompanied by persistent lactic acidosis. The rarity of this disease makes it a diagnostic challenge.

A 26-year-old African American female presented to the hospital with a seizure episode. Initially patient could not contribute much to history due to post-ictal state so history was obtained from her sister who mentioned frequent seizures almost on a daily basis. With a past medical history significant for known seizure disorder, hearing loss, and multiple cerebrovascular accidents (CVA) with residual weakness, she was subsequently admitted and anti-epileptic drugs reinstated. On physical examination, she was hemodynamically stable and pertinent positive findings neurologically were bilateral hearing loss, left upper and lower extremity weakness with upgoing plantar reflexes on the left. Given her young age and history of CVA, workup for hypercoaguable state, vasculitis and other entities was performed but returned negative. Magnetic resonance imaging indicated ischemic infarction in the right middle cerebral artery distribution along with remote infarctions in the medial aspect of the left occipital lobe and in the left cerebellar hemisphere. Labs revealed elevated lactic acid with anion gap acidosis. Upon further questioning it was noted that multiple members of her family on the maternal side exhibited similar symptoms. Subsequently, muscle biopsy showed classic ragged red fibers under microscopy.

The incidence of MELAS is currently unknown due to its rarity and difficulty to diagnose. However, the spectrum of multiple strokes typically before the age of 40, seizures and presence of lactic acidosis with or without evidence of ragged red fibers on biopsy should raise the specter of MELAS. Coupled with clinical manifestations of this condition, a family history of similar symptoms strengthens the diagnosis. Presence of normal early development, recurrent headaches and vomiting are also found. There could be a number of variants including Kearns-Sayre Syndrome or Myoclonic epilepsy with ragged red fibers (MERRF). Wide variability within a family tree is classic for mitochondrial inheritance diseases. Furthermore this case raises awareness that, although rare, MELAS should still be considered. Despite the fact that this patient presented with all the classic findings of MELAS, many patients may not have all of these findings, and therefore require a high index of suspicion. While no proven treatment to reverse the disease course exists, management is geared towards symptom relief.

MICHIGAN POSTER FINALIST – Tanvir K Kahlon

Considering medicine overuse headache with an underlying etiology of headache

First Author: Tanvir Kahlon, Donald Rozzell

Medicine overuse headache (MOH) is a growing problem around the world that is often overlooked in clinical practice. Data suggests that 1% of the general population in Europe, North America, and Asia have MOH. A 34 year old female with past medical history of seizure disorder, and idiopathic intracranial hypertension with multiple lumbar-peritoneal shunt revisions, presented with a 2 week history of a worsening headache, bilaterally equal, constant, 10/10 in intensity, nausea and 2 episodes of emesis.

Headache was not associated with postural changes, visual aura, scotoma, fevers, or neck stiffness. She had tried various medications for her chronic headaches for the past year with no relief. Patient had been using morphine sulfate extended release (MS-Contin), on an as needed basis, to alleviate her symptoms. Patient's physical exam and CT head were within normal limits. Fluoroscopy guided lumbar puncture showed an opening pressure of 11, and a closing pressure of 8, after removal of 10 cc of cerebrospinal fluid.

Patient was diagnosed with MOH, due to exclusion and meeting Revised International Headache Society criteria for MOH, of headache present > 15 days of the month, with > 10 days per month use of an opioid for > 3 months. She was treated for MOH with modified Raskin protocol, and abrupt withdrawal of all opioids. Patient's headache showed improvement on the 7th day of treatment. MOH is a growing phenomenon, and is especially difficult to identify in a patient such as the one above, where there is an underlying etiology of chronic headache.

MICHIGAN POSTER FINALIST - Tina Ozbeki

Recurrent Hyperhemolysis Syndrome in Sickle Cell Disease

First Author: Tina Ozbeki, Diane Levine, Sara Kunz, Jarrett Weinberger

Introduction Hyperhemolysis syndrome is a hemolytic transfusion reaction characterized by a decrease in hemoglobin below pre-transfusion levels, reticulocytopenia, evidence of hemolysis, and a negative direct antiglobulin test. It involves the idiopathic destruction of both transfused and autologous red blood cells. It occurs infrequently, but is a life-threatening event and must be recognized immediately to avoid complications such as congestive heart failure, acute renal failure, and pancreatitis. The current treatment for hyperhemolysis syndrome is intravenous immunoglobulin (IVIG) and methylprednisolone.

Case A 22-year-old female with sickle cell disease presented to the hospital with a vaso-occlusive pain crisis. Her hemoglobin on admission was 7.4 g/dL, the patient was given aggressive hydration and narcotic analgesia. On the third hospital day, the patient complained of chest pain. A repeat hemoglobin dropped to 5.7 g/dL. She was subsequently transfused four units of packed red blood cells because of her declining hemoglobin and concern for acute chest syndrome. One day after the blood transfusion, her hemoglobin had risen to 8.8 g/dL. Her chest pain resolved. She was discharged on day nine of hospitalization. Three days post-discharge, she presented with hemoglobinuria and diffuse pain. Her hemoglobin dropped to 3.7 g/dL, her reticulocytes were 4.9%, and her direct antiglobulin test was negative. The patient was diagnosed with hyperhemolysis syndrome and successfully treated with IVIG and methylprednisolone.

Additional history revealed that one and a half years prior, the patient received a blood transfusion for acute chest syndrome and developed hyperhemolysis syndrome, with hemoglobin dropping to 2.8 g/dL. At that time she was treated with IVIG and methylprednisolone.

Discussion Hyperhemolysis syndrome occurs anywhere form 1-7 days post-transfusion. Delay in diagnosis may occur as the symptoms of hyperhemolysis syndrome, such as fever, joint pain, low hemoglobin, and hemoglobinuria, may be similar to those of a sickle cell pain crisis. Diagnosis of hyperhemolysis is vital as hemoglobin levels may fall to dangerous levels in patients who begin with chronically low hemoglobin.

Cases of recurrent hyperhemolysis syndrome are rare and the best course of action is to avoid additional blood transfusions. Unfortunately, sickle cell patients often need multiple blood transfusions for dangerously low hemoglobin levels, acute chest syndrome, and other associated sequelae. Close observation and monitoring for hyperhemolysis is crucial. IVIG and steroid therapy have been shown to be effective treatments. Novel treatments including immunosuppression and plasma-to-RBC exchange transfusion have been used successfully but remain anecdotal. The benefits of the transfusion should always outweigh the risks. This is most important in patients with a history of hyperhemolysis syndrome.

MICHIGAN POSTER FINALIST - Kimberley Grady

Coil Embolization as Palliative Treatment in Diffuse Type I Hepatopulmonary Syndrome

First Author: Kimberley Grady Srinath Gowda, MD; Pascal Kingah, MD; Ayman Soubani, MD

Hepatopulmonary syndrome is defined by three diagnostic criteria: (1) liver disease (most commonly portal hypertension) with or without cirrhosis, (2) hypoxemia (PaO_2 <70 mmHg or A-a gradient >15 mmHg on ambient air) and (3) intrapulmonary vascular dilatations (supported by contrast-enhanced echocardiography or abnormal uptake with radioactive lung-perfusion scan).

Hepatopulmonary syndrome can be further characterized by pulmonary angiogram as type I or type II. Type I hepatopulmonary syndrome is defined as pre-capillary pulmonary artery dilatation without the presence of arteriovenous fistulas, whereas type II hepatopulmonary syndrome is defined as discrete areas of pulmonary arteriovenous fistulas. Type I hepatopulmonary syndrome is usually has limited response to 100% oxygen once there are diffuse vascular changes and liver transplantation is the treatment option used to improve oxygenation in these patients. We present a patient who is a 59-year-old male with a history significant for active alcohol abuse, hepatitis C and cirrhosis who has experienced progressive hypoxia over the past one year. Initial ABG on 95% FiO2 on high flow nasal cannula revealed PaO2 of 58.9 mmHg. He had contrast-enhanced echocardiography and radioactive lung perfusion nuclear scan that indicated intrapulmonary shunt, with shunt fraction of 33%. Chest CT scan and pulmonary function tests revealed no significant pulmonary disease. The pulmonary arterial vessels were diffusely dilated especially in the lower lobes. Right heart catherization indicated RV 28/4mmHg, PA 17/14mmHg with mean 15mmHg, PCWP 13mmHg, CO 6.7L/min, CI 3.22L/min*m2. Pulmonary angiogram showed severely dilated pulmonary vessels, especially in the lower lobes with no focal arteriovenous malformations. There was the appearance of significant bubbles in left atrium after injection into right and left lower main pulmonary arterial segments, less so when bubbles were injected in the upper lobe main pulmonary arterial segments.

The patient was diagnosed with diffuse, type 1 hepatopulmonary syndrome. He was not candidate for liver transplantation given active alcohol use, severe psychiatric problems and lack of social support. After extensive discussions, the patient underwent sequential coil embolizations of the bilateral lower pulmonary arteries. The patient was discharged home on 2L supplemental oxygen. This case suggests that patients may benefit from coil embolizations of the pulmonary arterial dilatations as a palliative treatment of diffuse, type I hepatopulmonary syndrome.

MINNESOTA POSTER FINALIST - Maros Cunderlik

OPQRST - Do you know your ABCs? Cognitive bias and diagnostic error

First Author: Maros Cunderlik, BA, MBA, Andrew Olson, MD

The role of cognitive biases in diagnostic errors has been well documented (1,2,3). This case in an example of such biases that offers a unique learning opportunity in improving clinical decision making.

Case: A 63 year old woman was admitted with one day of vertigo, nausea and vomiting. Her past medical history included atrial fibrillation, hypertension, primary biliary cirrhosis, tonsillar cancer three years prior treated with chemotherapy and radiation with no recurrent disease, xerostomia and esophageal strictures related to radiation requiring dilation procedures. Chronic dysphagia was noted and the patient was unable to open her mouth fully. She was treated for pneumonia and discharged.

Regular follow-ups in subsequent five years with multiple providers revealed worsening dysphagia and xerostomia to the point where she required an all liquid diet. She developed weight loss and PEG tube was placed. CT showed no evidence of metastases, stable postsurgical and post radiation changes in the neck without apparent adenopathy. Bronchoscopy showed friable mucosa in posterior pharynx and EGD revealed Barrett's esophagus. Workup for malignancy was negative and a swallow study showed discoordination of lower pharyngeal and upper esophageal musculature but no radiation induced stricture.

Five years after the initial encounter, she developed bilateral leg edema and difficulty breathing. Further workup revealed pericardial effusion and transudative plural effusion with negative cytology. However, positive ANA and anti- Ro antibody were found. Subsequent detailed review of her history of present illness revealed that “prior to her tonsillar carcinoma with chemotherapy/XRT, she reported longstanding history of dry eyes and dry mouth”, “her dysphagia has also been a longstanding symptom but mild prior to chemotherapy/XRT. She remembers have the feeling of food getting stuck in her esophagus” and “Raynaud's phenomena were going on for more than 20 years”. As a result, the diagnosis of the Sjogren’s syndrome, systemic sclerosis with limited skin findings, esophageal dysmotility, and Raynaud's phenomenon – CREST syndrome was established and treatment begun.

In conclusion, the clinical case demonstrates how repeated cognitive biases of premature closure and anchoring on the radiation as the cause of patients’ symptoms led to a delay in diagnosis and treatment. The two systems universal model of diagnostic reasoning provides a framework for understanding how these biases occur and how they can potentially be prevented (4).

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MINNESOTA POSTER FINALIST – Benjamin W Meyer

An Internist's Dilemma: Paraneoplasia vs. Primary Rheumatologic Disease

First Author: Benjamin Meyer, Elizabeth Goldsmith MD, Mumtaz Mustapha MD, University of Minnesota Medical Center

Introduction: Causes of persistent fever are a diagnostic challenge, and can be divided into three main categories: infectious, non-infectious inflammatory, and malignant. With similar biochemical underpinnings and nonspecific clinical findings, primary rheumatologic disease and paraneoplastic syndromes can be extremely difficult to differentiate.

Case Presentation: A 59 year old woman visiting from China presented with two weeks of high intermittent fevers, rigors, and arthralgias. She had no significant past medical history other than a lumbar fusion with unknown hardware in 2012.

On exam, she was found to have a fever to 39.3, swelling and tenderness of the left wrist and knee, 1+ tenosynovitis of MCPs bilaterally, PIP swelling of the right 3rd digit, and no tenderness over the lumbar spine. Remaining vitals along with cardiac, respiratory, abdominal, dermatologic, and neurologic examinations were unremarkable.

Laboratory studies revealed WBC of 17.6 k/uL (predominantly neutrophils), along with CRP of 158 mg/L, ESR of 96 mm/h, and ferritin of 2030 ng/mL. Blood cultures, infectious studies, and ENA panel were negative. CT scan of the chest, abdomen and pelvis showed a small lesion in the superior pole of the left kidney.

She was initially treated with broad-spectrum antibiotics, but fevers increased in frequency, migratory arthralgias persisted, an intermittent salmon-colored rash developed, and ferritin levels rose, peaking at over 14,000 ng/mL. The patient began 40 mg prednisone for a working diagnosis of adult Onset still disease (AOSD) with resolution of fever and arthralgias within one day. Given renal mass and suspicion for paraneoplastic process, MRI was pursued, but could not be obtained due to uncertainty about spinal hardware composition. CT with renal mass protocol revealed a lobulated, enhancing mass in the upper pole of the left kidney, compatible with renal cell carcinoma. She continued prednisone, remained afebrile, and symptomatically improved. Partial nephrectomy as an outpatient revealed renal cell carcinoma.

Discussion: There is little clinical evidence to differentiate between paraneoplastic syndrome and AOSD, as the syndromes may be similarly cytokine-mediated. Fever is nonspecific and is one of many protean presentations of paraneoplastic RCC. There are no definitive tests for AOSD and the diagnosis is based largely on clinical criteria. Ultimately, the decision to treat with steroids was made as the diagnostic process continued, in an effort to achieve symptomatic relief without impairing definitive diagnosis.

Conclusion: When a patient presents with fever of unknown origin and signs/symptoms suggesting a non-infectious etiology, it can be difficult to clinically distinguish primary rheumatologic disorders and paraneoplastic entities. CT imaging with appropriate protocols can be a valuable tool in evaluating for underlying malignancy. In any such work-up, malignancy should be on the differential, and diagnostic and therapeutic measures should be coordinated to allow symptomatic treatment for quality of life as the investigation proceeds.

MISSOURI POSTER FINALIST - Robert Harper

Autoimmune Hepatitis in a Patient with False Positive Viral Hepatitis Antibodies

First Author: Robert Harper, Natraj Katta MD, FACP

Introduction: We report a case of autoimmune hepatitis in a patient who presented with false positive herpes, hepatitis B, CMV, and EBV viral antibodies

Case Presentation: A 57 year old white female with a past medical history of psoriatic arthritis treated with methotrexate who presented with hepatic transaminitis and hyperbilirubinemia. She was diagnosed with psoriatic arthritis in October 2012 and started on methotrexate 15 mg weekly. Her LFT's were measured biweekly, then monthly with normal results. Her methotrexate was increased to 20 mg. Her transaminases were elevated at her next check, AST 159/ALT 289, and her methotrexate dose was cut in half. Two weeks later AST 311/ALT 505 and her methotrexate was stopped completely; recheck showed AST/ALT >1000 with a total bilirubin of 10.4. She reported fatigue, RUQ pain, dark urine, and pale stools, but denied nausea, vomiting, or diarrhea. She denied a history of IV drug use, STI, or hepatitis. Her physical exam was notable for mild RUQ pain, scleral icterus, and jaundice. Lab evaluation was significant for AST/ALT: 1104/1331, ALK: 172, total billirubin: 11.6, albumin: 2.8, PT/PTT/INR: 18.7/42.5/1.4. Quantitative IgG was elevated: 3783. Herpes 1/2 IgM, Hepatitis B IgM, EBV IgG, and CMV IgG were positive. FANA was positive: 1:1280 with speckled pattern, anti-dsDNA positive, ANCA was positive: 1:640, F-actin antibody was elevated: 94. MRCP showed cholelithiasis, gallbladder wall thickening, but no duct dilation or obstruction. Tranjugular liver biopsy was performed. Pathology showed brisk mixed portal and lobular inflammatory infiltrate composed of lymphocytes, numerous plasma cells, eosinophils, and polymorphonuclear cells. Stains for CMV, HSV, iron and alpha-1-antitrypsin were negative. The patient was diagnosed with autoimmune hepatitis type 1 based on serology and liver pathology. She was started on prednisone 40 mg per day. Her liver enzymes began to trend downwards and she was discharged on hospital day 9.

Discussion: This case illustrates the necessity of a thorough evaluation of acute liver injury. When the patient presented, drug-induced liver injury was suspected due to history of methotrexate use and symptom development concurrent with dosage increase. False positive viral hepatitis titers necessitated the workup of several viral etiologies of acute liver injury. Her initial evaluation included: MRCP, salicylate/acetaminophen levels, serum FANA, anti-F-actin, Quantitative IgG, hepatitis serology, HBV, CMV, and EBV serology. The first result was a positive Hepatitis B core IgM. The patient denied risk factors. Hepatitis B core and HBV DNA were ordered to confirm, which were negative. Her next positive results were elevated Quantitative IgG, positive anti-F-actin antibody, positive ds-DNA, and ANA, and positive CMV IgM. Autoimmune hepatitis became the leading diagnosis and transjugular liver biopsy was ordered. Positive HSV1/2 IgM and EBV IgG returned next. The patient was started on empiric acyclovir pending biopsy. Pathology results were consistent with autoimmune hepatitis with negative stains for viral hepatitis. The positive viral serological results were likely false positives in light of the significantly elevated quantitative immunoglobulins. The patient was started on prednisone with significant clinical improvement.

MISSOURI POSTER FINALIST - Erin Engelhardt

Hepatopulmonary Syndrome: Orthodeoxia in a patient with end-stage Liver Disease.

First Author: Erin Engelhardt, BA; Kevin Clary, MD

Introduction: Hepatopulmonary syndrome is a rare complication of cirrhosis characterized by the triad of liver pathology, oxygenation impairments, and intrapulmonary vascular dilatations (IPVDs). Recognizing hepatopulmonary syndrome in the cirrhotic with hypoxia is crucial for determining the need for transplant.

Case Presentation: A 64 year-old female presented to the ED with increasing shortness of breath. PMH was significant for cirrhosis and COPD. Vital signs showed tachycardia (111), tachypnea (25), hypotension (98/38), and hypoxemia (88% on room air). Physical exam revealed icteric sclera, spider nevi, bruising, digital clubbing, and a systolic murmur. Lungs were clear and abdomen was benign without ascites. Oxygen therapy improved her oxygen saturations, however she had orthodeoxia with a supine oxygen saturation of 94%, dropping to 83% while upright. ABG revealed pAO2 of 51 mmHg on room air, improving only to 74 mmHg on non-rebreather. A-a gradient was 597 mmHg. Chart review revealed normal prior PFTs with an isolated decrease in DLCO (effectively refuting her COPD diagnosis), and echocardiogram showing a late right to left shunt. CT demonstrated a varix between the portal vein and IVC, as well as disparities in pulmonary vasculature diameter of the lower lobes. She was diagnosed with hepatopulmonary syndrome and is currently awaiting liver transplant evaluation.

Discussion: In hepatopulmonary syndrome, liver dysfunction allows circulating vasodilators to increase pulmonary capillary diameters. These dilatations cause a Resultant hypoxemia can cause unique findings of orthodeoxia and platypnea due to increased gravity-dependent blood flow through the IPVDs while upright. Diagnostic criteria include oxygenation defect (pAO2 <80mmHg or A-a gradient >15 mmHg on room air), IPVDs, and liver disease. Definitive treatment is liver transplant. Increased awareness of hepatopulmonary syndrome causing hypoxemia in patients with advanced cirrhosis is crucial. Such severe oxygenation deficits can have significant multisystemic effects if not recognized and referred for early transplant.

NEPAL POSTER FINALIST - Rhisti Shrestha

Acute-onset Hemiparesis in an elderly man with a high grade Glioma

First Author: Rhisti Shrestha, Vijaya Raj Bhatt, Ritesh Prasad Shrestha, Nicole Shonka

Introduction: Sudden-onset hemiparesis in an elderly man is a common presenting symptom of stroke, which affects more than 700,000 Americans annually and is one of the leading causes of death. In addition to stroke, acute hemiparesis can also be the manifestations of other serious problems such as brain injury, encephalitis, demyelinating disorders, or brain tumors. We describe an uncommon cause.

Case Description: A 77-year-old man presented to the emergency department with complaints of acute onset left-sided hemiparesis, which lasted for less than an hour. Medical history was significant for isocitrate dehydrogenase 1 wild-type high grade glioma diagnosed approximately 3 months ago. He had undergone concurrent chemotherapy with temozolomide and intensity modulated radiation therapy. Ten days prior to the presentation, the patient had received first dose of bevacizumab for symptomatic progression. Examination revealed mild hemiparesis and numbness of left upper and lower extremities. Magnetic resonance imaging of brain showed stable T2 hyperintense lesions involving the right parieto-occipital cortex and right temporo-occipital cortex, consistent with the history of glioma. A possibility of transient ischemic attack was considered. Two hours after the admission, the patient was found to have continuous involuntary rhythmic contraction of his left upper extremity without any change in mental status. An electroencephalogram (EEG) confirmed the diagnosis of simple partial status epilepticus with Todd's paresis. The patient received intravenous lorazepam and levetiracetam and was placed on continuous EEG monitoring. Over the next few days, antiepileptic regimen was optimized. The patient had resolution of the seizures as well as recovery of the left-sided muscle strength and sensation, and he was discharged to rehabilitation facility on a stable condition.

Discussion: Simple partial status epilepticus is rare with an estimated prevalence of less than 1 per million. In adults, it is often the results of cerebrovascular diseases or neoplastic conditions. It can manifest with focal neurological deficit such as paresis or aphasia, with preserved mental status. The motor manifestation may be subtle, intermittent or even absent in case of a sensory, autonomic or psychic simple partial status epilepticus. High index of suspicion is required for correct diagnosis and timely initiation of therapy. This case illustrates the subtle nature of the simple partial status epilepticus necessitating an EEG for diagnosis, and emphasizes that Todd's paralysis should be considered in the differential diagnosis of focal neurological deficit particularly in patients with structural brain lesions or injury.

NEPAL POSTER FINALIST - Sumesh Khanal, MBBS

Treatment-related acute non-lymphocytic leukemia in a patient with chronic lymphocytic leukemia

First Author: Sumesh Khanal, Vijaya Raj Bhatt, Sumit Dahal, Rajesh Shrestha, Apar Kishor Ganti

Introduction: Chronic lymphocytic leukemia (CLL) is well known to transform to a higher grade lymphoma (Richter's transformation) or pro-lymphocytic leukemia, however, transformation to an acute non-lymphocytic leukemia (AML) is rare.

Case Description: A 78-year-old woman was referred to our institution for acute-onset of fever, dyspnea, epigastric discomfort, one episode of coffee-ground emesis and multiple skin bruises. Past medical history was significant for CLL diagnosed 6 years ago, which was treated with 6 cycles of fludarabine and rituximab 4 years after the diagnosis followed by 6 cycles of bendamustine and rituximab at relapse 6 months ago. Examination revealed multiple ecchymoses involving bilateral upper extremities and both thighs. There were no palpable peripheral lymph nodes or hepatosplenomegaly. Laboratory evaluation revealed white blood count of 116900µ/L, hemoglobin of 10.1 gm/dl, platelets count of 45000µ/L, prothrombin time of 30 seconds, *partial thromboplastin time* of 55 seconds, fibrinogen of <60 mg/dl, and d-dimer of >4 mcg/ml (normal 0.2 - 0.4 mcg/mL). The coagulation profile was consistent with disseminated intravascular coagulation (DIC). Computed tomography scan of chest, abdomen and pelvis showed extensive mediastinal, hilar, periesophageal, and retrocrural lymphadenopathy. A possibility of "Richter's transformation" was considered. Peripheral blood smear revealed circulating blasts (84%) and occasional schistocytes. A bone marrow biopsy revealed markedly hypercellular bone marrow (80%) with 95% blasts and promonocytes. Blasts were positive for nonspecific esterase and myeloperoxidase, and negative for Sudan black and specific esterase. Cytogenetics and *fluorescent in situ hybridization* revealed 46, XX, t(10;19)(q22;q13.1). A small residual CLL cell population was also present. A diagnosis of treatment-related acute monoblastic leukemia (AML-M5) and persistent CLL was made. In addition to the supportive care including transfusion of fresh frozen plasma, cryoprecipitate and platelet for DIC, the patient received leukapheresis and hydroxyurea followed by chemotherapy with decitabine. She was subsequently discharged for continuation of further cycles of decitabine as outpatient.

Discussion: This case highlights the rare possibility of the development of a myeloid hematologic malignancy in the background of a lymphoid disease. Fludarabine, which is known to predispose to treatment-related AML, was the likely causative agent for the development of AML in this patient. DIC, common in acute promyelocytic leukemia, is uncommon in other AMLs. The presence of symptomatic DIC in this patient may reflect the aggressive nature of treatment-related AML developing in a patient with CLL. A delay in the diagnosis and therapy of such condition can result in early death, bleeding or other complications. Misdiagnosis is likely because anemia and thrombocytopenia frequently represent disease progression in CLL. Hence, knowledge of this rare transformation is the key to timely and accurate diagnosis.

NEPAL POSTER FINALIST - CLINICAL VIGNETTE Ritesh Prasad Shrestha, MBBS

Leptomeningeal carcinomatosis in epidermal growth factor receptor-mutant non-small cell lung cancer

First Author: Ritesh Prasad Shrestha, MBBS, Vijaya Raj Bhatt, MBBS, Rhisti Shrestha, Alissa S. Marr, MD

Introduction Leptomeningeal carcinomatosis occurs in about 5% of non-small cell lung cancer (NSCLC) patients and portends a poor prognosis. Therapeutic options for leptomeningeal carcinomatosis are few and often limited to palliative craniospinal irradiation or intrathecal chemotherapy. Recently, the use of epidermal growth factor receptor (EGFR) tyrosine kinase inhibitors such as gefitinib and erlotinib has been shown to improve performance status and survival in EGFR-mutant NSCLC with leptomeningeal carcinomatosis. Currently, in most of the cancer centers, EGFR mutation is tested routinely in female patients with adenocarcinoma, who are never or light smokers, since this is the group most likely to harbor a mutation. This may prevent the use of tyrosine kinase inhibitors in men and smokers with leptomeningeal carcinomatosis.

Case Report A 57-year-old man, 40 pack-year smoker, with newly diagnosed metastatic lung adenocarcinoma presented with a 3-week history of gradually progressive weakness of both legs and paresthesia of left foot leading to frequent falls and inability to ambulate. He had also developed difficulty in swallowing and weight loss. Examination revealed numbness of left side of face and left leg as well as paraparesis with loss of deep tendon reflexes at bilateral knee and ankle joints. Modified barium swallow evaluation showed pharyngeal dysphagia and aspiration. Magnetic resonance imaging of brain as well as cervical, thoracic and lumbar spine showed extensive leptomeningeal disease involving the brain and entire spine. The patient was started on oral dexamethasone and palliative craniospinal radiation. An epidermal growth factor receptor mutation analysis showed exon 21 L858R mutation. Although he was planned to receive erlotinib, hospital course was complicated by progressive generalized weakness, aspiration pneumonia and worsening hypoxia. The patient was transitioned to hospice care and died soon thereafter.

Discussion Few studies have indicated the possibility that patients with NSCLC who present with brain metastasis at diagnosis are more likely to harbor EGFR mutations. In one study among NSCLC patients with leptomeningeal carcinomatosis, more than 90% of the patients had adenocarcinoma and approximately 70% had EGFR mutation. Although EGFR mutation is seen more frequently in female never-smokers, in patients with leptomeningeal carcinomatosis, as highlighted by this case, EGFR mutation can be positive and should be tested even in male with significant smoking history.

NEVADA POSTER FINALIST - Joshua Gabel

Hepatocellular Carcinoma in an HIV/HCV Co-Infected Patient: A Call for Increased Surveillance

First Author: Joshua Gabel, Dr. Ranjit Makar, Dr. Matthew Schreiber

Introduction: Hepatocellular carcinoma (HCC) was a rare phenomenon in patients with HIV and Hepatitis C Virus (HCV) co-infection prior to the advent of HAART therapy, but has since joined opportunistic pathogens as a major cause of morbidity and mortality in this population. Persons with HIV/HCV co-infection are particularly susceptible to HCC given the tendency for HCV infections to progress to a chronic carrier state, impaired cellular immunity to limit viral replication secondary to HIV infection, and a stimulatory effect of HIV upon HCV via transforming growth factor (TGF-ß1). The synergistic effect leads to a substantial increase in the risk of oncogensis.

Case Presentation: A 62-year-old African American male with a history of HIV, on treatment with HAART for 25 years, presented with diffuse debilitating abdominal pain of three weeks duration. Physical exam findings were notable for an abdomen tender to light palpation diffusely, but most prominent in the right upper quadrant. There were no appreciated stigmata of chronic liver disease. Serum lipase was unremarkable and liver function tests showed slight elevations in AST (88 U/L) and ALT (127 U/L). Albumin, total bilirubin, and INR were within normal limits. A viral hepatitis panel showed reactive antibodies to Hepatitis C Virus (HCV) and a titer of 186,000 IU/mL. CD4 count was 142 cells/mm3, but HIV viral load was 93 Copies/mL, indicating appropriate virologic suppression. Serum alpha-fetoprotein (AFP) was 8.4 ng/mL (normal). Triphasic CT of the liver was performed to further characterize an incidental liver lesion found during evaluation for an acute abdomen. Imaging showed a 2.9 x 2.6 cm hepatic lesion in the left hepatic lobe that demonstrated arterial hypervascularity and moderate venous washout. Hepatocellular carcinoma was subsequently confirmed by biopsy.

Discussion: The American Association for the Study of Liver Diseases (AASLD) surveillance guidelines for HCC categorize HIV/HCV co-infected patients within the same risk category as HCV mono-infected patients, requiring the presence of cirrhosis to recommend serial hepatic ultrasonography. Whereas HCC occurs almost exclusively with advanced hepatic fibrosis or cirrhosis in HCV mono-infected individuals, 1/4 of patients with HIV/HCV co-infection are not cirrhotic at time of diagnosis. HIV-infected patients are more often symptomatic (e.g. abdominal pain) at the time of initial HCC diagnosis than non-HIV-infected patients, but had more advanced tumor staging and worse prognosis compared to asymptomatic patients. This case demonstrated the importance of maintaining a high index of suspicion for HCC in HIV/HCV co-infected patients as (1) laboratory findings suggestive of risk (e.g. hepatic decompensation) are less likely to be present compared to mono-infected patients; and, (2) clinical symptoms are not adequate to identify individuals early enough to prevent late-stage diagnosis. Patients with HIV/HCV co-infection may show great benefit from enhanced surveillance strategies, including serial hepatic ultrasonography, even in the absence of confirmed cirrhosis, given improved prognosis with early detection.

NEW YORK POSTER FINALIST - Daniel Jipescu

Multiple Myeloma presenting as CVA secondary to Marantic Endocarditis

First Author: Daniel Jipescu, OMSII Brett Grobman, OMSII Craig Grobman, DO

Learning objective: Recognize the importance of completely working up CVA.

Case: A 63-year-old male patient with a history of diabetes, hyperlipidemia and coronary artery disease presented to ER with right-sided weakness and aphasia. On MRI several acute focal infarctions within portions of the left cerebral hemisphere were noted. Suspecting cardioembolic event, a transesophageal echocardiography (TEE) was performed. An aortic valve vegetation was found, which was thought to have most likely led to his thromboembolic event. The patient underwent aortic valve replacement (27 mm Edwards Perimount bovine pericardial aortic valve prosthesis) as well as coronary artery bypass grafting surgery due to multi vessel obstructive coronary artery disease (CAD) found on cardiac angiogram. The surgical pathology of the aortic valve revealed aortic valve nodules that were fragments of blood clot and calcified material. The patient recovered uneventfully and followed up in the clinic. Based on the pathology report and lack of infectious findings, it was thought that the patient had marantic endocarditis due to malignancy or autoimmune disease. The workup revealed a very high erythrocyte sedimentation rate and elevated protein levels. Ultimately, he was found to have on serum protein electrophoresis (SPEP) and immunofixation electrophoresis (IFE) an IgG paraprotein with kappa light chains. Further workup revealed a solitary focal lytic appearing lesion in L2, positive anti nuclear antibody titer, negative hypercoagulable workup. The patient was referred to hematology where further diagnostic procedures were performed including bone marrow biopsy. After bone marrow biopsy, 24-hour urine for Bence Jones protein and a skeletal survey, the diagnosis of multiple myeloma was made. The aortic valve pathology was retrospectively stained for light chains and was found to be positive. After completing chemotherapy, the patient is currently in remission and has undergone stem cell harvest for possible future need.

Discussion: The complete work-up of a patient with CVA secondary to marantic endocarditis could reveal malignancy, systemic lupus erythematous, antiphospholipid syndrome, or other diseases that manifest hypercoagulability. Clinically, it resembles bacterial endocarditis

NEW YORK POSTER FINALIST - Kelly Lyons

A Rare Presentation of Fusobacterium necrophorum Bacteremia

First Author: Kelly A. Lyons (MS-IV), Christa R. Fistler, MD, Lauren M. Tavani PA-C Department of Medicine, Christiana Care Health System, Newark, DE

Introduction: *Fusobacterium necrophorum* is an anaerobic gram-negative rod associated with bacteremia originating from the oral mucosa and gastrointestinal tract leading to Lemierre's disease, endocarditis, and cases of splenic/liver abscesses. Young individuals with no history of medical comorbidities in particular are susceptible to *F. necrophorum* infection. Cases of *F. necrophorum* endocarditis, specifically tricuspid valve endocarditis, are rare and as such pose an interesting diagnostic and management challenge.

Case Description: A 23 year-old Hispanic Spanish speaking male with a past medical history significant for intravenous drug use, presented to the emergency room with the complaint of fever, chills, nausea, and emesis for the past week. On exam, he was ill-appearing, tachycardic and tachypneic with associated left sided pleuritic chest pain, left upper quadrant tenderness, hepatomegaly, scleral icterus, and an open ulcerated wound on his right ankle. Initial laboratory findings showed a WBC count 21,900, platelets 21,000, aspartate transaminase 90, and alanine aminotransferase 116. A CXR showed nodular opacities in the right lung suspicious for septic emboli versus at the time atypical diseases such as *Mycobacterium tuberculosis* considering the patient's recent travel from Mexico. Given the patient's history of illicit drug use, suspicion for infective endocarditis was confirmed with a bedside Transesophageal echocardiogram demonstrating a tricuspid valve vegetation. CT of the chest, abdomen, and pelvis showed multiple hepatic abscesses in the right hepatic lobe, moderate splenomegaly, and further confirmed multiple bilateral pulmonary nodules. Following blood cultures, the patient was started on empiric antibiotic coverage with Vancomycin, Metronidazole, Levofloxacin, and Cefepime. During the course of the patient's hospital stay; he became hypotensive requiring pressor support, was intubated secondary to respiratory distress, underwent CT guided drainage for the hepatic abscesses, had a diagnostic bronchoscopy, and received further CXRs and diagnostic imaging. Initial blood cultures drawn on presentation demonstrated growth of *F. necrophorum*; all additional follow up cultures after treatment (blood, respiratory, hepatic fluid) were negative. Dental consult was negative for any signs of oral erythema and a panorex film did not demonstrate any oral lesions related to possible origins for *F. necrophorum*. Antibiotics were de-escalated to Ampicillin-Sulbactam and Metronidazole after sensitization was received and the patient was stabilized from the MICU.

Discussion: This case illustrates a rare presentation of tricuspid valve endocarditis caused by *F. necrophorum* bacteremia with the additional findings of hepatic abscesses and septic pulmonary emboli. Prior reported cases of *F. necrophorum* endocarditis have frequently involved the aortic and mitral valves; thus our case serves as an example of the clinical presentation seen with the rare involvement of the tricuspid valve.

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NEW YORK POSTER FINALIST - David M Haughey

PRES After Renal Transplantation: A Simple Solution for a Complicated Patient

First Author: Haughey D, Bhardwaj R MD, Narsipur S MD

Posterior reversible leukoencephalopathy syndrome (PRES) is characterized by acute neurologic dysfunction coupled with characteristic findings on brain imaging. PRES occurs in hypertensive emergency, eclampsia and as a neurotoxic effect of immunosuppressive agents. While overwhelmingly reversible without residual deficits when promptly recognized, vague symptomatology may delay diagnosis.

A 50 year-old male was air-lifted to this institution due to multiple episodes of seizure. He had undergone cadaveric renal transplant five days prior for end-stage renal disease secondary to focal segmental glomerulosclerosis. He did not have a history of seizure disorder or alcoholism. The transplantation was without complication; post-transplant urine output was adequate and the patient remained normotensive. Discharge medications included prednisone, tacrolimus, mycophenolate, acyclovir, trimethoprim-sulfamethoxazole, atenolol and enalapril. On the day of presentation he experienced severe headache, blurred vision and tonic-clonic seizure-like activity. In the Emergency Department, IV lorazepam and intubation led to cessation of seizure activity. The patient was afebrile with systolic blood pressure in the 170s, heart rate approximately 100 and oxygen saturation 100% while intubated. Neurologic exam was limited by sedation, although no focal deficits were evident. Labs evidenced BUN and creatinine of 23 and 1.0 mg/dL, the remainder of the BMP was unremarkable. CBC exhibited no leukocytosis; hemoglobin and hematocrit were 9.7 and 28.0 g/dL (unchanged from baseline). Lumbar puncture revealed normal opening pressure, negative Gram stain, benign CSF analysis and India ink preparation. CT and CTA of the head and neck did not evidence acute pathology. MRI of the brain revealed prominent bilateral enhancing parietaloccipital lesions on FLAIR sequence.

Tacrolimus was held, all other medications were continued. Levetiracetam was begun for seizure prophylaxis. The patient remained afebrile and normotensive and was extubated on the second hospital day. Repeat tacrolimus level was 5.0 µg/L, a concentration not typically associated with toxicity. The patient reported no neurologic symptoms and was discharged home on the third hospital day after a full recovery.

While the outcome of PRES is typically benign, delayed diagnosis may lead to permanent neurologic deficits and misdiagnosis can be lethal. Definitive management involves removal of the offending agent or treatment of the underlying etiology. Given appropriate neuroimaging findings, a clinical picture of headache, visual abnormalities, altered mentation and seizures is sufficient to prompt empiric discontinuation of agents known to cause PRES. Calcineurin inhibitors such as tacrolimus, even at "normal" serum levels, are known to cause PRES and in this patient discontinuation led to complete clinical resolution.

NORTH CAROLINA POSTER FINALIST - Mark Dakkak

Demystifying Hemophagocytic Lymphohistiocytosis

First Author: Mark Dakkak Second Author: Cecily Peterson, MD, FACP

A 26 year old woman with HIV on HAART presented to an outside hospital with fevers, chills, abdominal pain and headache. Initial workup included negative urine culture, head CT and lumbar puncture. Empiric antibiotics yielded no improvement. She presented to us 3 days later. Additional symptoms included nausea, vomiting, bilateral ear pain, non-productive cough, diffuse joint pain, and dysuria. She denied dyspnea, chest pain, rash, hematuria, or hematochezia. Prior opportunistic infections included esophageal candidiasis, whipworm and tuberculosis, all successfully treated.

Vitals upon admission were blood pressure 120/75 mmHg, heart-rate 127 beats/min, respiratory rate 16/min, and temperature 104 F. She was diaphoretic and in mild distress. Right lung base crackles were audible. Tympanic membranes were normal and no tonsillar erythema or candidiasis was present. Lymphadenopathy was appreciated in the anterior cervical chain. There was no nuchal rigidity or rash. Splenomegaly and diffuse abdominal tenderness were appreciated.

Chest radiograph showed mild diffuse reticular opacities with trace left pleural effusion and abdominal CT confirmed splenomegaly. Labs included AST 281 U/L, ALT 272 U/L, hemoglobin 8.4 g/dL, platelet count 34 x 10^9/L, CD4 count 193, HIV-1 viral load 90 copies/mL and a negative pregnancy test. Lactate dehydrogenase was 263 U/L, haptoglobin 6 mg/dL, and Ferritin was 5,131 ng/mL. Tamiflu, Vancomycin and Meropenem were started empirically for treatment of sepsis.

Over the next few days, the patient had relapsing fevers, episodic hypotension, tachycardia, and worsening hemolytic anemia and thrombocytopenia requiring transfusions. Extensive infectious workup was negative except for highly elevated Ebstein-Barr Virus (EBV) viral load of 340 genome copies/uL. EBV IgG and EBNA antibodies were positive, but IgM antibodies were negative. Bone marrow biopsy failed to show hemophagocytosis. Triglycerides were 578 mg/dL and soluble IL-2 receptor level 20,383 units/mL (elevated). She met 6 diagnostic criteria for Hemophagocytic lymphohistiocytosis (HLH). Antibiotics were discontinued and she was started on disease-specific therapy.

HLH is a rare disorder with pathologic, clinical, and laboratory diagnostic criteria: pathologic criteria include hemophagocytosis in bone marrow, spleen, or lymph node biopsy; clinical criteria include fever and splenomegaly; laboratory criteria include cytopenias affecting at least two peripheral blood lineages, hypertriglyceridemia or hypofibrinogenemia, elevated ferritin, low Natural Killer cell activity, and elevated soluble IL-2 receptor. A diagnosis can be made with five of eight criteria. The absence of hemophagocytosis should not delay treatment.

EBV is the most common trigger of acquired HLH and presents in a characteristic fashion. EBV viral load can be significantly higher in the setting of HLH than with infectious mononucleosis. Antibody tests often reveal chronic or reactivated infection. EBV historically portended the worst prognosis of all acquired HLH. After four weeks of appropriate therapy, our patient's condition relapsed and the disease proved fatal.

OHIO POSTER FINALIST - Emily Bowers

Men1 Syndrome presenting as an anterior mediastinal mass in a healthy young man

First Author: Emily Bowers, Faculty Mentors: John C. Morris, MD, LeAnn Coberly, MD

Case Presentation: A previously healthy 31 year-old male smoker with a history of kidney stones presented with new onset chest pain. On examination the patient was also noted to have numerous prominent abdominal striae. Chest X-ray revealed a 7 cm anterior mediastinal mass. Laboratories revealed elevated serum calcium of 11.5 mg/dl and an increased parathyroid hormone (PTH) level of 143.7 pg/dl (normal, 10-60 pg/dl) consistent with primary hyperparathyroidism. Biopsy of the mass revealed thymic neuroendocrine carcinoma (carcinoid). The patient underwent thymectomy and post-operative radiation therapy. A right parathyroidectomy was performed which showed diffuse hyperplasia. Cushing's syndrome due to ectopic adrenocorticotrophic hormone (ACTH) production by the thymic carcinoid or a pituitary adenoma was suspected; however, ACTH and Cortisol levels were normal. Genotype analysis was positive for a mutation in the menin gene, confirming the diagnosis of multiple endocrine neoplasia type 1 (MEN1) syndrome. On further evaluation, other than a mildly elevated serum vasoactive intestinal peptide (VIP) and pancreatic polypeptide (PP) levels, there was no evidence of hormonal hypersecretion.

Discussion: Thymic neuroendocrine tumors (NETs) are extremely rare aggressive neoplasms. Although most are sporadic, up to 25% are associated with the hereditary syndrome, MEN1. The majority of the reported cases of MEN1-related thymic NETs have been in middle-age men who were smokers, as in our patient. MEN1 is an autosomal dominant disorder of variable penetrance characterized by hyperparathyroidism, anterior pituitary tumors, enteropancreatic tumors and other neuroendocrine tumors. Hyperparathyroidism, most commonly due to hyperplasia, is the most frequent early manifestation of MEN1 in the majority of patients. Despite a negative family history, the MEN1 syndrome was suspected in our patient due to the presence of parathyroid hyperplasia along with thymic neuroendocrine carcinoma. The diagnosis was confirmed by the detection of a germline mutation in the menin gene. Recognizing the association between thymic NETs and MEN1 syndrome was critical for this patient's management. The patient can now undergo appropriate screening for the individual manifestations of MEN1, and his family members can be tested for the MEN1 mutation and screened as well. Likewise, it is important for those with an already established diagnosis of MEN1 to undergo screening for thymic NETs because of their malignant potential and poor prognosis. Some reports have emphasized the use of regular chest imaging including magnetic resonance imaging or computerized tomography to screen for mediastinal tumors in MEN1 patients. Prophylactic thymectomy at the time of parathyroidectomy is generally recommended for MEN1 patients, especially male smokers, although its role continues to be debated.

OHIO POSTER FINALIST - Sung In Kim

Asymptomatic Ascending Aortic Dissection in Pregnancy

First Author: Sung In Kim Mentors: Angel Lopez-Candales, MD and LeAnn Coberly, MD

Case Presentation: A 38 year old G5P1 African American female at 36 weeks gestation, with a history of preeclampsia during previous pregnancies, was found to have BP 209/119 mmHg during her OB visit and was admitted for hypertension management and work-up. She denied pain and presence of symptoms, including syncope, headache, visual changes, and epigastric pain. Patient had a history of poorly managed primary hypertension and mild renal insufficiency, but could not provide any family history due to her adoptive status. Vital signs were otherwise within normal range and no murmurs were appreciated during the cardiac exam. Labs were unremarkable without proteinuria. On TTE, we were surprised to find a dilated aortic root with a linear density in the proximal ascending aorta suggestive of an intimal flap. CTA subsequently confirmed the Stanford type A dissection.

Patient underwent an emergent cesarean section and was subsequently followed in the hospital for progression of the dissection. Given that she had recently undergone surgery and that her dissection remained stable without valvular or coronary involvement, it was decided that she would undergo a delayed repair. Patient underwent surgery four months later and recovered without immediate complications.

Discussion: Aortic dissection is rare in women younger than 40 years of age, but an estimated 50% of cases occur during pregnancy. Furthermore, over 50% of reported cases in pregnancy are associated with Marfan's syndrome. Asymptomatic aortic dissection is also rare and has been reported in only 6.4% of patients among 977 patients in the International Registry of Acute Aortic Dissection. Asymptomatic dissetions were associated with significantly higher in-hospital mortality rate (33% versus 23%). Past medical history of diabetes, aortic aneurysm, or cardiovascular surgery is more often elicited in patients who present with painless dissection.

Pregnancy is associated with physiologic expansion of the plasma volume and increased cardiac output, which put women at risk for pre-eclampsia and exacerbation of chronic hypertension. Histopathologic changes have been reported in the aortic media of pregnant women without connective tissue disease, including hypertrophy and hyperplasia of smooth muscle cells, decreased elasticity and acid mucopolysaccharide content, and fragmentation of reticular fiber. When aortic root enlargement is found during pregnancy in a hemodynamically stable patient, regular surveillance with strict blood pressure control is undertaken and consideration is given to pre-term elective cesarean section with delayed repair.

In contrast to our case, aortic dissection in pregnancy is often a catastrophic event for both the mother and the fetus. Delayed diagnosis is not uncommon among pregnant women, as cases of chest pain and elevated BP are often misdiagnosed. Although rare, careful history taking with special attention to family history, drug use, and cardiovascular history may prove critical for a timely diagnosis of aortic dissection.

OHIO POSTER FINALIST - Marilyn Wickenheiser

Tuberculosis—The great mimicker

First Author: Marilyn Wickenheiser

Introduction: This is the case of a patient presenting with a unilateral renal mass and weight loss.

Case Description: The patient is a 25-year-old male who presented with a one-month history of increasing left flank pain and 30 pound unintentional weight loss. The patient presented to the emergency department 3 times in the month prior to admission with complaints of throbbing left flank pain. He was discharged with diagnoses of musculoskeletal injury and pyelonephritis. At this visit, the pain was so intense it prevented him from ambulating. On review of systems the patient endorsed anorexia, fatigue, and night sweats. He denied hematuria, dysuria, and polyuria.

A thorough history revealed remote history of pulmonary tuberculosis at age 13. The patient completed multi-drug therapy for nine months with no recurrence. Social history revealed a 5 pack-year history of smoking.

In the emergency department, the patient was febrile. Physical exam exhibited left-sided CVA tenderness and tenderness to palpation with guarding in the left abdominal quadrants. Labs indicated elevated erythrocyte sedimentation rate and C-reactive protein. Complete blood count, renal and liver function tests were within normal limits. Urinalysis showed no red or white blood cells. CT demonstrated a new heterogeneous left renal mass extending into the psoas muscle, most concerning for malignancy. Abscess and tubercular involvement could not be excluded, but were felt to be less likely.

Renal biopsy showed non-necrotizing granulomas with no evidence of malignancy. Acid-fast stain of the specimen was positive for mycobacterium. Blood and urine cultures were collected for 3 days for antibiotic sensitivities. Chest X-ray and a chest CT were performed, and because both were negative for pulmonary involvement, respiratory isolation was not required. The patient was started on isoniazid, pyrazinamide, rifampin, and ethambutol quadruple drug therapy.

Discussion: Tuberculosis classically presents with pulmonary involvement, however it is important to be aware of extra-pulmonary manifestations. Renal tuberculosis is the second most common extra-pulmonary manifestation after peripheral lymphadenopathy. Tuberculosis is known as the great mimicker, and in the kidney it presents under the disguise of various diagnoses. It can present with symptoms of nephrolithiasis or pyelonephritis including renal colic, pyuria, and hematuria. Additionally, on imaging it can resemble hydronephrosis or renal abscess. Renal TB can mimic renal adenocarcinoma, as heterogeneous renal mass with constitutional symptoms. Renal tuberculosis should be included in the differential diagnosis of renal lesions in patients with exposure to or remote history of tuberculosis. Unfortunately for this patient, the limitations of non-invasive testing as well as low suspicion led to delay in appropriate diagnosis. Increased awareness of the various presentations of tuberculosis will lead to more timely diagnosis and treatment as well as fewer unnecessary tests and emergency room visits.

OHIO POSTER FINALIST - Narayana Sarma V Singam

Optimizing heart failure management: Catheter ablation in a patient with frequent premature ventricle complexes (PVCs) with Non-Compaction Cardiomyopathy

First Author: Narayana Sarma V Singam Co author: Navneet Lather MD, MPH, Jitender Munjal, MD, Alexandru Costea MD

Introduction: High burden of PVCs can cause deterioration of heart function in patients with structurally normal hearts. However, high burden of PVCs may further deteriorate clinical status and heart function in patients with structurally abnormal hearts. In these patients, every possible treatment modality may be used to reduce the likelihood of further deterioration.

Case Description: A 66 year old Caucasian woman with Ehler-Danlos Syndrome (EDS), severe Osteoporosis, COPD, and Dyslipidemia presented with retrosternal chest discomfort and dyspnea on exertion suggestive of angina pectoris. Her physical examination and EKG were unremarkable. Myocardial perfusion imaging showed reversible defects with a left ventricular ejection fraction (LVEF) of 39%. However, her coronary angiogram showed normal arteries. Interestingly, the Transthoracic Echocardiogram (TTE) revealed apical myocardial thickening and significant trabeculations in inferolateral and inferior apical walls suggestive of non-compaction cardiomyopathy (NCCM). She underwent Cardiac Magnetic Resonance imaging that confirmed the diagnosis.

She was placed on standard heart failure (HF) medications. However, despite optimal medical management for 4-6 months, her New York Heart Association class did not improve. A cardioverter-defibrilator was implanted for primary prevention of sudden cardiac death. Her one month device interrogation revealed a high burden of unifocal PVC that exceeded 20% of her normal sinus beats. Current data suggests that a high PVC burden decreases ejection fraction (EF) while a catheter ablation procedure may successfully improve EF. The patient underwent successful ablation of the PVC; interestingly, the focus was located at the base of the postero-lateral papillary muscle, deep into one of the noncompaction crevasses as visualized on the intracardiac echocardiography. At one month follow up, she reported significant improvement in her clinic symptoms. She will undergo repeat echocardiograms at 6-9 months to reassess LVEF.

Discussion: NCCM is an autosomal dominant disorder with prevalence of 0.014% in patients referred to cardiology clinic. Symptoms are nonspecific and typically correlate with severity of HF. EKG can be entirely unremarkable. Diagnosis is established with TTE showing a thickened apex with prominent trabeculae; apical surfaces also have a thick noncompacted endocardial layer and a thin compacted epicardial layer. Treatment consists of standard medical management directed to optimize systolic function. In our case, we decided to proceed with catheter ablation. However, the procedure is not without risk in this patient population due to a thin left ventricular wall. Ablation of ventricular arrhythmias in the NCCM population has not been reported; this procedure was beneficial in our patient as the PVC burden was reduced significantly with marked improvement in symptoms, while the likelihood for EF improvement was maximized.

Even though the patient has a progressive non-reversible congenital cardiomyopathy, any possible risk factor that can further deteriorate heart function should not be overlooked and treated optimally.

OHIO POSTER FINALIST - Michelle A Torbeck

Nitric Oxide: An Unusual Clinical Response in a Patient with Severe Hepatopulmonary Syndrom

First Author: Michelle Torbeck (student member) and Jean M. Elwing, MD, FCCP. University of Cincinnati Academic Medical Center, Cincinnati, Ohio

Introduction: Hepatopulmonary syndrome (HPS) is believed to result from the over production of nitric oxide leading to pulmonary capillary dilatations and intrapulmonary shunting with resultant hypoxemia. Here we report a patient with refractory hypoxemia who had documented improvement in response to nitric oxide inhalation on multiple occasions.

Case presentation: A 61-year-old female with end-stage liver disease (ESLD) secondary to nonalcoholic steatosis (NASH) and complicated by severe HPS developed acute worsening of chronic hypoxemia and respiratory failure following orthotopic liver transplant. Treatment with methylene blue was unsuccessful. Surprisingly, nitric oxide dramatically improved her ability to oxygenate. By her 6th postoperative day, she was liberated from mechanical ventilation and transitioned to high flow nasal cannula.

Of note, her pre-operative oxygen requirement was approximately 6 liters, which maintained her oxygen saturations in the range of 85% to 90%. After a prolonged hospitalization and short-term rehabilitation, she was discharged home on 4 liters supplement oxygen with saturations greater than 90%. Since the initial hypoxic event that responded to nitric oxide, she developed two subsequent episodes of acute worsening of her hypoxemia requiring ICU admission and nitric oxide inhalation for rescue.

Discussion: Hepatopulmonary syndrome is diagnosed when the following three findings are present: liver disease, pulmonary vascular dilatations and impaired oxygenation. The pathogenesis of HPS is controversial. Nitric oxide vascular effects in the form of pulmonary capillary dilatations is a proposed mechanism. The level of severity of HPS is based on the PaO_2 at rest, breathing ambient air, with a PaO_2 < 50 mmHg being the most severe. Currently, no effective medical therapies for the HPS exist. Liver transplantation is the only successful treatment.

Methylene Blue blocks the nitric oxide cascade by interfering with guanylate cyclase and attenuating vasodilation within the lung. In clinical practice, it has been inconsistently effective in treating HPS.

Given the above discussion, it appears counterintuitive to treat HPS with nitric oxide. In fact, there are no reports of its use to treat HPS in adults. Normal physiology dictates that a healthy lung will undergo hypoxic vasoconstriction in order to shunt the blood to the alveoli with higher oxygen content. In the setting of HPS, hypoxic vasoconstriction may actually cause more blood flow to the dilated capillaries, which likely are not governed by the same hypoxic mechanisms. We propose nitric oxide therapy benefited this patient by improving ventilation/perfusion matching in the lung unaffected by HPS and thus improved her oxygenation.

OHIO POSTER FINALIST - An-Kwok Ian Wong

Antiphospholipid Syndrome causing Pulmonary Capillaritis and Chronic, Non-massive Diffuse Alveolar Haemorrhage

First Author: An-Kwok Ian Wong, Clifford Packer

Diffuse alveolar haemorrhage (DAH) is a rare disorder characterized by bleeding into the alveolar space. Causes can include anticoagulation, autoimmune processes, AAA, and CHF. Pulmonary antiphospholipid syndrome (PAPS) is an extremely rare cause of DAH. Diagnosis and treatment of DAH and PAPS can be challenging.

A 75 year-old African American was admitted from the emergency room for a two month history of chronic haemoptysis. His past medical history was significant for four-vessel CABG, sick sinus syndrome with pacemaker, CHF, atrial fibrillation (CHADS-2-Vasc score: 5) treated with warfarin and aspirin for 17 years, CKD, and a stable AAA. In addition to the hemoptysis, he had recently developed recurrent epistaxis which was controlled with cautery. His family history was significant for a sister with recently-diagnosed sarcoidosis who also presented with haemoptysis. His social history is significant for a remote history of cocaine abuse.

On admission, we discontinued all medications known to cause or worsen DAH (aspirin, warfarin), without remission of symptoms. CBC, RFP, and coagulation studies were stable and within normal limits. Chest CT on admission revealed ground-glass densities bilaterally with a "crazy paving appearance" that was not present on chest CTs prior to the onset of symptoms. Bronchoscopy with serial lavage confirmed DAH, ruling out gross bronchial malignancy and obvious trauma. TTE showed stable LV dysfunction with EF 50-55%. Initial rheumatologic laboratory studies revealed a low positive P-ANCA (1:8) but negative MPO-ANCA, ANA, and cryoglobulins. Repeat bronchoscopy revealed mucosa too friable to biopsy. VATS lung biopsy pathology indicated pulmonary capillaritis. Further laboratory studies revealed a positive IgG antiphospholipid autoantibodies without IgM or IgA autoantibodies.

Treatment was initiated with pulse dose methylprednisone followed by a prednisone taper, resulting in the resolution of symptoms to date.

This case illustrates the difficulty of elucidating the cause of DAH in a patient with many previously-recognized causative factors. There appear to be fewer than 30 cases of PAPS worldwide with only pulmonary sequelae in literature within the past 20 years. Although PAPS-induced DAH is extremely rare, earlier consideration of PAPS and discontinuation of anticoagulation and possible iatrogenic causes in the context of chronic, non-massive haemoptysis is critical to instituting appropriate therapy.

OHIO POSTER FINALIST - Shiyu Bai

The use of Anakinra in managing Acute Gout exacerbation in a patient with Congestive Heart Failure and Chronic Kidney Disease

First Author: Shiyu Bai, Case Western Reserve University School of Medicine

Traditional first-line management of acute gouty arthritis, including colchicine, NSAIDs, and corticosteroids, is limited in patients with multiple co-morbidities, such as chronic kidney disease and congestive heart failure. Anakinra, an IL-1 receptor antagonist, might be a valuable alternative to use in this group of patients.

A 63 year-old Caucasian male with complex past medical history of diastolic heart failure with preserved ejection fraction, coronary artery disease, atrial fibrillation on warfarin, chronic kidney disease stage III, diabetes mellitus type II, hypertension, dyslipidemia, noncrystal-proven gout, papillary thyroid carcinoma s/p total thyroidectomy, presented with excruciating right foot pain secondary to gout exacerbation.

Patient was hospitalized two weeks prior with acute decompensated heart failure and volume overload. Patient was aggressively diuresed with 26 pounds weight loss and discharged on increased home furosemide dose. Shortly after discharge, patient began to experience pain, erythema, and edema in multiple joints of the right foot, which resembled previous gouty attacks. During an outpatient visit, patient was started on oral prednisone 30mg for 2 days followed by dose increase to 60mg for 3 days without relief. Patient had been on daily allopurinol (300mg) and renal dose colchicine (0.6mg Q48H) for recurrent gout and reported good medication adherence. Colchicine dose was also increased at outpatient during this flare up, resulting in medication-induced diarrhea.

At presentation, patient was in acute distress and unable to ambulate due to pain. Physical exam showed exquisite tenderness to palpation on first toe, first metatarsophalangeal articulation, and lateral malleolus, with significant erythema and edema. Patient was euvolemic and uric acid level was 4.9. Initial treatment included two doses of IV methylprednisolone 125mg over the course of two days without any symptomatic improvement. Pain was difficult to manage as patient did not respond to oral acetaminophen or oxycodone. IV Hydromorphone (0.6mg q3h) only provided transient pain relief. NSAID was avoided due to chronic kidney disease. Intra-articular steroid injection was not feasible due to the polyarticular presentation of gout. Given that the patient was not responding to traditional treatment, subcutaneous injection of anakinra (100mg daily) was initiated. Patient had moderate improvement after two doses with satisfactory pain control and increased mobility of the foot.
As the population continues to age, clinicians might encounter more difficult-to-treat gouty patients with multiple medical problems. The use of anakinra in treating acute gouty arthritis has only been documented via case reports and one small retrospective study. Though more double-blinded clinical studies are needed to establish anakinra's efficacy, it remains a viable treatment option for gouty arthritis in patients with complex medical history.

ONTARIO POSTER FINALIST - Daniel Pepe

Recurrent Prosthetic Valve Endocarditis following valve replacement and Aortic Root reconstruction for Infective Endocarditis

First Author: Daniel L. Pepe, Schulich School of Medicine and Dentistry, Western University, London, Ontario, Canada

Infective endocarditis (IE) is a life-threatening infection of the heart valves that is often associated with intravenous drug use (IVDU) or underlying structural abnormalities such as bicuspid aortic valves. While valve replacement and aortic root reconstruction (ARR) may improve survival in patients with severe IE, recurrent infections that lead to prosthetic valve endocarditis (PVE) can be especially challenging to treat, and are associated with a high mortality.

A healthy 36 year-old non-IVDU male with no known cardiac disease presented to the emergency department with a three-day history of malaise, nausea, and fever. On physical examination, he was lethargic and febrile with a systolic heart murmur. An echocardiogram demonstrated multiple vegetations overlying a bicuspid aortic valve, and blood cultures grew methicillin-sensitive Staphylococcus aureus. The patient was treated with intravenous cloxacillin for IE. However, he deteriorated rapidly with a decreased level of consciousness, complete heart block, acute renal failure, and digital ischemia. A computed tomography (CT) scan of his head revealed a subarachnoid hemorrhage and multiple infarcts within the right temporal lobe. An abdominal CT scan demonstrated numerous hepatic, splenic, and renal infarcts. The patient underwent an urgent aortic valve replacement with a porcine prosthetic valve. His postoperative course was complicated by the development of a spontaneous splenic rupture while on anticoagulation for his splenic infarction, and he underwent an urgent splenectomy. After a prolonged stay in hospital, the patient was discharged to a long-term rehabilitation center for several months. After an elective operation to correct a ventricular septal defect, the patient developed post-operative mediastinitis and again deteriorated rapidly with signs of severe sepsis. He underwent urgent operative debridement of his mediastinal tissues and ARR. The infected tissues grew Serratia sp., Candida sp., and Staphylococcus epidermidis, and the patient was treated with intravenous antibiotics and antifungal agents for several months. Five months later, the patient was readmitted with sepsis, and was diagnosed with PVE secondary to Candida parapsilosis based on clinical, microbiological and echocardiographic evidence. Due to his lack of clinical response to potent antifungal agents (caspofungin and amphotericin B), the patient underwent a second valve replacement and ARR. After a prolonged hospital stay, the patient was discharged home on oral fluconazole and is slowly resuming his normal daily activities.

This case illustrates the devastating complications that can arise from IE and PVE. The role of valve replacements and complex aortic surgeries, which are associated with significant morbidity and mortality, remains controversial in the treatment of this challenging disease. However, preoperative antifungal therapy may be a viable option for the prevention of PVE.

ONTARIO POSTER FINALIST - Alexandra Farag

Iron Overload and Acute Intermittent Porphyria

First Author: Alexandra Farag Senior Author: Chitra Prasad

Introduction: Acute intermittent porphyria (AIP) is a rare inherited metabolic disorder of heme synthesis. Hemochromatosis is a more common inherited disorder that results in increased intestinal iron absorption and subsequent iron deposition in tissues. Here, we report a patient with AIP and hemochromatosis.

Case: A 56-year-old Caucasian woman presented to genetics clinic for routine follow up of her AIP. She had been diagnosed with AIP two years prior after genetic testing of the HMBS mutation confirmed a familial missense R173W mutation in one of her alleles. She had recurrent episodes of neurovisceral attacks, characterized by abdominal pain, muscle weakness, nausea and vomiting, chronic back pain and longstanding depression. She smoked marijuana daily and drinks 2-4 oz of alcohol several times per week. Recently, the attacks had been increasing in frequency and the patient had been feeling more fatigued than usual. The physical examination revealed a soft, diffusely tender abdomen with no peritoneal signs.

Laboratory investigations revealed a UIBC of 15.0 (19-66)umol/L, transferrin saturation of 72.1 (11-56) %, a ferritin of 269.2 (13-150) ug/L and an iron of 39 (7-26) umol/L. Genetic testing for HFE-Associated Hereditary Hemochromatosis identified C282Y and H63D mutations. The patient was advised to reduce her marijuana and alcohol intake and underwent six phlebotomy treatments for her hemochromotosis. She felt that it reduced the frequency and severity of her attacks. Her ferritin after phlebotomy was 93.8.

Discussion: AIP is a rare autosomal dominant condition. It results from reduced activity for the hydroxymethylbilane synthase (HMBS), the 3rd enzyme in the heme synthesis pathway. This leads to a build up of 5-aminolaevulinic acid or other metabolites, which are thought to be neurotoxic. Although hemochromatosis has been shown to be a risk factor for porphyria cutanea tarda, there have been no reports of patients with hemochromatosis and AIP. Hemochromatosis is a very common genetic disorder in the caucasian population. It is possible that the iron overload caused by the patient's hemochromatosis may have increased the demand for heme synthesis and triggered her attacks. We report this case to the importance of managing potential triggers, including iron overload in AIP. Further investigation in to the pathophysiology and long term outcomes of iron overload in AIP is warranted.

ONTARIO POSTER FINALIST - Peter Ip Fung Chun

Thrombocytopenia and Cerebral Infarction during Vaso-occlusive crisis mimicking Thrombocytopenic Purpura: A case report.

First Author: Peter Ip Fung Chun,Dr. Keith Bellovich.

Sickle-cell-beta-thalassemia is a form of sickle cell disease that can predispose to vaso-occlusive crisis. Here, we present a patient with vaso-occlusive crisis who developed thrombocytopenia and acute mental status changes mimicking Thrombocytopenic purpura (TTP). Thrombocytopenia can rarely be a feature of vaso-occlusive crisis and this condition must be considered when multiple organs are affected in a sickle cell disease patient. This case is an example of where rare complications of a common disease can mimic a syndrome, such as TTP, that would otherwise lend to a unifying diagnosis.

A 23 year old African-American female with sickle-cell-beta-thalassemia presented to the ED with a four day history of generalized pain in the upper and lower extremities. Her history was significant for infrequent vaso-occlusive pain crisis'. Early in her hospital course she was febrile, tachycardic, and in acute distress from pain. The patient was alert and oriented with no focal neurological deficits. Initial WBC was 6.2 Thou/mm^3, hemoglobin 12.9 gm/dL, platelets 168 thou/mm^3, LDH 301 IUnit/L, Haptoglobin of 101 mg/dL and reticulocyte count of 2%. On the second day of hospitalization the patient continued to have fever, became disoriented, and was unable to respond to verbal commands. An emergency CT scan of the head showed no evidence of acute bleed. Blood smear failed to show stickled cells. The patient's platelet count dropped from 162 to 59 thou/mm^3, LDH increased to 2013 IUnit/L, and Hemoglobin dropped to 9.4 gm/dL. A complete workup for an infectious process was negative. The patient underwent plasma exchange for suspected TTP, in addition to aspirin and prednisone treatment. After failing to improve the patient underwent red cell exchange. Over the next ten days after red cell exchange the patient's hemoglobin stabilized and her platelet count trended up from 43 to 303 thou/mm^3. Follow-up imaging with magnetic resonance angiography showed evidence of cerebral infarction. The patient continued to improve during her hospital stay and upon discharge to rehabilitation was oriented, able to verbalize, and in stable condition.

This patient did present with all the signs and symptoms to make a clinical diagnosis of TTP. Since the timing of treatment with plasma exchange is crucial to the survival of the patient treatment was promptly started. Subsequent analysis of this case including cerebral imaging results, negative ADAMTS13, and failure to respond to treatment point to the alternative diagnosis of vaso-occlusive crisis. As such this case illustrates vaso-occlusive crisis is a pathophysiology complex process that may mimic clinical symptoms and laboratory disarrangement of the syndrome of TTP.

OREGON POSTER FINALIST - Bianca Reyno Argueza

Pemphigus Presenting with Progressive Respiratory Failure

First Author: Bianca Argueza MS3, Katie O'Brien PA-S2, Honora Englander MD

Pemphigus is a rare autoimmune disease that causes mucocutaneous blistering. Autoantibodies target antigens on the surface of keratinocytes, which lose their adhesion properties and result in flaccid blisters. If untreated, patients can develop skin infections and life-threatening sepsis. This case illustrates that pemphigus can also be associated with other potentially fatal pathologies.

A 77-year-old man with oropharyngolaryngeal pemphigus presented with worsening dyspnea and a syncopal episode. Five months prior, he was diagnosed with unspecified pemphigus. His lesions subsided with prednisone but returned after cessation. He subsequently developed subacute progressive dyspnea and difficulty managing secretions. Two days prior to admission, he experienced syncope without prodromal symptoms and reported poor oral intake due to odynophagia. He had 3 similar episodes of syncope over the past few years, but prior cardiac work-up was unrevealing. Upon arrival, he was tachypneic, tripoding, and requiring 4 liters of oxygen and aggressive suctioning. He was orthostatic with otherwise normal vitals. His exam revealed injected conjunctiva, crusted hemorrhagic ulcers over the lips, patchy denuding of the oropharyngeal mucosa, and distant breath sounds. Chest X-ray showed an elevated left hemidiaphragm. Due to concern for a mediastinal mass with phrenic nerve involvement, a chest CT was obtained and revealed an 8.0 x 4.6 cm anterior mediastinal mass insinuating between the major branches off the aortic arch without vascular invasion. Pathology showed a WHO class B2/B3, Masaoka stage III thymoma. Immunofluorescence studies of the oral mucosa and serum were consistent with the diagnosis of paraneoplastic pemphigus. The patient was intubated after his respiratory function declined. Due to the improbability of a complete resection, the treatment plan included two neo-adjuvant cycles of chemotherapy with surgical re-evaluation.

Paraneoplastic pemphigus (PNP) is a rare mucocutaneous blistering disease caused by autoimmune antibodies most commonly associated with lymphoproliferative neoplasms. A frequent cause of death is bronchiolitis obliterans, which is precipitated by extension of the epithelial sloughing process into the small airways. This patient's respiratory failure was likely caused by a combination of bronchiolitis obliterans and phrenic nerve palsy from mass compression. There was also suspicion for paraneoplastic myasthenia gravis leading to respiratory muscle weakness and difficulty managing secretions.

Interestingly, while the patient's syncopal episode was likely due to hypovolemia, it is possible that mass compression of the major arteries off the aortic arch contributed to cerebral hypoperfusion. While PNP is rare, this case illustrates the need for a high index of suspicion in patients with progressive respiratory failure as pulmonary epithelial injury is characteristic of PNP compared to other types of pemphigus. A thorough workup can also facilitate discovery and treatment of occult neoplasms.

PENNSYLVANIA POSTER FINALIST - Amol Agarwal

A Paraneoplastic Syndrome Without the Neoplasm: Opsoclonus Myoclonus Ataxia

First Author: Amol Agarwal, MS-III, Perelman School of Medicine, University of Pennsylvania

Opsoclonus-Myoclonus Ataxia (OMA) is a neuro-ophthalmological phenomenon usually considered to be associated with underlying malignancy. However, OMA may precede identification of the cancer, and thus determining the etiology of OMA in the absence of an established malignancy can be quite challenging.

A 55-year-old male with HIV (on HAART) and prior HAV infection developed abrupt onset of nystagmus and ataxia along with nausea. When he presented to the ED at his local hospital several hours later, he was found to have a prominent "ocular flutter", truncal ataxia with wide-based gait, and resting tremor. At the time, he was diagnosed with BPPV because he also displayed a positive Dix-Hallpike maneuver; treatment with lorazepam and meclizine did not alleviate his symptoms. Four days later he returned and was admitted, and he underwent an MRI/MRA/MRV, which was unrevealing. After he was transferred to our institution, he underwent an LP with was notable for lymphocytic pleocytosis and slightly elevated proteins. Cryptococcal antigen and fungal culture on CSF were negative, as were PCR studies for WNV, EBV, CMV, and JCV. However, he was found to have HCV infection with a RNA quantification of approximately 10 million. In addition, he had serological evidence of chronic EBV infection and an ESR of 85. Other serologic studies, including Hepatitis B, thyroid function, vitamins B1/B12/E, rheumatoid factor, ANA, liver enzymes, CRP, and electrolytes were all within normal limits.

Neurology and neuro-ophthalmology were consulted to address his ataxia and nystagmus. Both services agreed that his physical examination findings were consistent with opsoclonus myoclonus ataxia, a clinical diagnosis, and investigation to identify an occult malignancy was commenced. The patient underwent a CT of the chest/abdomen/pelvis which showed nothing concerning for neoplasm, and serum and urine protein electrophoreses did not demonstrate a monoclonal gammopathy. Of note, IgG oligoclonal bands were found in the CSF, and these were thought to be consistent with a paraneoplastic syndrome. A paraneoplastic antibody panel was sent to an outside lab, and with results pending, the patient was started on Solumedrol 125 mg IV for 5 days, followed by IVIG 30g for 5 days, with no improvement in his ataxia or nystagmus. The patient was discharged to acute rehabilitation and scheduled for a colonoscopy and PET-scan to rule out occult malignancy.

After discharge, the results of the paraenoplastic panel showed positive anti-Acetylcholine Receptor Modulating and anti-Striational antibodies. These have been shown to be associated with a number of neoplasms, most commonly thymoma but also adenocarcinomas and sarcomas from a wide variety of tissues. No occult malignancy was found as this patient was lost to follow-up. This case illustrates that a patient presenting with a paraneoplastic syndrome such as OMA may not demonstrate a primary malignancy on extensive workup. In an HIV-positive patient, ruling out infectious etiologies, especially in the CSF, is essential.

RHODE ISLAND POSTER FINALIST - Alyssa E Doody

Tuberculosis Peritonitis: An Elusive Diagnosis in a Patient with Ascites and Spiking Fever

First Author: Alyssa Doody MSIV, Alisa Merolli, MD

Introduction: Tuberculosis peritonitis is the rarest extra-pulmonary presentation of TB, with an incidence of 2 persons per one-million annually. It often presents with an ambiguous clinical picture in HIV, immunocompromised, immigrant, and dialysis patients. Culture is the definitive gold-standard test but its 4-8 week incubation period makes it suboptimal. Up to 50% of patients with untreated TB peritonitis die within 6 weeks of presentation, often awaiting culture results.

Case: A 62-year-old Honduran male with chronic kidney disease presented with two weeks of anorexia, malaise, abdominal distention and a ten pound weight gain. Admission vitals were within normal limits. Physical exam revealed a distended abdomen with hypoactive bowel sounds and right upper-quadrant tenderness. Labs revealed WBC 8.6, hemoglobin 6.4, hematocrit 18.9, BUN 157 and creatinine 15.2. He was admitted for uremia in the setting of end-stage-renal-disease and was started on hemodialysis. After transfusion he began Procrit for anemia. On day two the patient developed a fever of 100.7 without obvious source of infection. Fever of unknown origin was worked-up with urinalysis and multiple blood, line and stool cultures, which were negative. Autoimmune and infectious disease work-ups were also negative and PPDs failed to indurate after 72 hours. CT to evaluate his increasing abdominal distention revealed severe ascites in the mid-abdomen and pelvic inlet. Ascitic fluid analysis showed a lymphocyte predominant WBC count of 470, ADA 30.4 U/L, albumin 2.2 g/dl, and LDH 182 U/L but was negative for TB. Chest x-ray showed small bilateral pleural effusions but thoracentesis was negative. Procrit was discontinued for suspicion of drug fever but his temperature continued to spike to 104 degrees daily. Chest CT revealed a 7mm calcified granuloma in the right middle-lobe but biopsy was subsequently negative. On day 23, the patient underwent exploratory laparoscopy revealing numerous small white implants on the bowel, peritoneum and omentum, highly suspicious for peritoneal TB. Biopsies showed granulomatous inflammation also strongly suggestive of TB. By hospital day 30, thoracentesis fluid culture and a urine sample grew Mycobacterium tuberculosis. He was treated with isoniazid, rifampicin, pyrazinamide, and ethambutol and within two days his fever resolved.

Discussion: Due to its lack of pathognomonic signs and symptoms TB peritonitis tends to be diagnosed late in its clinical course. A presentation of ascites, fever, and abdominal pain in those at increased risk should raise strong suspicion. Despite an extensive TB workup, it was only after laparoscopy that the diagnosis of TB peritonitis was made and our patient was successfully treated. Laparoscopy is sensitive (93%), specific (98%) and rapid. Our case supports that it is a valuable and expeditious diagnostic tool for TB peritonitis.

TEXAS POSTER FINALIST - Anish A. Patel, BCh

Cushing's Syndrome and Adrenal Insufficiency in an HIV-infected Patient on Ritonavir Receiving Periodic Intra-articular Triamcinolone Injections

First Author: Anish A. Patel, BCh Priti Dangayach, MD Charlene Flash, MD

Introduction: A decade ago, the diagnosis of HIV (human immunodeficiency virus) or AIDS (acquired immune deficiency syndrome) meant increased morbidity and mortality for those infected. Today, antiretroviral therapy has revolutionized HIV treatment and made it possible for HIV-positive patients to lead healthy, productive lives. The discovery that ritonavir, a protease inhibitor (PI), improved the efficacy of PIs and highly active antiretroviral therapy (HAART), has led to its coadministration with such drugs to enhance effectiveness. Ritonavir inhibits the metabolism of the cytochrome p450 (CYP3A4) pathway, which is the way certain drugs in HAART and PIs are metabolized. While this "boosting" mechanism helps to decrease pill burden and facilitate medication tolerability, it also affects the efficacy of numerous other medications, including exogenous corticosteroids, and can cause them to accumulate. By suppressing the hypothalamic-pituitary-adrenal axis, the accumulation of steroids can result in clinically significant cases of Cushing's syndrome and subsequently adrenal insufficiency, which is important to recognize as it may result in numerous complications including cardiovascular collapse. We present a case of a patient with HIV on a ritonavir-boosted HAART regimen who was receiving intra-articular triamcinolone acetonide injections for trochanteric bursitis and subsequently developed Cushing's syndrome and adrenal insufficiency.

Case study: A 56-year-old African-American patient with HIV (CD4 count 303 cells/mm^3 and viral load 48 copies/mL) on a ritonavir-boosted highly active antiretroviral therapy regimen was receiving intra-articular triamcinolone acetonide injections for trochanteric bursitis. After having received the injections every three months for the previous four years, the patient gradually developed Cushingoid features including: "moon" facies, a dorsocervical hump, truncal obesity, diffuse purple striae, scattered ecchymoses, and severe generalized weakness. Endocrine work-up revealed a baseline cortisol of 0.4 µg/L (normal 3.09 – 22.4) and adrenocorticotropic hormone (ACTH) of < 1.1 pg/mL (normal 7.2 – 63.3). The patient underwent a low dose (1 mcg) cosyntropin stimulation test which revealed inadequate plasma cortisol response at 1.7 µg/dL (normal > 20). A high dose (250 mcg) cosyntropin test yielded similar inadequate plasma cortisol response at 6.4 µg/dL (normal > 20). He was therefore diagnosed with secondary adrenal insufficiency. Due to ritonavir's interference with steroid metabolism, the high level of circulating steroids suppressed of the hypothalamic-pituitary-adrenal axis. After this interaction was identified, the patient's adrenal insufficiency was treated with physiologic doses of replacement hydrocortisone and he was advised to avoid corticosteroid injections in the future. Throughout his admission, the patient gradually experienced improvement in his physical functioning, including activities of daily living.

Conclusion: The goal of this case is to increase awareness among clinicians and subspecialists about potential risks associated with the administration of intra-articular steroids to HIV infected patients on ritonavir with the resultant sequelae of excess exogenous steroid levels. It is also important to thoroughly reconcile medication use with these patients as intermittent steroid administration or steroids administered via injection may not appear in medication reconciliation lists. In patients presenting with Cushing's syndrome or adrenal insufficiency, a high index of suspicion should be maintained for this potentially life-threatening medication interaction.

TEXAS POSTER FINALIST - Angie Hamouie

Leukemia Complicated by Limbic Encephalitis

First Author: Angie Hamouie

Introduction: Limbic encephalitis is an immune-mediated inflammatory process in the limbic system associated with changes in mood, behavior, and cognition. The antibodies are most frequently produced secondary to small cell lung carcinoma, breast cancer, and Hodgkin lymphoma. Case descriptions of limbic encephalitis associated with B-cell acute lymphoblastic leukemia (B-cell ALL) have not been published in the English language literature.

Case Description: A 20-year-old woman, followed during a global health elective at the King Hussein Cancer Center in Amman, Jordan, was diagnosed with B-cell ALL by bone marrow biopsy. She completed one round of the chemotherapy regimen hyper-CVAD at the time of diagnosis with no complications and was discharged from the hospital. Two weeks after discharge, she was readmitted due to neutropenic fever. The patient was treated with broad-spectrum antibiotics, antivirals, and antifungals. Once the fever subsided, she received a second course of hyper-CVAD. On day 21 of admission, the patient complained of blurred vision and loss of concentration. Two days later, she had impaired heel-to-shin test on left side, impaired alternating hand movements on left side, and positive Romberg sign. Side effects from chemotherapy were suspected. It was discontinued, but no relief of symptoms occurred. Molecular tests on CSF were negative for the following organisms: HSV, HHV6, H1N1, CMV and TB. Brain MRI showed hypointense lesions in the cerebellum and small lesions in the temporal lobes bilaterally. Following MRI, limbic encephalitis was suspected. IVIg and acyclovir were administered on day 25. One day later, patient showed improved cerebellar signs. On day 30, cerebellar signs were completely resolved and IVIg was stopped. Five days after the cessation of IVIg, patient was discharged. To confirm the diagnosis, CSF samples were submitted to the Mayo Clinic to test for anti-neuronal antibodies. They arrived in U.S. customs on April 15th, 2013, the day of the Boston Marathon Bombings, and were discarded by U.S. officials.

Discussion: This case represents a novel example of limbic encephalitis associated with leukemia. Neurological paraneoplastic syndromes occur in less than 1% of patients with malignancies. Prognosis is highly variable, with delays in treatment associated with permanent damage. Diagnosis involves imaging, ruling-out other causes, and testing for antibodies. Hyperintense lesions on T2 flair in medial temporal lobes and brainstem immediately raise limbic encephalitis on the differential. Such lesions rule out hyper-CVAD toxicity, as chemotherapy does not cause structural changes in the cerebellum. Molecular tests rule out infectious causes. Treatment is two-step, involving immunosuppression with IVIg and continued chemotherapy. Early recognition and treatment is key. Our patient, and patients like her, should not be taken off chemotherapy if MRI reveals lesions. This improves the prognosis of patients with rare cases of limbic encephalitis.

TEXAS POSTER FINALIST - Sheba John

Stones, Groans, and Pulmonary Overtones: A case of Histoplasmosis with Hemoptysis from a Broncholith

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Introduction: Histoplasmosis is an endemic mycosis of the Ohio River Valley. Though often asymptomatic, it classically presents with subacute pulmonary symptoms. Occasionally, infection can manifest with chronic pulmonary disease and more significant complications. We present a patient with a known history of histoplasmosis and chronic respiratory symptoms who subsequently developed gross hemoptysis from a broncholith impinging on the pulmonary artery. Broncholiths are calcifications of pulmonary granulomas and lymph nodes that may erode into adjacent bronchi resulting in cough, hemoptysis, sputum production, wheezing, and fever.

Case Presentation: A 49 year-old Caucasian male with a history of histoplasmosis and chronic shortness of breath presented as a new patient to our hospital with a 2-week history of worsening hemoptysis, chest pain, fatigue, decreased appetite, exertional dyspnea, and fevers. He had sudden hemoptysis with greater than a cup of gross blood. He had a 40 pack-year smoking history and was formerly a resident of Illinois. He was diagnosed with histoplasmosis in 2007 requiring multiple prior hospitalizations for recurrent pneumonia. He denied previous antifungal treatment or surgical interventions. His chest x-ray and CT of the thorax confirmed complete consolidation of left lower lobe with a left-sided pleural effusion. Additionally, there were calcifications around the left upper lobe bronchus and impingement of the pulmonary artery. A ventilation-perfusion scan indicated low perfusion and ventilation of the entire left lung. A bronchoscopy confirmed narrowing of the left upper lobe bronchus and an erosive broncholith invading into the left pulmonary artery. Blood cultures, fungal cultures, and acid fast stains were negative. He was evaluated by cardiothoracic surgery and subsequently underwent left pneumonectomy. Postoperatively, he recovered well and was shortly discharged.

Discussion: One rare sequelae of long-standing histoplasmosis is the formation of broncholiths, which are calcifications of pulmonary granulomas and lymph nodes. These may result in recurrent post-obstructive pneumonia and in more severe cases may also result in hemoptysis. Broncholiths can sometimes be removed bronchoscopically or may require surgical intervention depending on the severity of the pathology. In caring for patients with a history of tobacco abuse, worsening respiratory symptoms and hemoptysis, it is important to consider a broad differential.

TEXAS POSTER FINALIST - Manoj Reddy

Superior Sagittal Sinus Thrombosis as an initial presentation of Renal Cell Carcinoma

First Author: Manoj Reddy, M3 Second Author: Daniel DeMarco, MD

INTRODUCTION: Venous thrombosis in the setting malignancy is a well-known phenomenon explained by multiple factors that lead to a hypercoaguable state. We describe a case of a relatively uncommon location for a venous thrombosis in the setting of Renal Cell Carcinoma (RCC). The clinical findings in this report lend value to the diagnostic work up of unusual presentation findings of a patient with previously undiagnosed Renal Cell Carcinoma.

CASE DESCRIPTION: A previously healthy 68 year-old male presented to the emergency department with complaints of a 6-week history of progressively worsening frontal headache and outpatient MRI results revealing a superior sagittal sinus thrombosis. He denied a personal or family history of hypercoagulability disorders. The patient was afebrile, normotensive, and displayed no focal or neurological deficits on physical exam. The patient was started on hydrocodone for pain and a heparin drip. A hypercoaguable workup that included Lupus Anticoagulant, Factor V Leiden, Prothrombin G20210A mutation, Homocysteine, Protein C and S deficiency, and Antithrombin III deficiency were negative. An evaluation of the JAK2 mutation, Homocysteine levels, and Paroxysmal Nocturnal Hemoglobinuria similarly were negative. Further investigation on cerebral angiography 2 days post-admission revealed a partially occlusive thrombus within the middle 1/3 of the superior sagittal sinus, which appeared subjectively improved from previous outpatient MRI. CT abdomen on malignancy workup demonstrated a 10.0 x 8.6 cm large necrotic mass emanating from the posterior aspect of the left kidney. The renal vein appeared patent with no pathological lymphadenopathy demonstrated within the retroperitoneum or other organ involvement. Patient was continued on heparin and urology was consulted for planned nephrectomy.

DISCUSSION: This initial presentation of undiagnosed malignancy demonstrates the diverse manifestations of cancer. Many cases of venous thrombosis in patients with Renal Cell Carcinoma involve the main renal vein with extension to the inferior vena cava. This case provides an example of an unusual location for thrombosis and stresses the need for the diagnostic steps taken to address the etiology of an unexplained venous thrombus. Many patients with RCC are asymptomatic at diagnosis and have the cancer discovered incidentally on imaging. Studies have shown that only 9% of patients present with the classic triad of RCC (flank pain, palpable renal mass, hematuria) (1). Secondary symptoms of malignancy that include anemia, cachexia, venous thrombosis, or hepatic dysfunction may provide the only clues of an underlying pathology. In the setting of undiagnosed cancer, seemingly unrelated symptomology may point to a possible distant malignancy when all other diagnostics prove to be negative.

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TEXAS POSTER FINALIST - Erica Fidone

Immune System Gone Wild

First Author: Erica J. Fidone, Student, Texas A&M HSC COM, Temple, TX; Curtis Mirkes, DO FACP, Member, Texas A&M HSC COM / Scott & White Healthcare, Temple, TX

Hemophagocytic lymphohistiocytosis (HLH) is a rare hematologic disorder, with an estimated incidence of 1.2 cases per million per year, characterized by an exaggerated immune response leading to marked proliferation of reactive lymphohistiocytes, excessive release of inflammatory cytokines and eventual cytokine-induced, multi-organ failure. HLH presents a diagnostic challenge to physicians due to its ability to mimic more common hematologic, infectious and rheumatologic etiologies. However, prompt diagnosis of HLH is crucial, as this disorder progresses quickly and is invariably fatal without treatment.

A 28-year-old African-American male, currently being evaluated as an outpatient for possible lymphoma, presents to the ED with a 3-day history of intractable nausea and vomiting, spiking fevers, and severe abdominal pain. He reports having a three month history of nausea, vomiting, abdominal pain, night sweats, and a 100-pound weight loss. Vitals on presentation were normal except for a heart rate of 126 and a blood pressure of 104/66. Physical exam revealed a diaphoretic male with scleral icterus, axillary and inguinal lymphadenopathy, abdominal tenderness, and hepatosplenomegaly. Laboratory evaluation demonstrated pancytopenia, a ferritin level of 71,905 ng/mL and a fibrinogen level of <60mg/dL. Over the next few days, the patient continued to decline clinically, requiring multiple units of blood and cryoprecipate. An axillary lymph node core biopsy and a bone marrow aspirate and biopsy demonstrated hemophagocytic lymphohistiocytosis. After ruling out inciting infectious etiologies, the patient was initiated on high-dose corticosteroids. His clinical picture improved dramatically in the following days.

This case emphasizes the importance of early detection when confronted with HLH. The average time to diagnosis for HLH can range from 2 weeks to 3 months. However, patients suffering from HLH do not have the luxury of time. This disease is almost uniformly fatal within 2 months if left untreated yet, dramatic clinical response can occur once treatment is initiated. Thus, prompt consideration of HLH is paramount. This patient illustrates that a dramatically elevated ferritin strongly suggests an autoimmune hemolytic process. When coupled with hypofibrinogenemia, pancytopenia, generalized lymphadenopathy and hepatosplenomegaly, one must first consider a consumptive, rather than an infiltrative, process.

VERMONT POSTER FINALIST - Eleah Porter

A Rare Cause of Massive Hematuria: Renal Artery Aneurysm Rupture

First Author: Eleah Porter, MSIII, Department of Surgery, The Brooklyn Hospital Center, Brooklyn NY Supervising Authors: David Hirschl, MD, Interventional Radiologist and Joshua Rosenberg, MD, Chair Critical Care

Introduction: Spontaneous renal artery aneurysm (RAA) rupture is a rare but potentially fatal condition. In pre-menopausal females without history of dysfunctional uterine bleeding (DUB), post-urination massive blood/clots warrants clinical suspicion for gross hematuria.

Case Description: A 47-year-old African American female with past history of hypertension, chronic kidney disease Stage III, Cesarean section and cholecystectomy presented to the ED complaining of spontaneous vaginal bleeding. Earlier that day, the patient noticed a large amount of blood/clots after urination. The patient believed it to be of vaginal origin, however she was mid-cycle and denied history of DUB. She subsequently experienced increased urinary frequency and urgency. At the time of presentation, patient appeared diaphoretic and complained of supra-pubic pressure that radiated to the lower back bilaterally. Urine beta HCG was negative. Urine analysis was significant for hematuria with RBC's too numerous to count. The pelvic exam revealed only minimal blood in vaginal vault. Patient's vital signs were initially stable, however she experienced a syncopal episode in ED followed by altered mental status. Patient was found to be hypotensive (BP 60/20) and tachycardic. A foley catheter was placed and frank hematuria returned. Renal function tests were significant for elevated BUN and creatinine levels 35/2.3 mg/dL respectively (baseline unavailable). Her hemoglobin was initially 10.8 g/dL, which decreased to 9.1 g/dL following hypotensive episode. Resuscitation with rapid infusion of crystalloids and type 0 negative blood improved mental status and restored blood pressure to normal. CT of the abdomen/pelvis revealed a large right perinephric and retroperitoneal hematoma (13x12x21cm) and 2.5cm right RAA. Following CT, patient decompensated and an emergent renal angiogram with coil embolization of the aneurysm was performed. Post-procedure creatinine increased to 2.8g/dL, but eventually returned to baseline. A repeat right renal artery angiogram showed no further filling of the aneurysm or extravagation. The patient was monitored in the surgical intensive care unit and blood counts remained stable. Hematuria resolved and the patient was discharged in stable condition.

Discussion: Recent literature suggests the incidence of RAA to range from 0.01% to 1%. They occur more frequently on the right and in males with a mean age of 60 at diagnosis. Acquired etiologies include but are not limited to trauma, longstanding untreated hypertension, recent surgical manipulation, and chemotherapeutic agents. Most acquired RAAs are less than 2 cm but if larger carry a 30% chance of rupture with mortality greater than 20%. Due to the risk of rupture, asymptomatic RAA's 2 cm and larger warrant surgical treatment. Complexity in diagnosing RAA rupture can arise when hematuria is confused with DUB. In this case report, a high index of suspicion and early recognition of bleeding source was critical in reducing morbidity and mortality.

VIRGINIA POSTER FINALIST - Brent Ozaki

Neisseria meningitidis; A rare cause of Facial Cellulitis

First Author: Mr Brent Ozaki, Dr Adam S Kittai, Dr Suzanne Chang, Mr Alex Mayom

Introduction: Best recognized as a causal agent of bacterial meningitis, Neisseria meningitidis is also a rare cause of cellulitis in immunocompetent hosts. We present a case of culture-confirmed Neisseria meningitidis causing facial cellulitis. Though uncommon, this organism should be included in the differential in patients presenting with acute skin and soft tissue infections especially involving the periorbital, head, and neck regions.

Case: A 68 year-old Chilean male presented with 2 days of facial swelling, which began in the lateral upper lip. The patient was presumptively diagnosed with food-related angioedema and treated with diphenhydramine and methylprednisolone then discharged home on a prednisone taper. The facial swelling worsened despite this treatment. On return to the ER the patient was febrile to 38.2 degrees Celsius, with marked erythema and edema involving the right cheek, jaw, and proximal neck. After additional questioning, he reported sustaining a small laceration during a recent shave at a barber. Labs were significant for a leukocytosis of 16 with a left shift. A maxillofacial CT demonstrated soft tissue stranding of the right cheek and submandibular gland with no fluid collection. Treatment was begun with IV clindamycin but the erythema and edema worsened, thus antibiotic coverage was broadened to vancomycin and piperacillin-tazobactam. On hospital day #2 blood cultures returned with gram negative diplococci, subsequently speciated as N. meningitidis. Antibiotics were narrowed to ceftriaxone 2 grams IV daily and the erythema and edema improved, after which the patient was discharged home on oral amoxicillin with the input of the infectious disease team.

Discussion: Facial cellulitis is a diagnosis commonly seen by internists, but rarely caused by gram-negative organisms. To our knowledge, there have been 7 reported cases of cellulitis secondary to Neisseria meningitidis in adults. Our case confirms the findings of other authors that Neisserial infection, in the setting of acute cellulitis, has a predilection for the periorbital/ facial region. Of the 7 known cases, only one was immunocompromised. Our patient had no notable infectious risk factors, with exception of his age as well as a potential site of exposure secondary to a superficial wound the patient sustained in weeks prior to hospitalization. Therefore, this case highlights the importance of recognizing Neisseria meningitidis as a possible cause of cellulitis in immunocompetent hosts. This is particularly important as typical empiric agents for facial cellulitis do not treat this organism thus missing this diagnosis would leave patients at risk for progressive infection.

WEST VIRGINIA POSTER FINALIST - Eric Riley

Primary Intestinal Lymphangiectasia In a Patient with 6q Duplication Syndrome

First Author: Eric Riley MS-3 Kim Weaver MS-4 Rezwan Ahmed MD Yaser Rayyan MD

Introduction: Primary Intestinal Lymphangiectasia (PIL) is a rare protein-losing enteropathy characterized by dilated intestinal lacteals and leakage of lymph into the bowel lumen. This disorder typically presents before the age of 3, making the diagnosis of PIL particularly challenging in adults. Although the etiology of PIL remains unclear, it has been associated with numerous congenital syndromes including Hennekam, Klippel-Trenaunay, Noonan, Turner, and von Recklinghausen. A review of medical literature has revealed no known association between 6q Duplication Syndrome and PIL. We present a case of PIL in a patient with 6q Duplication Syndrome, suggesting there may be a link between the two conditions.

Case Description: A 28 year-old male with 6q Duplication Syndrome presented to the emergency department with acute hypercapnic respiratory failure, abdominal distention, and bloody diarrhea. The patient underwent exploratory laparotomy for radiographic evidence of pneumoperitoneum. Retroperitoneal edema was present; however, no perforation was identified. The patient had a prolonged hospital stay, but his gastrointestinal symptoms ultimately resolved and the patient was discharged home. He returned to the hospital 9 days later with fever, generalized swelling, and a right-sided pleural effusion. The patient developed abdominal tenderness two weeks into his hospital course, and an abdominal CT demonstrated increasing abdominal ascites and bowel wall thickening of the distal duodenum and proximal jejunum in addition to bilateral pleural effusions. CT of the chest, abdomen and pelvis were negative for malignancy. The patient underwent a diagnostic paracentesis and a milky white fluid with a triglyceride level of 412 mg/dL, consistent with chylous ascites, was obtained. Cytology showed benign mesothelial cells and chronic inflammatory cells. Laboratory examination revealed decreased total serum protein (3.2 g/dl) and albumin (1.8 g/dl) as well as lymphocytopenia. The patient subsequently had an EGD that showed edematous small bowel. Gastric and duodenal biopsies demonstrated dilated lymphovascular spaces consistent with a diagnosis of PIL. Treatment was initiated with medium-chain triglycerides (MCT), albumin, and octreotide. The patient's gastrointestinal symptoms and abdominal distension improved.

Discussion: Although PIL is most commonly diagnosed in childhood, it is important to consider this diagnosis in the setting of recurrent pleural effusions and chylous ascites after malignancy has been ruled out. Treatment of PIL involves adoption of a low-fat diet with medium chain triglycerides, which are directly absorbed into the portal venous system, bypassing the lymphatics and preventing lacteal engorgement. This patient had a previous history of 6q Duplication Syndrome and was subsequently diagnosed with PIL. We highlight this case to make clinicians aware of this potential link and to encourage further investigation to elucidate any association between chromosome 6q Duplication and PIL.

WISCONSIN POSTER FINALIST - Heidi L Blank

Case Report: Thyrotoxic Periodic Paralysis in Undiagnosed Hyperthyroid Male

First Author: Heidi L Blank, MS4 Lia Jamian, MD Felix Fernandez, MD Nemer Dabage Forzoli, MD

Thyrotoxic Periodic Paralysis is an underdiagnosed complication of hyperthyroidism. The case of a 31-year-old Indian male who presented with muscle weakness and concurrent hypokalemia is presented.

CASE REPORT 31-year-old previously healthy Indian male presented to the ED with 2-day history of pain of bilateral thighs and inability to ambulate. He reported playing basketball the previous day. One similar episode occurred 3 months earlier and spontaneously resolved; he attributed the event to increased strenuous activity at that time. He reported chronic heat intolerance, fatigue, mild tremor x2 months, palpitations with activity, 20 pound weight loss over 1.5 months despite increased appetite, and resolution of his chronic constipation. Review of systems otherwise negative. No family history of similar episodes. Patient denied substance abuse.

Significant vital signs included BP 138/87mmHg, pulse 114bpm, temperature 98.7 F and BMI 26.61kg/m2. Pertinent physical exam findings included decreased strength 2/5 in bilateral lower extremities with 5/5 strength in bilateral upper extremities. Admission labs were significant for CK >2000, hypokalemia (3.2), hyperthyroidism (TSH 0.007, free T4 5.65), normocytic anemia, unremarkable renal function, elevated alkaline phosphatase (165), and negative urine drug screen. EKG revealed tachycardia.

Considering elevated CK and muscle tenderness, initial diagnosis was rhabdomyolysis. Given presence of hypokalemia, patient was treated with normal saline and potassium 40 mEq PO which raised potassium to 3.3 and slightly improved weakness. Additional potassium was required throughout hospitalization. Thyroid Ultrasound showed goiter and diffuse vascularity most consistent with Grave's Disease. Endocrinology was consulted and started propranolol 20mg BID and methimazole 20mg BID. Tachycardia subsequently resolved. Patient was discharged home on above medications, ambulating normally.

DISCUSSION Initially, rhabdomyolysis was the diagnosis; however, hyperkalemia would have been expected. The reported symptoms and laboratory and imaging studies were all consistent with hyperthyroidism. We determined that our patient had Thyrotoxic Periodic Paralysis (TPP) due to the recurrent, episodic nature of proximal lower extremity weakness preceded by vigorous exercise and resolution with potassium and beta blockade.

TPP is a complication of Grave's Disease almost exclusively found in males in the 3rd to 5th decade of life, especially Asians. When compared to Familial Periodic Paralysis (FPP), both are triggered by high carbohydrate meals, salt ingestion, stress, or exercise. Differences include that FPP has a positive family history (autosomal dominant inheritance), earlier presentation (1st-2nd decades of life), Caucasian predominance, and chronic myopathies with response to prophylactic carbonic anhydrase inhibitors. Hypokalemia in TPP is due to over-activity of the Na+/K+ ATPase pump leading to a shift in extracellular to intracellular potassium. Therefore, treatment includes reversing the hypokalemia using a non-selective beta blocker to inhibit this pump.

RESEARCH PODIUM PRESENTATIONS

GEORGIA PODIUM PRESENTATION - Caroline M Lewis

Zoledronate Inhibits Cell Membrane Repair

First Author: Caroline M Lewis Second Authors: Paul McNeil, Tiffany Floyd, and Joshua Fields

Bisphosphonates are a class of drugs that inhibit the resorption of bone by osteoclasts to increase bone mass. They are commonly prescribed to increase bone mass in patients with osteoporosis, cancerous tumors of bone, and other bone disorders. Unfortunately, bisphosphonates are associated with the poorly understood side effect of bisphosphonate related osteonecrosis of the jaw (BRONJ). This side effect is initiated by a traumatic injury to the jaw, such as a tooth extraction.

Traumatic tissue injury produces tears or disruptions in the plasma membranes of resident cells, and a previous study indicated that bisphosphonates interact with the protein machinery that mediates repair of this type of cell injury. Here we have tested whether the most commonly prescribed bisphosphonate with the highest incidence of the BRONJ side effect, zoledronate, inhibits the membrane repair process, and might thereby contribute to BRONJ

Monkey kidney epithelial cells (BSC1) and mouse myoblasts (C2C12) were treated with zoledronate and plasma membrane disruptions such as those that occur in traumatic injury. Membrane disruptions were created with a microscope laser in the presence of FM1-43, a fluorescent dye that rushes into the cell and brightly illuminates its interior when repair fails. When, however, the integrity of the boundary is restored by successful repair, FM1-43 dye entry into the cell interior is minimal: the cell interior remains dark except for a small, peripheral, spot-weld scar of fluorescence where the injury and subsequent repair occurred. This uptake of fluorescence can be quantitated by image analysis.

Both BSC1 and C2C12 cells incubated 24 hours with 1µM zoledronate in this laser assay exhibited significant ($p < 0.05$, one way ANOVA Tukey post hoc comparison) increases in uptake of dye over time compared to untreated, control cells. Zoledronate-treated cells filled rapidly with dye, whereas controls did not. Thus, zoledronate strikingly inhibits cell membrane repair in two distinct cell types.

Zoledronate-induced inhibition of cell membrane repair and consequent cell death may be an important factor in BRONJ. Wound healing requires frequent membrane repairs since membranes are torn as cells glide past one another. Without proper cell membrane repair, these cells die, and complete wound healing cannot occur. Further study of BRONJ and the involvement of zoledronate-induced inhibition of cell membrane repair is warranted. Recently, a non-toxic compound, vitamin E, was found to promote membrane repair. The results of this study suggest a simple and inexpensive possible prophylactic treatment for BRONJ: administration of vitamin E supplements prior to dental work.

NORTH CAROLINA PODIUM PRESENTATION - Katherine Wu

The Clock is Ticking: Improving general medicine discharge communication timelines

Katherine Y. Wu, B.S. (School of Medicine, Duke University) David Y. Ming, M.D. (Departments of Medicine and Pediatrics, Duke University)

Introduction: Timely discharge (DC) communication is critical for high-quality care transitions from inpatient to outpatient settings. DC communication usually relies upon discharge summaries. Inadequate DC communication is associated with negative patient outcomes. The purpose of this quality improvement (QI) project was to improve the quality of DC communication via improved timeliness of DC summary completion and transmission from general medicine (GM) inpatient to outpatient providers.

Methods: DC summaries from Duke University Hospital GM inpatient services were typically dictated by a resident. An attending physician signed the transcribed DC summary, and the document was automatically faxed to outpatient providers listed by the dictating physician as needing to receive a copy. DC communication timeliness was measured by time between DC date and 1) date of dictating provider signature (DC summary "completion") and 2) date of attending provider signature (DC summary "transmission"). These timeliness metrics and date of first post-DC follow-up (F/U) appointment were abstracted in a pre-intervention manual chart review of GM inpatients discharged to home in January 2012. From April-May 2013, a multi-modal intervention was implemented consisting of: 1) physician awareness campaign to encourage timely DC communication, 2) establishment of 24 hours post-DC as the benchmark for DC summary completion, and 3) real-time performance feedback. Weekly during this intervention period, timeliness metrics were manually abstracted from patient charts. We determined the proportion of DC summaries completed within 24 of DC, transmitted within 48 hours of DC, and transmitted before the first F/U appointment. All patients discharged to home from resident-led GM teams were included. Intervention-period performance data were stratified by team and provider and fed back in real-time to providers. We analyzed pre-intervention and intervention-period data with an unpaired t-test and Fisher's Exact Probability Test.

Results: 58 pre-intervention patients and 277 intervention-period patients were included. Pre-intervention median time to DC summary completion was 1.72 days (95% CI: 1.00-2.18) and to transmission to F/U providers was 2.62 days (95% CI: 1.94-3.86). 36% of summaries were completed within 24 hours, 40% were transmitted within 48 hours, and 45% were transmitted before the first F/U appointment. Intervention-period median time to DC summary completion was 1.14 days (95% CI: 0.97-1.49; p=0.01) and to transmission to F/U providers was 2.84 days (95% CI: 2.27-3.05; p=0.73). 45% of summaries were completed within 24 hours (p=0.24), 37% were transmitted within 48 hours (p=0.77), and 45% were transmitted before the first F/U appointment (p=1.00).

Conclusion: This multi-modal QI project achieved a significant decrease in time to DC summary completion by housestaff. This modest improvement in DC communication timeliness was achieved with low-intensity interventions. Improvements could be augmented and sustained with implementation of an automated system for provider-level, real-time feedback.

PENNSYLVANIA PODIUM PRESENTATION - Sucharita Mukherjee

The Prevalence and Correlates of Lifetime Mental Disorders and Trauma Exposures in Urban and Rural Settings: Results from the National Comorbidity Survey Replication (NCS-R)

First Author: Sucharita Mukherjee Additional Authors: Erik B. Lehman, MSc; Jennifer S. McCall-Hosenfeld, MD, MSc

Introduction: Mental health disorders are a product of both genetics and environment. Distinctions between rural and urban environments are likely to produce different frequencies of traumatic exposures, and thus differences in the occurrence of mental health disorders. Since rural patients are more limited in their ability to access appropriate mental healthcare, it is important to determine the frequency of mental health disorders and trauma exposures across the rural-urban continuum. It is hypothesized that the prevalence of lifetime mental health disorders and frequency of trauma exposures will differ by placement on the rural-urban continuum.

Methods: The National Comorbidity Survey Replication was used to assess a range of psychiatric disorders and related correlates among a nationally representative sample of the U.S. population (N= 9,282). Rurality was designated using the Department of Agriculture's 2003 rural-urban continuum codes (RUCC), which differentiate counties into nine level of increasing rurality by population density and proximity to metropolitan areas. Lifetime mental health disorders examined were post-traumatic stress disorder (PTSD), anxiety disorders, major depressive disorder, mood disorders, impulse-control disorders, and substance abuse. Trauma exposures were classified as war-related, accident-related, disaster-related, interpersonal or other. Ordinal logistic regression models were used to examine odds of lifetime mental health disorders and trauma exposures by placement on the rural-urban continuum, adjusted for relevant covariates.

Results: Seventy-five percent of participants came from RUCC 1-3 (metropolitan) 12% from RUCC 4-5 (nonmetropolitan, urban population>=20,000), and 13% from RUCC 6-7 (nonmetropolitan, urban population<20,000) counties. The most common disorder reported was any anxiety disorder (*f*=38.4%). Drug abuse was more common for respondents residing in metropolitan areas (*f*=8.74%, p=0.018) when compared to nonmetropolitan areas. A one-category increase in rurality was associated with decreased odds for war-related trauma (aOR = 0.86, 95%CI 0.78,0.95). Rurality was not independently associated with risk for any other lifetime mental health disorders or trauma exposure.

Conclusion: Across the rural-urban continuum, the frequencies of lifetime mental health disorders and most trauma exposures are similar. Rural communities suffer from a shortage of mental healthcare resources, reflecting a relative deficit to address the mental health needs of rural-residents.

RHODE ISLAND PODIUM PRESENTATION - Andrew Hwang

Association Between Outpatient "No-shows" and Subsequent Clinical Outcomes

First Author: Andrew Hwang (Tufts University School of Medicine, andrew.hwang@tufts.edu) Steven J. Atlas, MD/MPH (General Medicine Division, Massachusetts General Hospital, satlas@partners.org) Patrick Cronin (Lab of Computer Science, Massachusetts Genera

INTRODUCTION: To improve care and achieve performance targets, healthcare systems focus on patients at high risk for not achieving preventive cancer screening and chronic disease management goals. We hypothesized that patients with a higher propensity for missed outpatient appointments, or "no-shows," will have lower colorectal cancer (CRC) screening and low-density lipoprotein (LDL) goal attainment over the following year.

METHODS: We calculated the "no-show propensity factor" (NSPF) for 142,173 patients seen in an academic primary care practice network from 2007-2009 using 5 years (2005-2009) of outpatient appointment data. NSPF transforms a patient's count of arrivals and no-shows into a score that represents appointment adherence, correcting for patients with few appointments to avoid undue influence on the model. We divided patients into two groups: patients in the highest quartile and patients in the lower 3 quartiles of NSPF, and assessed CRC screening completion among patients aged 52-75 years without prior colectomy and LDL goal (LDL<100mg/dl) attainment in patients with diabetes or vascular disease at one year follow-up (2010). We evaluated the association between NSPF and our two binary outcomes using logistic regression models adjusting for number of visits. Using a "change-in-estimate" strategy, we included patient (age, gender, race, language, insurance, neighborhood median household income, Charlson comorbidity index, and diagnosis of depression or alcoholism) and provider factors (gender, years in practice, and whether the patient received primary care at a community health center) in the models if they altered the odds ratio by >5%. We also ran models adjusting for all variables.

RESULTS: Compared to patients in the lower 3 quartiles for NSPF, patients in the highest quartile were significantly (P<0.0001 for all) younger (45 vs. 52 years) and more likely to be male (44% vs. 42), non-white (39% vs. 18%), non-English speaking (18% vs. 7%), uninsured (7% vs. 4%), live in neighborhoods with low median household income ($50,518 vs. $63,736), receive primary care at a community health center (15% vs. 7%), and have a diagnosis of depression (20% vs. 11%) or alcoholism (3% vs. 0.9%). Compared to eligible patients in the lower 3 quartiles for NSPF, eligible patients in the highest quartile were significantly more likely to have not completed CRC screening (adjusted OR 1.72 [1.63-1.81] adjusting for number of visits and neighborhood median household income) or have an above goal LDL (adjusted OR 1.72 [1.60-1.85] adjusting for number of visits and age). Inclusion of all variables in the models did not change the significance or direction of the effect, and the effect changed by less than 7% for both outcomes.

CONCLUSIONS: NSPF was a strong, independent predictor of subsequent colonoscopy completion and LDL goal attainment. Using NSPF may help healthcare systems identify patients at increased risk for non-adherence to recommended care for targeted interventions to improve care and achieve performance targets.

VIRGINIA PODIUM PRESENTATION - Joseph Bozzay

Evaluation of Aspirin Use in Patients with Stable Coronary Disease with Atrial Fibrillation Requiring WarfarinJoseph

First Author: Joseph Bozzay, Shazia Ahmad, Devin O'Hara, Stephanie Thompson, Cindy Hanna, Atul Singh, William Carter

BACKGROUND: Until 2012, all guidelines recommended the use of both aspirin (ASA) and warfarin in patients with stable coronary artery disease (CAD) and atrial fibrillation (AF). In February 2012, CHEST guidelines in a major paradigm shift recommended warfarin alone without ASA in patients with stable CAD with AF (Class C recommendation). The committee felt this new guideline would help decrease the known increased bleeding risk associated with combined ASA and warfarin therapy and yet provide adequate embolic protection for AF patients. AIM: To investigate anticoagulation practices by clinicians at a large cardiac referral hospital for patients with AF and stable CAD and to retrospectively examine if ASA use was influenced by the Bleeding Risk Index, CHADS score, or the recent publication of the February 2012 CHEST guidelines.

METHODS: A retrospective study of 100 consecutive patients treated at a large cardiac referral hospital with a diagnosis of AF, stable CAD and warfarin therapy during a period before and after the publication of the new guidelines. Bleeding risk (Bleeding Risk Index), CHADS score and the time of decision to use ASA with warfarin in relation to the publication of the CHEST guidelines were obtained to determine if these factors influenced ASA use with warfarin.

RESULTS: ASA was given on discharge in 5/10 (50%) with warfarin in low bleeding risk group, 41/77 (48%) in intermediate bleeding risk and 9/13 (69%) in high bleeding risk group (P value=0.53). Likewise, 27/50(54%) of patients were on ASA before publication of the guidelines and 25/50 (50%) after the guidelines (P value= 0.84). Similarly, 2/2 (100%) with CHADS score of zero, 5/13(38.5%) with CHADS score of 1, 48/85(56.5%) with CHADS score of 2 or more were on ASA (P value= 0.21).

CONCLUSION: It appears likely at a large cardiac hospital center that ASA use with warfarin is not influenced by the new 2012 CHEST guidelines, bleeding risk, or CHADS score.

VIRGINIA PODIUM PRESENTATION - Alexander Weller

Examining Inpatient Cost Savings from the Patient Centered Medical Home

First Author: Alexander Weller, MS Henry Ivey, MD

Introduction The Patient Centered Medical Home (PCMH) is an increasingly popular effort to improve primary health care. It is hoped that more robust primary care will bring about improved health of the population while ultimately reducing costs for the health system. At Carilion Clinic, the largest provider of healthcare in Southwest Virginia with eight hospitals and over 500 physicians, the PCMH was implemented in eight primary care offices between 2009 and 2011. There is currently insufficient RESEARCH on the implications of this change for economic and utilization factors. This study is an effort to examine the initial impact of this change.

Methods Adult patients who had a chronic condition that was particularly amenable to PCMH interventions (hypertension, hyperlipidemia and diabetes) and had had an ambulatory encounter in the year prior to the study composed the study population. The study period of Janurary 1 2010 to June 30 2011 was chosen as approximately half the primary care practices had transitioned to the PCMH model by that time. Study population members who had an emergency department visit or hospital admission (and were discharged with a Diagnosis Related Grouping (DRG) condition that would presumably be affected by PCMH interventions) composed the study sample. The primary response variables were length of stay in days and total reimbursement that was received by Carilion Clinic (patients with 100% charity care were not included in the later).

The analysis was done on an intent-to-treat basis. If the data was non-normal, a Wilcoxon Rank Sum test was performed.

Results There were 9,443 patients diagnosed with diabetes, 27,364 with hypertension and 32,449 with hyperlipidemia; patients could have more than one condition. For all three conditions, there was no significant difference in the length of stay ($p>0.05$). Total payments were significantly different between PCMH and non-PCMH patients ($p<0.05$). For example, including both ED visits and admissions, the median payment was $1,603 greater for PCMH patients with hypertension; for admissions only, the median length of stay was 3.0 for both groups.

Discussion Although there was no difference in the length of stay, the total payments to Carilion Clinic from all payers was consistently higher for PCMH members. With the large study population and intent to treat design, this study could suggest that the PCMH, though possibly helpful for clinical measures, does not in and of itself reduce the overall cost of healthcare or have any impact on service utilization. It is possible that sicker patients might self segregate to areas with PCMH practices, or use different hospitals. However, this study used actual reimbursements received for services rendered, and looked at patients targeted for PCMH chronic disease interventions. More analysis will be needed to determine whether care coordination within the PCMH, or other facets of the PCMH, has an impact on clinical or economic outcomes.

RESEARCH POSTER FINALISTS

ARIZONA POSTER FINALIST - Tiffany Son

Optimization of Porcine Heart Decellularization

First Author: Tiffany Son Ning Qu, Anthony Louis, Courtney Hemphill, Alice Ferng, Brigid Smith, Katherine Stavoe, Kitsie Penick, Zain Khalpey

The traditional treatment of Stage IV cardiac disease is limited by available donor organs. As heart disease mortality grows worldwide, the disparity between the large patient population and the small heart donor pool is an increasing problem that makes cardiac tissue regeneration an anticipated solution. A method for organogenesis is to use a decellularized heart as a biological scaffold which bypasses the complications of organ donation and allows for clinical cardiac transplantation.

This study developed a decellularization protocol for porcine heart and compared experiment durations of 5 hours and 10 hours in order to optimize this technique. The system was pressure regulated and monitored to simulate physiological conditions with gradual flow rates (=2200ml/min) and pressures (=400 mmHg) to decellularize porcine hearts (n=9). Decellularization involved perfusion with 1-3% triton and 1-2% sodium dodecyl sulfate and a porcine heart was perfused with only ddH_2O for comparison. Native and decellularized hearts were histologically analyzed.

After a decellularization process of 5 hours or 10 hours, the non-native hearts appeared grossly translucent, indicating loss of cellular components. Histological data indicated removal of nuclear material with varying ranges of structural architecture in the decellularization procedures. The 5 hour reaction depicts the optimization of this procedure with the cardiomyocytes retaining the most structural integrity and minimal nuclear material compared to the other procedures. The aim of monitoring the decellularization protocol resulted in a shorter cardiac decellularization method in order to provide a viable scaffold for stem cell re-seeding.

ARIZONA POSTER FINALIST - Sandeep Singh Bains

Campaign against Texting and Driving

First Author: Sandeep Bains, Peter Rhee, Viraj Pandit, Daniel Judkins, and Bellal Joseph

INTRODUCTION: Distracted driving is a growing public safety problem which is estimated to cause over 387,000 critical injuries and over 3,300 fatalities annually. Distracted driving has been primarily considered as a problem among the young drivers however; in recent years there has been an increasing incidence of distracted driving among adults. The primary aim was to identify the incidence of distracted driving among health care providers. Our secondary aim was to create awareness and prevention strategies against distracted driving. We hypothesized that distracted driving is prevalent among health care providers.

METHODS: We performed a prospective interventional study of all the staff members at our hospital. The trial involved three phases: Phase one was 1 week pre-intervention observation outside employee parking garage. Phase two was 1 week intervention phase carried out in hospital cafeteria, banners at garage exit, and survey questionnaire via email. Phase three was 1 week post-intervention observation. Observations were carried out at three time intervals: 6.30-8.30am, 4.40-5.30pm, and 6.30-7.30pm. We defined distracted driving as texting or talking on cell phones. Hospital employees were identified with: badges and scrubs, employees exiting through employee gate, and parking pass on the car. Our primary outcome measure was incidence of distracted driving pre and post intervention. Univariate analysis was performed to compare incidence of distracted driving pre and post intervention.

Results: A total of 10,859 observations (Pre: 6,639, Post: 4,220) and 520 survey respondents were collected. The mean age of respondents was 44$\pm$27.5 years and 88% were female. 35.5% respondents admitted to texting while driving while 4.5% respondents were involved in an accident due to texting and driving. 77% respondents felt more informed after the survey and 91% respondents supported a state legislation against texting and driving. There was a significant reduction in distracted driving pre and post intervention in each of the time interval of observation (6.30-8.30am: 9% vs. 4%, p=0.01; 4.30-5.30pm: 19% vs. 14.6%, p= 0.02; and 6.30-7.30pm: 29% vs. 24.5%, p=0.04). On sub-analysis, there was a significant reduction in talking (10.1% vs. 4.8%, p= 0.001) and texting (5.2% vs. 2.3%, p= 0.01) while driving post intervention.

CONCLUSION: Distracted driving is prevalent among healthcare professionals. We recorded greater than 50% reduction in the incidence of distracted driving during the post-intervention phase. Implementation of a national education campaign against distracted driving is warranted.

CALIFORNIA POSTER FINALIST - Steven He

A National Survey of Aspergillus Prophylaxis and Treatment in Lung Transplant Recipients

First Author: Steven Y. He, BS, Zaineb H. Makhzoumi MD, MPH, Jonathan P. Singer, MD, MS, Peter V. Chin-Hong, MD and Sarah T. Arron, MD, PhD. University of California, San Francisco, San Francisco, CA, USA.

Introduction: Lung transplantation is an accepted therapy for patients with end-stage lung disease and the number of transplants per year continues to increase in the United States (U.S.). However, patient survival remains significantly limited by fungal infections and *Aspergillus species* are the most common cause of infection. In lung transplant (LTx) recipients, the incidence of *Aspergillus* infection is as high as 40.5 cases per 1000 person-years. Prophylaxis against invasive aspergillosis (IA) is common practice for LTx recipients, with >75% of U.S. LTx centers reporting prophylaxis in 2004 and >58% of LTx centers worldwide reporting prophylaxis in 2011. The optimal therapy for treating *Aspergillus* colonization and IA has not been identified, although IV voriconazole and IV amphotericin B are agents commonly employed as therapy. Despite multiple existing studies comparing the efficacy of various antifungals for *Aspergillus* prophylaxis and treatment of infection in LTx recipients, there are no consensus guidelines for the optimal agent, route or duration of prophylaxis or treatment, leading to substantial variations in clinical practice across LTx centers.

Methods: A cross-sectional study surveyed the directors of active U.S. LTx centers to examine clinical practice variations in *Aspergillus* prophylaxis and treatment of colonization and IA in LTx recipients. Descriptive statistical analyses were performed using STATA v11.2.

Results: A total of 27 of 64 (45.5%) active U.S. LTx programs responded to the survey, representing 9 of 11 transplant regions with survey responses reflecting the regional distribution of centers. 77.8% of centers reported using antifungal prophylaxis, with the most common agent being inhaled amphotericin B (61.9%). 74.1% of centers treat *Aspergillus* airway colonization, with 80.0% of centers using oral voriconazole and 60.0% using inhaled amphotericin B. All centers treat IA, and 92.6% employed oral voriconazole. The duration of *Aspergillus* prophylaxis and treatment of colonization or IA varied widely across centers from 3 months to greater than one year. 51.9% of centers reported internal practice variations amongst different practitioners at the site. Factors impacting treatment decisions included microbiologic culture and antifungal sensitivity (74.1%), ease of administration (59.3%), interaction with other medications (55.5%), side effect profile (51.8%), and center guidelines (48.1%). No center considered patient preference when choosing an antifungal agent. 85.2% of LTx centers recommended routine skin cancer screening for LTx recipients, but only 44.4% of LTx centers reported having a dedicated transplant dermatologist caring for these patients.

Conclusion: Most LTx centers currently employ antifungal prophylaxis and treatment for *Aspergillus* colonization and invasive aspergillosis. However, practice variations across and within centers differ substantially with choice of agent, route of administration and duration of treatment. There are a limited number of transplant dermatologists available across LTx centers. Overall, there is a strong need for level I consensus guidelines directing antifungal prophylaxis and treatment of *Aspergillus* infection in LTx recipients.

CALIFORNIA POSTER FINALIST - Elliot Ho

A Review of Additional Indices to a Dobutamine Stress Echocardiogram in the Evaluation of Patients with Low Flow Low Gradient Aortic Stenosis

First Author: Elliot Ho, MS, Jonathan Kung, MD, Radha Sarma, MD, FACP

Introduction: Individuals with truly severe low-flow, low-gradient aortic stenosis (LFLG AS) benefit from aortic valve replacement (AVR), while AVR in patients with pseudo-severe aortic stenosis (PS AS) often result in high mortality and exposure to unnecessary surgical risk. Traditional use of dobutamine stress echocardiogram (DSE) often misclassifies PS AS as truly severe aortic stenosis (TS AS) leading to unwarranted AVR.

Methods: A search on Pubmed was done for randomized controlled trials (RCTs) from 1965 to 2010 on low-flow, low-gradient aortic stenosis. Key words in the search included: "low-flow," "low-gradient," "aortic stenosis," and "pseudo-severe aortic stenosis." Our literature review evaluated whether combining DSE with other cardiac modalities would offer better distinction between TS AS and PS AS; thus providing information needed to choose optimal treatment for LFLG AS.

Results: Our literature review evaluated four modalities used to differentiate PS AS from TS AS. First, the multicenter Truly or Pseudo-Severe Aortic Stenosis (TOPAS) study demonstrated BNP's utility in differentiating PS AS from TS AS, as BNP was significantly higher in TS AS when compared to PS AS as well as in patients who underwent AVR.[1] Second, Blais *et al.* suggests that by standardizing flow, projected effective orifice area (EOAproj) permits assessment of AS severity under similar flow conditions.[2,3,4] The use of standardized transvalvular flow rate would correct for variability in transvalvular pressure gradient and effective orifice area (EOA) during inconsistent degrees of increased flow induced by DSE, thus providing a more accurate interpretation of DSE results.[5,6,7]

Third, Hachicha *et al.* demonstrates that valvuloarterial impedance (Z(va)) calculates AS severity by estimating global hemodynamic load faced by the left ventricle, predicting occurrence of LV dysfunction. A higher Z(va) is associated with an increased risk of overall and cardiovascular mortality. Furthermore, asymptomatic patients with Z(va) > 4.5mmHgmL^{-1}m^2 and abnormal findings from stress testing would benefit from AVR.[8]

Lastly, the SEAS substudy revealed that 47.5% of patients classified as severe AS by aortic valve area index (AVAI) were reclassified to non-severe AS when pressure recovery was taken into account. Severe AS was associated with AVAI and ELI = 0.6cm^2/m^2.[9,10]

Conclusion: Conventional use of aortic valve area, transvalvular mean pressure gradient, and jet velocity[11,12] for detecting AS leaves room for misdiagnosis of PS AS and results in unwarranted AVR. Instead, a panel of indices including EOA(proj),[13] valvuloarterial impedance,[8] plasma levels of BNP,[14] and pressure recovery[9] used in concert with traditional DSE increases the accuracy of differentiating TS AS from PS AS – providing better guidance for staging and LFLG AS management.

CALIFORNIA POSTER FINALIST – Srikanth Krishnan

Left Ventricular Septolateral Delay Affects Survival Independent of QRS Duration in Patients with Systolic Heart Failure: Nine Year Outcome in 119 Patients

First Author: S Krishnan MS, S Verma MD, M Cheng DO, R Krishnan MD, R Pai MD

Background: Although the goal of cardiac resynchronization therapy is to correct left ventricular (LV) mechanical dyssynchrony, the prognostic importance of the latter in patients with systolic heart failure is not known. We investigated this question in 119 consecutive patients with systolic heart failure with an LV ejection fraction (EF) =35% who did not receive an implantable cardioverter defribrillator.

Materials and Methods: The cohort is a prospective series of 119 patients with EF =35% and who did not receive a defribrillator between March 2002 and February 2004. Tissue Doppler velocities of the 4 quadrants of the mitral annulus were obtained using pulsed wave technology. Time measurements were made referencing the signals to the q wave of the electrocardiogram. Ejection to onset septolateral and anteroposterior delays were computed and related to mortality obtained from chart review and National Death Index.

Results: Patient characteristics included age 53±12 years, 73% male, 23% with coronary artery disease, LVEF 24±7%, LV end-diastolic dimension 65 ±9mm, LV end-systolic dimension 56 ±9mm, QRS duration 110 ±38ms and 92 (84%) with QRS duration <120 ms, and mean septolateral delay 39.7 ms. Over a follow-up of 9 years, there were 63 deaths. Univariate predictors of mortality included LV septolateral delay (HR 1.001 per ms, p <0.0001); anteroposterior delay (HR 1.001 per ms, p=0.003); and age (HR 1.001 per year, p=0.005); but not EF, LV size or QRS duration. Using Cox regression analysis LV septolateral delay was an independent predictor of higher mortality (p=0.0005) after adjusting for age, gender, EF, LV size, QRS duration, coronary artery disease, diabetes mellitus, and use of beta blockers or angiotensin converting enzyme inhibitors. Patients with a larger than the mean septolateral delay had poor survival.

Conclusions: The QRS duration is <120 ms in majority patients with systolic heart failure and LVEF = 35%. Septolateral LV mechanical dyssynchrony is a strong and independent predictor of long-term survival in these patients independent of QRS duration. CRT therapy in patients without QRS duration < 150 msec and without LBBB has not been shown to improve survival; however, dyssynchrony as assessed by TDI still remains a marker of long-term mortality.

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COLORADO POSTER FINALIST - Philipp Hannan

Health and Health Care for the LGBT Community: Identifying and Minimizing Disparities

First Author: Philipp Hannan Co-Author: Rita Lee, MD

An interactive online module for healthcare providers to improve LGBT health

Statement of Problem*:* Within the health care system, lesbian, gay, bisexual, and transgender (LGBT) persons face inequity that contributes to health disparities. A 2011 survey found 21% of LGB individuals had been refused services by health care providers due to their sexual orientation, a rate that increased to 53% among transgender respondents. 65% of LGB respondents felt there were insufficient adequately trained health care professionals to address their LGBT-specific needs, while 85% of transgendered persons felt the same. Currently, United States medical schools demonstrate a dearth in education surrounding LGBT individuals, and devote only a median of 5 hours on issues around LGBT health. Thus, access to culturally responsive and clinically trained providers is a critical issue in improving the health of the LGBT community. We seek to address this with an online educational module.

Learning Objectives:

1. To describe the health disparities LGBT individuals face
2. To describe the specific healthcare needs of LGBT individuals
3. To list the steps a practice or healthcare provider can take to create a welcoming and safe environment for LGBT individuals

Description of Intervention**:** We developed a one-hour long, interactive, online module using Adobe Captivate that addresses LGBT demographics and each of the learning objectives listed above. Based on adult learning theory, the module includes: availability to interested learners at their convenience (timely); pre- and post-tests to document knowledge gains (goal-oriented), embedded videos showcasing LGBT experiences (relevant), links to online resources for additional learning (self-directed), and simple, explicit instructions on creating a more welcoming environment for their LGBT patients (practical). Much of the module is interactive to enhance learner engagement. This module provides 1 hour of continuing medical education credit (1 AMA PRA Category 1 Credit).
Results: The module has been launched. We anticipate widespread dissemination by December, 2013.
Key Lessons Learned: Using educational technology has a steep learning curve, but can enhance the educational experience of the learner.
Link to Module*:* http://www.cms.org/resources/health-and-health-care-for-the-lgbt-community

CONNECTICUT POSTER FINALIST - Chung-Sang Tse

The Development and Implementation of an Online Educational Module on Palliative Care and End-of-Life Care for Pre-Clinical Medical Students

First Author: Chung-Sang Tse, Matthew S. Ellman

Background: Within Internal Medicine, Hospice and Palliative Care has emerged as a subspecialty to specifically address the comfort and quality-of-life needs of patients at the end-of-life. Since 2012, practice in this subspecialty has required board certification and fellowship training through the American Board of Internal Medicine. However, education should begin during the early stages of medical training to ensure that all physicians to have a basic understanding of palliative care. At the Yale School of Medicine, the official End-of-Life / Palliative Care Curriculum was established in 2008 to address this need. This curriculum was expanded in 2012 to include an original educational online module designed specifically for second-year medical students. The goal of this module is to introduce pre-clinical students to specific topics in end-of-life and palliative care prior to their third-year clerkship rotations, during which they are likely to encounter and care for dying patients particularly in the hospital setting.

Methods: "Life, Death & Medicine: The Dying Process, Hospice Care, and Terminal Care" was developed as a 30-45 minute interactive web-based module featuring patient case studies, multiple-choice questions with individualized feedback, multimedia clips, and web-links to supplementary material to teach three topics: 1) Physiological signs and stages of the dying process; 2) Treatment options for terminal symptoms; and 3) Services and qualifications for hospice care. The educational content is literature-based with reference citations throughout the module. A knowledge-and-attitudes survey was administered to second-year medical students at Yale to evaluate the effectiveness of the module. Results: 112 students (62 students from the Class of 2015; 50 from the Class of 2016) participated in the survey (56% response rate) in 2012 and 2013, of which 70 students completed the online module and 42 had not (control). Fisher's Exact Test was used to analyze the knowledge performance based on a series of multiple-choice questions; students who completed the online module performed statistically better ($p < 0.05$) on 40% of the questions. Two-way ANOVA was performed and found that the responses between the two class cohorts were not statistically different. Moreover, all the students (no statistical difference in Yes/No Module groups or 2012/2013 class cohorts) expressed that they felt somewhat uncomfortable caring for dying patients, though they regarded it as part of the physician's duty, and that medical school education has an important role in addressing this knowledge gap.

Conclusions: A promising tool has been developed to introduce pre-clinical medical students to key concepts of terminal care. The application of this online module could be extended to other medical education institution to augment teaching of palliative and end-of-life care.

FLORIDA POSTER FINALIST - Brooke A Johnson

Effects of Osteopathic Manipulative Treatment (OMT) in lowering perceived stress in medical, dental, and pharmacy student populations.

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INTRODUCTION: 50% of medical students report burnout and 10% report suicidal ideation when surveyed about their perceived forms of distress (Dyrbye). Only one previous pilot study has investigated OMT as a modality to reduce stress in medical students. Physiological distress is an incredibly common trend among not only medical students, but also pharmaceutical and dental students. It was hypothesized that OMT would provide a reduction in self-reported stress in a population of health professions students.

METHODS: 102 study participants were de-identified and randomly assigned to 1 of 3 groups: control, directed treatment (DT), and non-directed treatment (NDT). Both the DT and NDT groups received 20 minutes of therapy specific to those groups once a week for 4 weeks, followed by a 10 minute supine rest period post-treatment. DT was based on treatments targeting core areas and NDT was based on mostly non-core areas. Treatments were performed by OMSII's trained in uniform technique and were overseen by OMT faculty. All groups completed electronic Self-Perceived Stress Scale (PSS) questionnaires at weeks 0 (pre), 1, 2, 3, and 4 (post). Scores of the PSS were analyzed retrospectively using an independent samples t-test.

RESULTS: Subjects were excluded only if a subject became ill or opted to withdraw during the course of the study. There was a significant difference in average change in PSS in the DT group compared to the control group between surveys 1 and 4 (CI = 0.1to 6.7, P=.044). A significant difference was noted in the average change in PSS of the NDT group compared to the control group between surveys 0 and 4 (CI = 1.6 to 11, P =.009). A significant difference was noted in the average change in PSS of the NDT compared to the DT group between surveys 0 and 4 (CI = -.95 to -.27, P=.038).

CONCLUSION: Participants receiving both core and indirect treatments demonstrated a reduction in stress when compared to the control group. A surprising, significant greater reduction in perceived stress was observed in the NDT group when compared to the DT group. Overall, OMT in general has shown to be effective in reducing the distress in all three medical, dental, and pharmacy student populations. Further studies should address possible treater error, differences in the rigors of health professions curriculums, and the greater reduction in stress observed in the NDT population.

GEORGIA POSTER FINALIST - Thuy-Van Duong

Mercy Health Center Needs Assessment and Obesity Prevention Initiative

First Author: Thuy-Van (Tina) Duong BAS, MS2, Georgia Regents University- University of Georgia Medical Partnership Second Author: Grace Johnson, MA, Mercy Health Center Third Author: Cheryl Dickson, MD, MPH, Georgia Regents University- University of Geor

Introduction: Obesity, which is strongly linked to preventable diseases like diabetes, is an increasing concern faced by many Americans. Compared to the national prevalence of 35.7%, 52.0% of patients are obese (BMI =30) at Mercy Health Center, a volunteer-based free clinic in Athens, GA. To address this, Mercy offers health programs, but only 32.5% of patients have been referred, and of those, 26.0% completed a program. The purpose of this study was to understand the high obesity and low program referral and participation rates at Mercy in order to structure an obesity prevention initiative.

Methods: Data was collected from 306 charts (63.4% female, 45.7 avg. age), 318 surveys in English and Spanish (73.8% female, 48.1 avg. age), and 36 interviews (21 patients, 15 providers). SPSS was used to analyze trends and significant differences among patient subgroups, and data from interviews were grouped by common themes.

Results: In the obese, 61.1% had a provider talk about weight management, nutrition, or exercise. In comparison, 58.5% of obese patients expressed interest in enrolling in a health program, and 91.7% of them were interested in losing weight. This difference between patients' desires for weight loss and their providers' actions must be addressed.

While fear and family were strong motivators for a healthy lifestyle, barriers included lack of energy, money, and stress. Obese patients were more than twice as likely as non-obese ones to believe that there is no safe and convenient place to exercise.

Conclusion: To address the gap between patient and provider interests and actions, providers should be educated about the services available and should speak to obese patients about lifestyle changes, assess the patients' readiness to change, and refer them to appropriate programs. Information about obesity risks and healthy lifestyles should also be readily available to patients via slideshows and posters throughout the clinic. Overall, the study revealed a need for Mercy to expand on its current programs (i.e., wellness, diabetes, and hypertension) to create a clinic-wide wellness culture promoting healthy habits and an on-site program so patients can learn to manage their weight and have a convenient place to exercise.

GEORGIA POSTER FINALIST - Sean Bandzar

(+)-Catechin increases alkaline phosphatase activity in MC3T3-E1 cell lines

First Author: Sean Bandzar Co-Authors: Shabnam Gupta, Rosemary Song, Sam Raji

Introduction: Approximately 8 million women and 2 million men have bone density levels meeting the diagnostic criteria for osteoporosis. Protective factors include dietary calcium and vitamin D, which stimulate osteoblastic activity in the.

Methods: Previous studies have also illustrated a protective role of antioxidants such as vitamin C on bone health. However, studies have yielded confounding results pertaining to the effects of another antioxidant, catechin, on osteoblastic activity. In this study (+)-catechin, an antioxidant found in dark chocolate, was investigated to understand its effects on bone health. The effects of low, medium, and high concentrations of vitamin C (positive control) and catechin were studied to clarify their effects on osteoblastic activity.

Results: To elucidate the effects of vitamin C and (+)-catechin on ALP activity of osteoblasts, MC3T3-E1 cells were treated with three concentrations of vitamin C (low: 2x10-4 M, medium: 4x10-4 M, high: 6x10-4 M), (+)-catechin (low: 5x10-5 medium: 1x10-4 M, high: 1.5x10-4 M), a mixture of both, and a control group (cell media without vitamin C) for 5 days (n=6). The measured ALP levels were normalized to the total protein levels. This data was analyzed using a two-way ANOVA test and post-hoc Bonferroni test yielding p-values < 0.0001. Vitamin C was determined to significantly affect ALP activity above 4x10-4 M, while the effects of (+)-catechin on ALP activity were negligible at all concentrations. However, the additive effects of both antioxidants were significant at all concentrations.

Conclusion: This data suggests that (+)-catechin may increase ALP activity via interacting with other antioxidants such as vitamin C. Further studies including other bone markers such as osteocalcin are warranted to elucidate the mechanism by which (+)-catachin exerts its antioxidant properties.

GEORGIA POSTER FINALIST - Sean Bandzar

Family presence on morning rounds does not negatively impact the efficiency of rounds in a Pediatric Intensive Care Unit

First Author: Sean Bandzar Co-Authors: Qing Li, Pinar Keskinocak, Atul Vats

Introduction: Many pediatric hospitals invite families to attend physician rounds (FCR = family-centered rounds) to involve parents in the decision-making process. However, concerns exist that FCR may negatively impact teaching and rounding efficiency (CCM 2010:38(S12),735). The hypothesis of this study is that FCR will lead to decreased rounding efficiency and decreased time spent on teaching.

Methods: The amount of time physicians spent on various activities during rounds was recorded in the Pediatric Intensive Care Unit (PICU) at Children's Healthcare of Atlanta. The PICU underwent a process change allowing FCR. Human factors (observational data collection) techniques were used to shadow physician led rounds before and after the process change. Each rounding "event" is defined as one attending physician led morning rounds with the multidisciplinary team (including residents, fellows, and students) for either of 2 PICU teams. The impact of FCR was determined by comparing the total rounding time and time spent on teaching pre and post process change. Data were analyzed for statistical significance ($p<0.05$) using a two-tailed T-test and F-test.

Results: Fourteen rounding events were shadowed pre-process change and 18 post. Mean duration of rounds decreased (159.93±30.72 to 151.47±54.86; T-test: p=0.59; F-test: p=0.28). Mean time spent on teaching decreased as well (15.79±13.18 to 8.94±9.72; T-test: p=0.12; F-test: p=0.54). The average number of patients per rounding event was different during non-FCR as opposed to FCR (9.4 vs. 10.5 patients).

Conclusions: FCR did not negatively impact rounding efficiency or teaching. In fact, a slight decrease (not statistically significant) in time spent on rounds with a higher average census was observed during FCR. Due to the census difference between the two groups it is difficult to attribute differences solely to FCR. Furthermore, there was a decrease in physician teaching time after implementing FCR which approached, but did not achieve significance. However, it is difficult to ascertain if this was a reflection of increased census, and we are unsure if the quality of teaching was affected. Further studies are warranted to determine the impact of FCR on the quality of physician teaching and efficiency of rounds.

HAWAII POSTER FINALIST - Michael Wu

Safety net patients with diabetes experience less rapport building when providers demonstrate high computer use

First Author: Michael Wu, University of Hawaii, John A. Burns School of Medicine, Jennifer Barton, MD, Dean Schillinger, MD, Ed Yelin, PhD, Neda Ratanawongsa, MD, MPH, University of California, San Francisco

Limited research on how computer use influences physician-patient communication has yielded both positive and negative effects. This study aims to determine the effects of computer use on rapport building in diverse safety-net settings. Utilizing video recordings of patient encounters in both primary and specialty settings, we conducted an observational study at a large U.S. public hospital with a basic electronic health records (EHR). Eligible patients included English-or Spanish-speaking adults (age 18 or older) with diabetes who receive primary and subspecialty care at five hospital clinics. We coded verbal communication behaviors using an adapted version of the Roter Interaction Analysis System (RIAS). The primary outcome was rapport-building statements (such as reassurance, concern, empathy, or partnership statements) by patients and providers. The primary predictor was high concurrent computer use, categorized as encounters in which >15% of total statements (provider and patient) had concurrent provider computer use. Analysts also rated overall computer use using a 3-item observation instrument (total possible score 0-9), categorizing high use as score >3. We performed regression analysis using generalized estimating equations to account for clustering by providers, controlling for patient age and gender. To date, we have coded 15 encounters among 15 English-speaking patients and 13 providers. Among patients, 53% were women. Although all encounters were in English, 29% prefer Spanish. Among providers, 62% were women; 62% PCPs. Patients were less likely to use any rapport building statements with providers who demonstrated high concurrent computer use (IRR=0.989; 95% CI=0.977-1.000). Specifically, both providers and patients were less likely to use emotional rapport building statements (IRR=0.968, 95% CI=0.941-0.996; IRR=0.950, 95% CI=0.907-0.996, respectively). In addition, high overall computer use was associated with less positive rapport-building by providers and patients (IRR=0.961, 95% CI=0.954-0.968; IRR=0.993, 95% CI=0.987-0.999, respectively). However, both providers (IRR=1.173, 95% CI=1.084-1.268) and patients (IRR=1.302, 95% CI=1.100-1.542) were more likely to offer personal remarks and social conversations during encounters with high overall computer use. In conclusion, preliminary analyses suggest that high computer use may be associated with less overall rapport-building, but personal conversations or “chit-chat” occur more frequently. EHR use may influence patient-provider conversations towards more biomedically-oriented agendas. Future analyses will examine the relationship between computer use and other communication outcomes, such as biomedical and psychosocial statements. Although EHRs are promoted as tools to improve efficiency and safety, it is crucial to gain a better understanding of the how computer use alters patient-provider relationships and communication.

ILLINOIS POSTER FINALIST - Chris Smyre

Limits and responsibilities of physicians addressing spiritual suffering in terminally ill patients

First Author: Chris Smyre, BA John D. Yoon, M.D. Kenneth A. Rasinski, Ph.D. Farr A. Curlin, M.D.

Context: Many patients experience spiritual suffering that complicates and intensifies their suffering at the end of life. It remains unclear what physicians' responsibilities are for responding to patients' spiritual suffering.

Objectives: To investigate U.S. physician opinions about the impact unresolved spiritual struggles have on physical pain, physicians' responsibilities for treating patients' spiritual suffering compared to patients' physical pain, and the number of patients in the past 12 months whose suffering the physician was unable to relieve to a point that the physician or the patient found acceptable.
Methods: In 2010, a survey was mailed to a representative sample of 2016 practicing U.S. physicians from clinical specialties that care for significant numbers of dying patients.

Results: Of 1878 eligible physicians, 1156 (62%) responded to the survey. Large majorities of physicians agreed that patients with unresolved spiritual struggles tend to have worse physical pain (81%) and that physicians should seek to relieve patients' spiritual suffering just as much as patients' physical pain (88%). Half (51%) of physicians reported no patients in the previous 12 months whose suffering could not be relieved to a point they or the patient found acceptable. Compared to physicians who strongly disagreed that physicians should seek to relieve patients' spiritual suffering just as much as patients' physical pain, those who strongly agreed were less likely to report being unable to relieve patients' suffering to a point the physician found acceptable (27% vs. 54% reported 3 or more such patients in the previous 12 months, adjusted odds ratio [95% confidence interval] = 0.3 [0.1-0.8]).

onclusion: The great majority of physicians believe spiritual suffering tends to intensify physical pain and that physicians should seek to relieve such suffering. Those physicians who believe they should address spiritual suffering just as much as physical pain appear to experience more success in relieving patient's suffering—at least to a point the physician and the patient find acceptable.

ILLINOIS POSTER FINALIST - Christian Mcneely

Long term survival of patients undergoing Mitral Valve Repair and Replacement: A longitudinal analysis of Medicare fee-for-service beneficiaries

First Author: Christian McNeely, Christina Vassileva, Steve Markwell

Background. Despite the established superiority of mitral repair over replacement, its adoption in the treatment of elderly patients has not been uniform, partly due to lack of robust long term survival data. We present the long term survival of Medicare fee-for-service beneficiaries undergoing mitral valve repair and replacement over a ten year period.

Methods and Results. We used the Medicare database to identify 47,279 fee-for-service beneficiaries age ≥ 65 undergoing primary isolated mitral valve repair or replacement from 2000-2009. Operative mortality and long term survival are presented for repair and replacement. Operative mortality was 3.9% for patients undergoing repair and 8.9% for patients undergoing replacement. One, 5 and 10 year Kaplan-Meier survival estimates for patients undergoing repair were 90.9%, 77.1%, and 53.6%. One, 5 and 10 year Kaplan-Meier survival estimates for patients undergoing replacement were 82.6%, 64.7%, and 37.2%. Important predictors of mitral repair included younger age [OR 1.10, 95%CI 1.05-1.14], elective admission status [OR 1.34, 95%CI 1.27-1.41] and annual mitral procedure volume greater than 40 [OR 1.57, 95%CI 1.36-1.81. Female gender and the presence of comorbidities were associated with lower likelihood of repair.

Conclusions. Mitral valve surgery in the Medicare population carries less risk than previously reported. Given the favorable outcomes of elderly patients undergoing mitral valve surgery, and especially mitral valve repair, an approach of earlier identification and surgical referral appears justified regardless of age.

INDIA - POSTER FINALIST - Sikarin Upala

Abnormal :liver enzymes in Thai patients with Metabolic Syndromes.

First Author: Sikarin Upala Co author: Mayuree Homsanit, Anawin Sanguankeo, Kamol Udol

OBJECTIVE:Elevated transaminases have been found to be associated with metabolic syndrome (MS) in many populations but little is known in Asians. The present study aimed to investigate the association between elevated hepatic enzymes in Thai patients diagnosed with MS.

MATERIAL AND METHOD:A cross-sectional study on 2,585 Thais was conducted. Blood pressure, waist circumference, fasting plasma glucose, triglyceride, HDL-cholesterol, aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase (A LP) were measured. MS was diagnosed using NCEP/ATP III criteria with modified waist circumference for Asian. The association between MS with elevated liver enzymes was performed using logistic regression.

RESULTS:Twenty-seven percent of the subjects were found to have MS. The MS group had significantly higher mean AST, ALT, and ALP levels than the non-MS group (mean (SD) for AST 29.86 (18.97), 24.08 (12.71); ALT 38.39 (29.14), 24.38 (18.57); and ALP 73.45 (27.09), 65.72 (21.27) for MS and non-MS, respectively, $p < 0.05$). MS was significantly associated with elevated liver enzymes. The adjusted odds ratios (OR) were 2.2 (95% confidence interval (CI): 1.6-2.9), 2.3 (95% CI: 1.8-3.0), and 2.2 (95% CI: 1.1-4.2) for elevated AST, ALT, and ALP, respectively. ALT/AST ratio of > or = 1 was significantly associated with MS in both genders (adjusted ORs: 1.72 (95% CI: 1.28-2.32) for men and 2.30 (95% CI: 1.68-3.16) for women).

CONCLUSION:There is a strong association between metabolic syndrome and elevated liver enzymes. Further study is needed to investigate the long-term sequelae of liver abnormalities in those with metabolic syndrome in Thai population.

INDIANA POSTER FINALIST - Katarzyna Kania, MPH

Therapeutic modulation of MDM2 in Neuroblastoma

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Introduction: Neuroblastoma (NB) is the most common extracranial solid tumor of childhood. In high-risk NB, the MYCN gene is amplified in approximately 25% of all cases, and is considered to be a negative prognostic factor in NB. MYCN can transcriptionally activate the murine double minute-2 (MDM2) gene, leading to increased expression of MDM2, downregulation of the tumor suppressor p53, and increased tumorigenesis.

Methods: To improve treatment outcome in NB, inhibition of MDM2 function in the context of front-line chemotherapy is being explored. The E3 ubiquitin ligase, MDM2, which ubiquitinates and targets p53 for proteosomal degradation, is a multifunctional protein that regulates the p53/p73 signaling network as well as the DNA damage response. Cell growth assays in our laboratory indicate that inhibition of MDM2 function by the small molecule antagonist nutlin3a is synergistic to additive in combination with frontline chemotherapeutics in IMR32 NB cells (wt p53, MYCN amplified). To extend these findings and determine the effects of the combination of nutlin3a and the frontline chemotherapeutic cisplatin on a cell line without MYCN amplification, I performed cell growth assays using SK-N-SH NB cells (wt p53, single MYCN copy).

Results: The results demonstrated that combined treatment with cisplatin and nutlin3a is synergistic in SK-N-SH NB cells. To delineate the mechanism of action in IMR32 cells exposed to cisplatin and nutlin3a, I investigated the impact of the two drugs alone and in combination in the context of MDM2 expression, modulation of the cell cycle, and DNA damage response. Western blot analyses were performed to monitor expression of critical proteins of the cell cycle as well as DNA damage and repair responses that we hypothesized are regulated by nutlin3a-mediated MDM2 blockade (p53, p21, pRb, topoIIa, pHH3, MYCN). The results demonstrated that combination treatment in IMR32 NB cells enhanced the DNA damage response and inhibited cell growth.

Conclusion: The present data provide further support for the hypothesis that MDM2 is a target that can be therapeutically exploited in combination with front-line chemotherapy, such as cisplatin, to improve treatment outcome in MYCN non-amplified and MYCN amplified (high risk) neuroblastoma.

KENTUCKY POSTER FINALIST - Whitney L Ward

Minichromosome Maintenance Protein 3 is induced in renal tubules of Diabetic Mice

First Author: Whitney L. Ward (first author), Susan M. Isaacs, Michael L. Merchant, Michelle T. Barati

Introduction: Diabetic nephropathy is the leading cause of end-stage renal disease in the U.S. In diabetes, renal tubule cell exposure to hyperglycemia and high protein concentrations causes oxidative stress. Cells can combat oxidative stress through activation of nuclear factor erythroid-derived 2 related factor 2 (Nrf2) by release from KEAP1 sequestration, subsequent Ser-40 phosphorylation (pS40-Nrf2), nuclear localization, and target gene induction. Preliminary studies showed that nuclear pS40-Nrf2 increases in cultured tubule cells exposed to diabetic-like high albumin concentrations but decreases in tubules of older diabetic mice, suggesting Nrf2 inactivation. Mass spectrometry (MS) analysis revealed minichromosome maintenance (MCM) proteins 2-7 co-immunoprecipitating with pS40-Nrf2 in tubule cells. MCM2-7 form a DNA helicase required for replication and are also known to regulate some transcription factors. These properties of MCMs coupled to preliminary findings led to the hypothesis that MCM proteins are regulated in tubule cells by diabetes-like high glucose and protein concentrations.

Methods: This study focused on MCM3 protein since it was the most abundant isoform precipitating with pS40-Nrf2 in MS findings. First, immunoprecipitation (IP) of pS40-Nrf2 followed by immunoblot (IB) of precipitated proteins for MCM3 was performed to confirm MS findings. Next, immunohistochemistry was used to define expression of MCM3 and PCNA in tubules of 2,4, and 7 month old OVE26 diabetic and FVB control mice. The effect of high glucose (25mM, 24h) and protein (1 mg/ml albumin; 1,4,24h) concentrations, mimicking the diabetic milieu, on MCM3 expression and cytosol/nuclear localization in cultured human tubule cells was determined by IB.

Results: IP of pS40-Nrf2 from tubule extracts followed by IB for MCM3 confirmed association of these two proteins in a complex together, in both the cytosol and nucleus. MCM3 expression increased and was accumulated in nuclei of tubules from 4 and 7 month old diabetic mice, compared to normal mice of the same age. However, PCNA expression did not increase in diabetic mice, suggesting increased MCM3 expression was not associated with increased cell proliferation. Treatment of tubule cells with high glucose and protein conditions increased MCM3 expression, and high protein concentrations increased MCM3 nuclear localization.

Conclusions: In conclusion, induction of tubule cell MCM3 with diabetes is a novel finding and its role in tubule cell function during diabetes remains to be defined. Association of MCM3 in a complex with Nrf2 suggests a potential role in regulating Nrf2 function.

MANITOBA POSTER FINALIST - Thomas Winter

A C-Reactive Protein Polymorphism Modifies the risk of Rheumatoid Arthritis and Associates with C-Reactive Protein Levels in a North American Native Population

First Author: Thomas Winter, Carol Hitchon, Irene Smolik, David Robinson, Aaron Goldman, Xiaobo Meng, Alex Szalai, Charles Bernstein, Katherine Siminovitch, and Hani El-Gabalawy

Introduction: C-reactive protein (CRP) aids in host defense and CRP-deficient mice have accelerated arthritis, suggesting a role for CRP in immune tolerance. We examined associations between the rs3091244 and rs3093062 single nucleotide polymorphisms in the CRP gene, serum CRP levels, and rheumatoid arthritis (RA) susceptibility in a North American Native (NAN) population that has a high prevalence of RA.

Methods: Two single nucleotide polymorphisms in the CRP gene promoter region were tested by sequencing: rs3091244 (C/T/A) and rs3093062 (G/A) in NAN patients with RA (n=545), their unaffected first degree relatives (FDRs) (n=338), and healthy NAN Controls (n=667) with no history of autoimmunity. Rheumatoid factor, anti-CCP, and high sensitivity CRP (hsCRP) were tested using commercially available ELISAs, and shared epitope (SE) alleles by specific primers. The genotyping data were analyzed using genotypic (CC vs CA vs TT vs TA vs TC), allelic (C vs T vs A), dominant (CC, CA, TC vs TT, TA; TT, TA, TC vs CC, CA; CA, TA vs CC, TT, TC) and recessive models (TT vs CC, CA, TA, TC; CC vs CA, TT, TA, TC). We report odds ratios (OR) with confidence intervals, and medians (interquartile range). Statistical significance was $p<0.05$ using Chi Square, Mann Whitney U, and regression analyses.

Results: All subjects were homozygous (GG) for rs3093062. For rs3091244, significant differences between RA patients (58.9/3.1/6.2/0.4/31.4%) and NAN controls (61.3/2.7/3.2/1.8/31.0%) were found using the genotypic model (ChiSq 12.1, p=0.016) and the TT recessive model (RA=6.2 vs NAN controls=3.1%, ChiSq 6.6, p=0.012). In regression models including SE, anti-CCP, and smoking history, the C dominant genotypes predicted reduced risk of RA (OR 0.12, p=0.02, CI 0.02-0.76), whereas the T recessive genotype predicted increased risk of RA (OR 9.1, p=0.02, CI 1.4-59.6). Serum hsCRP levels differed between RA, FDRs, and Controls (9.5 (7.8) vs 3.6 (6.4) vs 1.2 (0.9) mg/L $p<0.0001$). In analyses including RA, FDRs and Controls, the C dominant genotypes were associated with lower hsCRP levels (4.1 (7.5) vs other genotypes 4.5 (8) mg/L p=0.02), particularly for smokers (p=0.07). This association was less robust for asymptomatic FDRs and Controls (3.2 (21) vs 3.4 (6) mg/L p=0.08).

Conclusions: Although controversy remains as to whether CRP has a causative role in RA pathogenesis, the rs3091244 CRP promoter region polymorphism may modify the risk of developing RA and influence circulating CRP levels in the NAN population.

MARYLAND POSTER FINALIST - Kailin Hsu

Lower self-reported medication adherence is associated with adverse patient safety events in chronic kidney disease (CKD): results from Safe Kidney Care

First Author: Kailin Hsu Authors: Kailin L. Hsu,1 Jennifer S. Ginsberg, MS,1 Marni Zuckerman, MA,1 Min Zhan, PhD,2 Wanda Fink, MS, RN,1 Corinne M. Woods, RPh, MPH,3 Jeffrey C. Fink, MD, MS,1,2 Clarissa J. Diamantidis, MD, MHS1 Institutions: 1. Departmen

Introduction: Low medication adherence has been shown to be associated with poor outcomes in chronic illnesses**,** yet little is known regarding the relationship between self-reported medication adherence and adverse safety events in chronic kidney disease (CKD).

Methods: The Safe Kidney Care (SKC) cohort study is a prospective study of individuals with pre-dialysis CKD (estimated glomerular filtration rate [eGFR] < 60mL/min/1.73m^2) intended to assess the incidence of disease-specific safety events in this at risk population. Enrollment began in April 2011, and study procedures include an annual in-center visit as well as a 6 month follow-up call to evaluate the incidence of inter-current disease-specific safety events thought to be related to a medication, such as hypoglycemia or hyperkalemia. Safety events are classified as being reported by participants at baseline and by phone (Class I event), or incidentally noted through routine study procedures during their baseline visit (Class II event). Medication errors are detected by cross-referencing validated renal-dosing guidelines for renal-pertinent medications with the participant's eGFR to determine the appropriateness of the current medication dose. Medication adherence is determined by assigning adjusted rankings based on participants' responses to a series of questions ascertaining the degree of compliance to their medication regimen.

Results: Of 267 SKC participants completing baseline visits, 263 participants (98.5%) answered questions regarding medication adherence and were included in the analysis. 137 of these participants (52.1%) were classified as having low medication adherence, and were found to be taking 50% more medication than those with high medication adherence (15 vs. 10 medications, respectively). After multivariate adjustment, low medication adherence was significantly associated with Class I events (OR 2.26, 95% CI 1.3, 4.0), Class I or II events (OR 1.90, 95% CI 1.0, 3.6) and medication errors (OR 2.03, 95% CI 1.2, 3.6), all $p < 0.05$. Low medication adherence was also significantly associated with multiple (= 2) Class I or II events (OR 2.46, 95% CI 1.2, 5.1) and multiple (= 2) medication errors (OR 2.24, 95% CI 1.0, 4.8) compared with adequate medication adherence.

Conclusion: Low medication adherence is associated with adverse safety events in CKD. Strategies targeting medication compliance may improve clinical outcomes in individuals with CKD.

MINNESOTA POSTER FINALIST - Pierre Tawfik

A Novel way to detect Coronary Heart Disease- comparing the accuracy of Acoustical Detection versus Cardiac Stress Testing in recognizing Coronary Artery Stenosis

First Author: Pierre Tawfik BS, Emily Caldwell BSN, Farzad Azimpour MD, Sue Duval PhD, Robert F. Wilson MD

Background: Hemodynamically significant coronary stenosis (CS) amplifies local blood flow turbulence. Acoustical detection (AD) of that turbulence may offer a noninvasive, inexpensive, and widely utilizable screening method for detecting CS. We compared the accuracy of AD to cardiac stress testing (ST) in detecting a >50% diameter CS.

Methods: We studied 69 consecutive patients who underwent ST prior to routine coronary angiography and had no history of chest surgery or valvular disease. AD data were collected with a specialized microphone before angiography at predetermined chest auscultation sites. The signal was analyzed blindly for the presence of turbulence using a modified FFT method. Angiograms were interpreted blindly by an experienced cardiologist who determined the percent diameter stenosis in each major coronary segment. Stenosis >50% was defined as significant. Stress ECG (n=69), nuclear imaging (n=28), and echocardiography (n=41) were analyzed by an experienced cardiologist blinded to clinical data. Tests with reversible ischemia were defined as positive. The accuracy of AD and ST methods was determined by comparison to angiographic findings.

Results: Table 1 compares the accuracy of AD and three ST methods (ECG, nuclear, and echo) in detecting coronary stenosis >50%. AD demonstrated sensitivity, specificity, PPV, and NPV at least comparable to all ST modalities.

TEST	n	Sensitivity	Specificity	PPV	NPV	Prevalence of CAD	Accuracy	ROC AUC
AD	69	0.64	0.76	0.74	0.66	0.52	0.70	0.70
ECG ST Depression>0.1mV	69	0.33	0.85	0.71	0.54	0.52	0.58	0.59
All imaging	69	0.58	0.46	0.54	0.50	0.52	0.52	0.52*
ST Nuclear	28	0.47	0.62	0.58	0.50	0.54	0.53	0.54
ST Echo	41	0.67	0.35	0.52	0.50	0.51	0.51	0.51

*p<0.05 compared to AD

Conclusions: Compared to the described ST modalities, AD demonstrated at least similar accuracy in detecting coronary stenosis >50%. An AD device requires less patient preparation, imposes no clinical risk, and reduces test acquisition time. This modality requires minimal operator training and reduces the overall economic cost. Thus, AD serves as a possible widely utilizable modality to screen patients for significant CS.

MISSISSIPPI POSTER FINALIST - Bradley Deere

Bad things may also come in small packages - Small Microvascular Lesions in the Brain and Incident Stroke and Mortality Risk: The Atherosclerosis risk in Communities (ARIC) Study

First Author: Bradley Deere, MS B Gwen Windham, MD, MHS Michael E Griswold, PhD Wanmei Wang, MS Daniel C Bezerra, MD, MS Kenneth Butler, PhD Dave Knopman, MD Rebecca Gottesman, MD, PhD Gerardo Heiss, MD, MS, PhD Thomas Mosley, PhD.

Background: Ischemic lesions <3mm on brain imaging are typically ignored in clinical and RESEARCH settings due to concerns of measurement error. Lacunar and non-lacunar ischemic lesions >3mm, (ie subclinical brain infarcts) and white matter hyperintensities (WMH) are associated with incident stroke and mortality in primarily older adults. We examined contributions of lesions <3mm, lesions >3mm, and WMH to the risk of incident stroke and stroke mortality in middle-to-old ages.

Methods: Participants free of clinical stroke in the ARIC Study who underwent brain MRI at 2 study sites (Jackson, MS; Forsyth County, NC; 1993-95) were included (n=1884; 40% men; 50% black; age 50-73 years). Participants were classified as having no lesions (n=1611), only lesions <3mm (n=50), only lesions >3mm (n=185), and both lesions <3mm and >3mm (n=35). WMH (0-9 scale) were dichotomized into <3 (n=1658) and >3 (n=223). Outcomes were cases of adjudicated incident stroke (n=157 events) and stroke mortality (n=50 events) obtained over an average 14 years follow-up. Cox proportional hazards models estimated risk of each outcome adjusted for age, sex, race-site, hypertension, systolic and diastolic blood pressure, diabetes, heart disease, smoking, BMI, hypertension medication use, statins, cholesterol, HDL, LDL, triglycerides, education, alcohol use.

Results: Stroke risk was tripled in those with only lesions <3mm (hazard ratio [HR]=3.44, 95% CI: 1.84-6.44), and doubled for those with only lesions >3mm (HR=1.93, 95% CI: 1.2-3.09) or with WMH (HR=2.06, 95% CI: 1.39-3.06). Having lesions <3mm and lesions >3mm combined was associated with an 8-fold increased risk of stroke (HR=8.1, 95% CI: 4.42-14.86). Stroke mortality had a similar pattern of estimates for lesions <3mm (HR=2.59, 95% CI: 0.85-7.86), lesions >3mm (HR=1.8, 95% CI: 0.79-4.1), and combined <3mm and >3mm lesions (HR=6.31, 95% CI: 1.82-21.85) with less statistical significance likely related to the smaller number of events.

Conclusions: These results suggest that even very small lesions on brain imaging, potentially indicative of microvascular disease, warrant clinical consideration and further study to better understand and ameliorate risk associated with early evidence of microvascular disease. The simultaneous presentation of both <3mm and >3mm lesions may represent a particularly marked increase in risk.

MISSISSIPPI POSTER FINALIST - Rupesh Patel

Inhibition of Toxin Production in Staphylococcus aureus Keratitis

First Author: R. Patel, M. Bierdeman, A. Arana & R. O'Callaghan, Ph.D.

Introduction: Staphylococcus aureus, the most common cause of eye infections, presents challenging antibiotic resistance and secretes multiple damaging toxins. Killing these bacteria does not arrest the activity of the previously secreted toxins and there is no drug that can stop these toxins from damaging tissue. Mediating the greatest ocular damage is a-hemolysin, a secreted protein able to lyse cells and cause apoptosis. The present study hypothesizes that a flavonoid, able to inhibit a-hemolysin production in vitro, can be developed into a formulation able to arrest toxin production in the S. aureus infected cornea.

Methods: S. aureus (strain 8325-4) was grown overnight in tryptic soy broth with or without the flavonoid (500 ?g/mL). Each culture supernatant was quantitatively assayed for toxin-mediated hemolysis of rabbit erythrocytes. To test the inhibitor in vivo, S. aureus (100 CFU) was injected into corneas (n = 4 per group) of anesthetized rabbits and the inhibitor or its vehicle was topically applied. Damage was quantified by grading seven ocular parameters on a scale of 0 to 4 and adding the grades to obtain a slit lamp examination score (SLE).

Results: The results of this study show that the inhibitor reduces toxin production in vitro by >1,000 fold. However, the SLE scores (P = 0.58) and epithelial erosion area (P = 0.10) from this study were not statistically different from the control group.

Conclusion: The in vitro data provides evidence that the flavonoid decreases the production of the cytolytic toxin. The in vivo data demonstrates that the decrease in a-toxin production did not significantly reduce S. aureus keratitis pathology in the rabbit eyes. However, the corneas were injected with 1,000 CFU rather than 100 CFU (10-fold increase). More studies are needed to correctly assess the treatment's affect on 100 CFU injections and furthermore, to enhance the in vivo effectiveness of the toxin inhibitor.

MISSISSIPPI POSTER FINALIST - John M Bridges

Early Subclinical Markers of Cognitive Impairment in African Americans: CAC vs. AAC

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Objective: Determine if earlier calcification is associated with cognitive impairment.

Background: Coronary artery calcification (CAC) may indicate microvascular brain disease and cognitive impairment. Abdominal aortoiliac calcification (AAC) precedes CAC and may be an earlier risk factor. Previous studies have not accounted for relationships between AAC and CAC when examining calcification risk factors.

Methods: We examined calcification relationships with 4 standardized cognitive domains [Global Cognition (GC): MMSE; Processing Speed composite (PS): Trails A, DSST; Memory (M): RAVLT; Executive Function (EF): Trails B] with higher scores representing better cognition. Physiologically progressive subclinical disease (SD) stages were defined (EarlySD: AAC>0, no CAC; LateSD: AAC>0, CAC>0) in a sample of the 2008-2011 GENOA CAC cohort of AA sibships from Jackson, MS (n=616, mean age 69 [range 42-98], 74% women, 82% hypertensive). Separate linear regression models were fit for each SD stage adjusting for age, sex, HDL, LDL, diabetic status, blood pressure, and education with GEE to account for sibship clustering.

Results: AAC and CAC were highly related (Spearman r=0.66). EarlySD participants (n=160) showed significantly poorer PS (ß with 95% CI subscripts: $_{-0.093}$-0.049$_{-0.004}$ p=0.032) and poorer EF ($_{-0.131}$-0.067$_{-0.004}$ p=0.038) for each doubling of AAC. LateSD participants (n=387) showed poorer GC ($_{-0.115}$-0.079$_{-0.042}$ p<0.001) and PS ($_{-0.082}$-0.049$_{-0.016}$ p=0.004) with each doubling of CAC, but no supported relationships with AAC.

Conclusions: Our results suggest that poorer processing speed and executive function (which may present earlier in vascular cognitive impairment) are associated with early subclinical disease (AAC with no CAC). Thus, AAC may serve as an even earlier risk factor for cognitive impairment than CAC. Studies which do not separate the effects of AAC and CAC may simply be reporting the byproduct of their strong correlation. Longitudinal studies should examine if AAC may be used as an earlier risk factor than CAC in predicting future cognitive decline.

MISSOURI POSTER FINALIST - Anand A Patel

The role of Cholesterol Synthesis Inhibitors as Antitumor Agents

First Author: Anand Patel (M4, University of Missouri School of Medicine) Virgilio Villeda (M4, University of Missouri School of Medicine) Tyler Johnson (BS, University of Missouri) Dr. Carl Freter (MD/PhD, Director of Hematology and Medical Oncology, University of Mis

Introduction: The lipid layer composition of eukaryotic cells is a vital component for cell function and existence. Embedded within the phospholipid bilayer, cholesterol plays a crucial role in maintaining membrane homeostasis. Cancerous cells, much like normal functioning eukaryotic cells, also rely on the presence of cholesterol to maintain proper functioning cell membranes. We examined the role cholesterol depletion would have on cancerous cell proliferation.

Methods: The T47D breast cancer cell line at a concentration of 30,000 cell/mL was cultured on 96 well plates at 100µL per well utilizing standard growth media free of cholesterol synthesis inhibitors. The cells were incubated for three days with the cholesterol synthesis inhibitor BIBB515. This agent limits the conversion of (3S)-2,3-oxidosqualene to lanosterol, a precursor to cholesterol, by inhibiting the enzyme 2,3-oxidosqualene cyclase in the biosynthesis pathway of sterols. The concentration of agent used ranged from 0.01µM to 100µM. After incubation cell proliferation was determined by performing the colorimetric assay MTT read at 570nM.

Results: Preliminary results indicate a decline in cell proliferation as the concentration of BIBB515 was increased. Using a control to compare results, the lowest concentration of BIBB515 used at 0.01µM resulted in an approximately 20% decline in overall cell proliferation versus the control. At the maximal concentration of 100µM, there was a 70-75% reduction in cell proliferation. The decrease in cell proliferation was noted to plateau at 40µM.

Conclusions: Cancerous cells, much like normal functioning cells, depend on cholesterol to maintain proper cell membrane integrity and function. Utilizing BIBB515, there is a significant decrease in cell proliferation as the inhibition of cholesterol synthesis increases. This study may aid in the formulation of further research regarding the utilization of cholesterol depletion as a tool towards cancer.

NEBRASKA POSTER FINALIST - Grant A Turner

The Role of IFT88 on Ciliogenesis of Motile Respiratory Epithelium and the regulation of Ciliary Motility

First Author: Grant A. Turner, Jacqueline A. Pavlik, P. Darwin Bell, Joseph H. Sisson

Cilia are essential components of multiple organ systems. Genetic defects in the formation of cilia, known as ciliogenesis, often result in embryonic lethality in genetic model systems indicating a critical role for cilia in growth and development. Intraflagellar transport proteins (IFTs), which function to shuttle ciliary components from the base of the ciliated cell out into the cilia structure or axoneme, play an essential role in ciliogenesis and presumably cilia function. For example, defects in IFT88 cause severe defects in the sensing cilia in the kidneys, where polycystic kidneys form, and in the lung, where bronchiectasis results. While it is clear that IFTs are essential for normal ciliogenesis, the specific role IFT88 plays in cilia function is unknown.

We hypothesized that: 1) IFT88 is required for *de novo* ciliogenesis *in vitro*; and 2) IFT88 is required to translocate the methacholine receptor, which is part of a cilia motility regulator complex, from the cilia basal body into the ciliary membrane. To test these hypotheses, we used airway cells derived from inducible IFT88 conditional knockout mice grown on air liquid interface (ALI) in the presence and absence of tamoxifen, which controls the expression of the IFT88 gene. We designed experiments to measure the motile cilia formation to quantify ciliogenesis during airway cell differentiation, as a function of time.

We also measured changes in ciliary beat frequency (CBF) triggered by methacholine (MCH), which is a cilia agonist that requires IFT88 placement compared to a ß-agonist, procaterol, whose receptor resides in the non-ciliary membrane. Our data show that when the IFT88 gene is turned off there is a striking decrease in the number of cilia measured as motile points as a function of time without any overall change in resting ciliary beat frequency (CBF) for those ciliated cells present.

We demonstrated a decreased CBF response to methacholine in IFT88 mutant airways, compared to cells containing IFT88 but found that both were equally sensitive to procaterol stimulation. In summary, we found support that IFT88 is required for motile ciliogenesis and methacholine responsiveness in mouse airway cells in ALI. Our work will likely lead to the recognition of new phenotypes of genetic and acquired cilia disorders that are based on dysregulation of IFTs in ciliary motility and not just anatomical structural defects of the axoneme.

NEBRASKA POSTER FINALIST - RESEARCH Sumit Dahal, MBBS

An Analysis of 2012 Food and Drug Administration Postmarket Drug and Biologic Safety Evaluation

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Introduction United States Food and Drug Administration (FDA) routinely performs postmarket drug safety evaluation to explore any adverse effect not well characterized in clinical trials, or to identify previously unknown adverse effect. Although such labor-intensive and costly evaluation is generally believed to be useful, the importance has not been systematically analyzed.

Methods FDA website, accessible to public, provides information about ongoing and completed postmarket safety evaluations for new drug and biologic agents approved since September 27, 2007. We reviewed the summary information for all the products evaluated from January 1, 2012 to December 31, 2012. Data abstracted included product name, active ingredients, approval date, major indications, summary of evaluation findings and regulatory actions.

Results During the one-year study period, FDA reviewed 70 products including seven biologics (10%) and sixty-three drugs (90%). Among the drugs, there were twelve antimicrobials (19%), nine analgesics (14%), seven hormones (11%), three immunomodulators (5%), three micronutrients (5%), two anti-diabetic agents (3%), two anti-allergic agents (3%), two anti-hypertensive agents (3%), two anti-depressants (3%), two gastric anti-secretory agents (3%) and nineteen miscellaneous drugs (31%). More than 60% of these products are regularly used by primary care physicians. Fifty-five products (79%) did not require any regulatory action, whereas 8 (11%) required continued evaluation because of the possibility of cardiovascular (n=3), neurological (n=4) and musculoskeletal (n=1) adverse effects. Fifty percent of these adverse effects were not previously known. Review of seven products (10%) resulted in labeling updates in administration instruction, adverse effects and/or warnings. These included appropriate instruction on administration (n=2), the risk of hypersensitivity reactions including anaphylaxis (n=3), kidney injury (n=1), bleeding (n=1), severe hypocalcemia (n=1), and pancreatitis (n=1), and contraindication in pregnancy because of fetal harm (n=1). Among the seven products requiring regulatory actions, 5 were initially approved for marketing in 2010, and 1 each in 2007 and 2008 respectively.

Conclusions This study confirms the importance of postmarket drug safety evaluation in determining clinically meaningful adverse effects of drugs and biologics. There may be a significant time delay between drug approval and identification of new adverse effects during postmarket drug safety evaluation. Future RESEARCH should focus on identifying ways to reduce such time delay, and determining factors associated with the identification of new adverse effects during postmarket drug safety evaluation.

NEVADA POSTER FINALIST - Rees Adomako

Degradation of p62/sqstm1 in Group B Coxsackievirus infected Cells

First Author: Rees Adomako,MS, David Hartley, PhD

Hypothesis: Coxsackievirus B3 (CVB3) is a prevalent human pathogen that causes viral myocarditis which may progress to dilated cardiomyopathy and heart failure. It has been shown that replication of Coxsackievirus requires the function of the proteasome and autophagic machinery. In this study we show that p62 is degraded during Coxsackievirus infection.

Materials and Methods: HeLa cells were infected with CVB3 and treated with MG-132 to inhibit proteasome activity. The cells were then fixed or lysed to monitor changes in the steady-state-level of p62.

Results: Western blot analysis on lysates from infected cells show a decrease in p62 protein and the appearance of a stable immunoreactive fragment. Mass spectrometry performed on p62 immunoprecipitates show viral proteins are associated with p62/SQSTM1. Immunofluorescent localization of p62 in infected cells fails to show colocalization of p62 with viral proteins shown to associate with it by mass spectrometry unless the proteasome is inhibited. Inhibiting p62 protein expression with siRNA increases viral propagation as measured by increases in viral proteins and released virions.

Conclusion: The data from this study demonstrates that p62/SQSTM1 is involved in inhibition of viral replication and targeted for degradation during infection of cells with Coxsackie virus. This suggests that p62/SQSTM1 can have anti-viral functions that may be expandable to other viral infections.

NEW JERSEY POSTER FINALIST - Zeynep G Gul

Exhaled Concentrations of Acetone and Pentane Track with Weight Loss in Response to Diuretic Therapy in ADHF Patients

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Introduction: While breath testing has revolutionized the diagnosis of disease states of the lung and gut, it has been underexplored as a potential diagnostic tool for heart failure (HF), the most common indication for hospital admission in patients over 65. Previous studies have shown that concentrations of certain volatile organic compounds (VOCs) are elevated in the exhaled breath of patients with HF. However, the relationship between exhaled VOC levels and HF severity is not well-established. In this study, we explored the relationship of exhaled acetone and pentane levels with clinical indices of HF severity and weight loss after diuresis in patients admitted with ADHF.

Methods: All patients admitted to Cleveland Clinic with ADHF and hypervolemia between 7/2012-7/2013, who consented within 24 hours of their admission, were enrolled in this single-center, prospective cohort study. Acetone and pentane levels were measured within 24 hours of admission and after 48 hours of diuresis. All exhaled breath samples were collected following an 8-hour fast and bottled-water mouth rinse to minimize and standardize the contribution of the aero-digestive tract. Single exhaled breath samples were collected in Mylar® bags and analyzed using SIFT-MS on a Syft™ Voice200 (Syft Technologies Ltd., Christchurch, New Zealand). Weight loss between samples was used as a marker of diuretic response. Median weight loss was determined and the population was split into those who lost at least the median weight loss and those that lost less. Comparisons were analyzed with Wilcoxon/Kriskal-Wallis tests and Spearman's rank correlation calculations.

Results: Fifty-five patients with ADHF and hypervolemia were enrolled. In our study cohort (age 65±12 years, LVEF 37±18%, median admission NT-proBNP 4,197 pg/mL, PCWP 27±6 mmHg), admission acetone levels correlated with lower LVEF ($r = -0.27$, $p=0.011$), but only trended with pentane ($r = -0.20$, $p=0.052$). Greater weight loss with diuretic therapy correlated with a greater reduction in acetone levels ($r = -0.397$, $p=0.003$) and pentane levels ($r = -0.308$, $p=0.022$). In patients with above-median weight loss (=4.5 kg), patients demonstrated significantly greater percentage reduction in acetone (59% reduction vs 7% increase, $p<0.001$) and pentane (23% reduction vs 2% reduction, $p=0.008$).

Conclusion: In patients admitted with ADHF, higher exhaled breath acetone levels were associated with lower LVEF. Greater reductions in exhaled breath acetone and pentane tracked with more weight loss in response to diuretics

NEW YORK POSTER FINALIST - Alan Gandler

Retrospective Chart Review of Portal Vein Thrombosis in a Tertiary Teaching Center

First Author: Alan Gandler Second Author: Maxine Ames Last Author: Tai-Ping Lee MD

Introduction: Portal vein thrombosis (PVT) is a common sequelae of cirrhosis, inflammation, neoplasm and hypercoagulable state. However, standardization for treatment of PVT remains unclear. PVT has a high morbidity and mortality, and has become more frequently identified due to increased use of abdominal imaging. Anticoagulation is reported beneficial in the treatment of acute PVT, however its benefits in complicated clinical situations is unclear.

Methods: The medical records of 25 patients with the diagnosis of PVT between February 2012 and March 2013 at North Shore University and Long Island Jewish Hospitals were reviewed. A database was created with multiple variables recorded for each patient including demographics, etiology, presenting features, treatment, and outcomes.

Results: Of the 25 patients reviewed 12 were men and 13 were women, the average age was 56.3. Ten were acute PVT, 14 were chronic, and one was undetermined. Eleven PVT were tumor thrombi. Twenty of 25 of the patients had cirrhosis, malignancy, or a previous GI bleed. Malignancy was seen in 60% of the patients, 60% of malignancies were hepatocellular carcinoma. All PVT patients except 1 with genetic hypercoagulability had evidence of intra-abdominal pathology. Esophageal and/or gastric varices were seen in more than 60% of cases; however, some varices may have been from underlying liver disease. One third of the patients presented with GI hemorrhage. Nearly 50% of cases did not have symptoms such as nausea, abdominal pain, vomiting, or ascites and PVT was an incidental finding. Forty five percent of patients were treated with anticoagulation or thrombolysis. Among the treated patients 5 had follow up imaging; 3 were unchanged, 1 improved, and 1 showed progression of thrombus. Of those not treated and with follow up imaging, 5 were unchanged, 1 had progression, and 3 improved. Two of 9 (22%) treated and 5 of 16 (31.25%) untreated patients had an adverse outcome (death, ICU admission, or GI bleeding). Fifty seven percent of chronic and 30% of acute PVT patients had 2 or more hospital admissions within a year of diagnosis.

Conclusion: The management of PVT should be individualized due to the heterogeneity of underlying conditions, and the risks versus benefits of anticoagulation or thrombolysis therapy. For patients with PVT from intra-abdominal pathology, a strategy of close monitoring of the thrombus status with serial imaging and D-dimer assay may be justified, especially in patients with high risk of bleeding complications. Any varices should be endoscopically managed to minimize the risk of hemorrhage, in the event that anticoagulation is indicated. In order to improve the therapy of PVT, future investigation will be needed to address whether anticoagulation therapy prevents thrombus progression and promotes resolution of thrombi and varices.

NEW YORK POSTER FINALIST - Aditya Jain

Cytochrome p450 4a-20-Hete System may be a key regulator of Human Endothelial Progenitor Cells in Angiogenesis

First Author: Aditya V. Jain, Li Chen, PhD Frank F. Zhang, MD John R. Falck, PhD Ali-Syed Arbab, PhD Michael Kessler, MD, A Guillermo Scicli, PhD Michal L Schwartzman, PhD and Austin M Guo, PhD.

INTRODUCTION: A better understanding of the mechanisms and regulation of neovascularization is crucial to develop therapies for a variety of pathological conditions such as cancer, atherosclerosis, and diabetic retinopathy. 20-hydroxyeicosatetraenoic acid (20-HETE), a metabolite of arachidonic acid (AA) via the cytochrome P450 4A (CYP4A) enzyme, has been previously suggested to regulate neovascularization. We sought to further investigate the role of the CYP4A-20-HETE system in regulating endothelial progenitor cell (EPCs) associated with angiogenic processes in both in vitro and in vivo settings.

METHODS: EPCs were isolated and enriched from human umbilical cord blood and the expression level of CYP4A11, the predominent 20-HETE synthase, was determined using RT-PCR. We performed cell proliferation and migration assays to determine if exogenous 20-HETE can affect these processes which are the necessary components of angiogenesis. In addition, cell adhesion assays were performed to assess whether EPCs adherence to fibronectin, an important component of the extracellular matrix, is also altered in the presence of exogenous 20-HETE. Lastly, we established a mouse ischemic hind-limb angiogenesis assay to study the contribution of 20-HETE to promote angiogenesis in vivo.

RESULTS: RT-PCR showed that EPCs specifically express CYP4A11, a key 20-HETE synthase. Furthermore, the presence of exogenous 20-HETE significantly increased the proliferation and migration of EPCs. In addition, EPC adhesion to fibronectin-coated wells was increased by 40% in the presence of 20-HETE compared to the control. Interestingly, these increases were markedly blunted in the presence of 20-hydroxy-6, 15-eicosadienoic acid (20-HEDE), a 20-HETE antagonist. In the mouse ischemic hind-limb model, animals treated with either DDMS (a 20-HETE synthesis inhibitor) or 20-HEDGE (also a 20-HETE antagonist) showed significantly decreased compensatory angiogenenic responses, compared to control mice.

CONCLUSION: The CYP4A-20-HETE system may be involved in the regulation of the proliferation, migration, and adhesion of EPCs at the sites of angiogenesis in vivo. Future studies will aim to further identify the regulatory components of the CYP-4A-20-HETE system in angiogenesis.

NEW YORK POSTER FINALIST - RESEARCH - Michael D Kuhn

Pulmonary Performance indices predict lung injury

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Background: Severity of pulmonary dysfunction in mechanically ventilated patients is often estimated with various pulmonary indices. Clinical research has shown that these indices have variable ability to predict successful ventilation weaning and survival. Utilizing a porcine model of septic shock and acute lung injury, we tested the ability of various pulmonary indices to predict histologic lung injury. We hypothesized that the pulmonary indices would predict histologic lung injury, and that oxygen index (OI) would be the strongest predictor.

Methods: Pulmonary physiology and blood gas data were collected during a 48 hour time period after an ischemia-reperfusion injury and fecal peritoneal transplant administration to a Yorkshire pig. The pulmonary indices: OI, partial pressure of arterial oxygen to fraction of inspired oxygen ratio (P/F), ratio of arterial to alveolar oxygen (a/AO2), ratio of arterial oxygen saturation to fraction of inspired oxygen (S/F ratio) and static compliance (C), were calculated at the 48 hour time point or at death if it occurred sooner. Dependent lung tissue was collected for histological analysis. A standardized scoring system graded: degree of atelectasis, fibrin deposits, leukocyte infiltration, alveolar wall thickness, vessel congestion and total blood in air space. These scores provided a quantitative assessment of the lung injury in each animal as well as a total score for each characteristic of injury. A fit model was constructed using JMP 10 software (Cary, North Carolina) to analyze the predictive ability of the various pulmonary indices for each histologic characteristic as well as the total histologic score.

Results: 33 pigs were studied. Total histology score was predicted well by the pulmonary indices with S/F ratio performing best ($p=0.0026$), followed by P/F ratio ($p=0.0048$), a/AO2 ($p=0.0052$), OI ($p=0.0424$) and C performing the worst ($p>0.05$). Fibrin deposition was also predicted by the pulmonary indices with an R-squared=0.34 and $p=0.0371$. Again, S/F ratio was the strongest predictor ($p=0.0033$) followed by P/F ratio, a/AO2, and static compliance ($p<0.02$). Oxygen index was not predictive ($p>0.05$).

Conclusions: Our findings demonstrate that pulmonary function indices were predictive of total histologic injury and fibrin deposition. Contrary to our hypothesis, S/F ratio correlated the strongest with lung injury and oxygen index had the weakest correlation.

NEW YORK POSTER FINALIST - RESEARCH Robin Petrizzo

Combined brain mapping and low-field intraoperative MRI for brain tumor resection

First Author: Robin Petrizzo, MS IV, Salvatore Zavarella, D.O., Lauren Jarchin, B.A., Dominic Nardi, M.D., Sarah Schaffer, Ph.D, Michael Schulder, M.D., F.A.A.N.S.

Background: Recent investigation has shown that surgery on patients with tumors in the dominant hemisphere for language is most optimal with awake language mapping. This allows neurosurgeons to locate and avoid resection of eloquent areas. An ideal technique combines awake mapping with intraoperative MRI.

Objective: Several studies report on the use of combined awake cortical mapping with the iMRI[1-3] or on patient perception of these circumstances,[4] but all previous articles have only discussed the use of a high-field magnet. This article will be the first to discuss the feasibility of using a low-field magnet during awake craniotomy tumor resection with cortical mapping.

Methods: Seventeen patients with lesions in the dominant hemisphere underwent awake resection under iMRI guidance. Imaging was performed using a compact, 0.15 Tesla iMRI unit (PoleStar Medtronic Navigation) designed to sit under the head of the operating table. Images were taken both before and at completion of tumor resection. This low-field iMRI set-up allowed for use of standard surgical equipment, without the need to adapt to nonferromagnetic, MRI compatible equipment. Diagnoses included low grade glioma (10), high grade glioma (5), mesial temporal sclerosis (1), and cysticercosis (1). Tumor location was in the frontal lobe in 8 patients, temporal lobe in 7, and the parietal lobe in 2. Patients were positioned so they could see the examining neuropsychologist. Pin fixation was used to limit patient movement during neurosurgery. Local anesthetic was used to anesthetize the pin sites, the incision line, and to block major scalp nerves below the planned surgical site. Intravenous sedation was used without intubation. Preliminary neuropsychiatric testing of language, memory and cognition were performed to assess the patient's baseline. Patients were awakened after dural opening in time for mapping and retested by the same neuropsychiatrist. Surgery was stopped when eloquent areas were encountered.

Results: The number of iMRI images acquired in the operating room ranged from 1 to 5 (mean 2.6), adding an average of 1.5 hours to surgery. Intraoperative imaging led to further resection in 11 out of the 17 patients. Language mapping led to a cessation of surgery in 6 patients. Gross total resection was achieved in 11 patients.

Conclusions: Combined awake language mapping and iMRI guidance is feasible for resection of dominant hemisphere tumors. Clinicians do not need to choose between these modalities.

KEY WORDS: Awake craniotomy, intraoperative MRI, language mapping

NORTH CAROLINA POSTER FINALIST - 2LT Elizabeth S Marx

Validation of the Improve Bleeding Risk Score for Medical Inpatients

First Author: 2LT Elizabeth S Marx Sarah Petteys, MD Brian Foster, MD Paul Clark, MD Jordanna Hostler, MD Josh Mitchell, MD Jacob Collen, MD Aaron Holley, MD

Introduction: Recent guidelines from the American College of Physicians (ACP) and the American College of Chest Physicians (ACCP) recommend that all patients admitted to medical services be assessed for venous thromboembolism (VTE) and bleeding risk before chemical VTE prophylaxis is ordered. Although objective scoring systems have been constructed few have been externally validated. Using data from patients admitted to medicine services over an 18 month period we attempted to provide external validation for the IMPROVE bleeding risk score.

Methods: Data was collected as part of a large quality improvement project aimed at increasing VTE prophylaxis rates. Patients who met the eligibility criteria for the original IMPROVE study were selected and bleeding rates were analyzed. The IMPROVE bleeding risk score was calculated to test accuracy for predicting bleeding during hospitalization. We also abstracted data on all chemical prophylaxis administered, including dosage and duration.

Results: 1684 patients from our cohort met the eligibility criteria used for the original IMPROVE study. Mean age (±SD) was 64.6±20.3, median duration of hospital stay (with IQR) was 5.0 (3.0-7.0) and 385 (22.9%) patients were admitted to an intensive care unit (ICU). Overall, 65 (3.7%) patients experienced a bleed during admission. There were 17 patients who experienced a major bleed (9 located in the central nervous system and 8 in the gastrointestinal tract) and 48 patients who experienced minor bleeding. The average IMPROVE score was 5.3 ± 2.9 and 24.5% of patients had a score = 7.0. Incidence of any bleed during admission was 8.8% versus 1.6% for patients with IMPROVE = 7.0 and < 7.0 respectively ($p<0.001$). For major bleeding and minor bleeding the rates were 4.6% versus 0.1% ($p<0.001$) and 4.1% versus 1.5% ($p=0.02$) for IMPROVE = 7.0 and < 7.0 respectively. The percentage of days that patients were on low-molecular weight heparin (LMWH) showed a trend toward predicting major or minor (any) bleeding ($p=0.08$) whereas unfractionated heparin (UFH) showed no association. After adjusting for LMWH administration an IMPROVE score = 7.0 remained a significant predictor for major or minor (any) bleeding (OR 5.1, 95% CI: 2.3-10.9).

Conclusions: Our study provides external validation for the IMPROVE bleeding risk score in a large population of medical inpatients.

NORTH CAROLINA POSTER FINALIST - Rita K Kuwahara

Access to Care among Adults with Previously and Newly Diagnosed Hypertension and Cardiovascular Disease Presenting to the Emergency Department of a Tertiary Referral and Teaching Hospital in Nairobi, Kenya

First Author: Rita K. Kuwahara, Kathryn W. Koval, Meredith H. Arasaratnam, Ian B.K. Martin. University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, North Carolina, USA

Background/Objectives: According to the World Health Organization (WHO), 326-401 deaths per 100,000 people in Kenya are attributed to cardiovascular disease (CVD) and diabetes, yet no national policies currently exist to address CVD in Kenya (WHO 2011). This study's objectives were to characterize the CVD burden among adults presenting to Kenyatta National Hospital's (KNH's) Emergency Department (ED) and assess the influence of socioeconomics on access to healthcare among adults with CVD in Kenya.

Methods: In this cross-sectional observational study, clinician-administered questionnaires were used to collect clinical, demographic, and healthcare utilization data from 112 patients with CVD presenting to KNH's ED in Nairobi, Kenya. Enrolled patients were 18-89 years old with newly or previously diagnosed hypertension, heart disease, stroke and/or deep vein thrombosis. Access to care was assessed using patients' self-reported access to regular medical care, barriers to care, access to CVD medications, and household income and location. Verbal informed consent was obtained from all participants. IRB #12-1414.

Results: Of the patients interviewed, 27% had new-onset CVD. Average age of CVD onset was 44.6 years. Of patients with new-onset CVD, only 48% had regular sources of healthcare, and 67% cited at least one barrier to care, particularly cost and transportation. In contrast, 86% of patients with known CVD had regular access to care, with 74% reporting at least one barrier. Forty-seven percent earned under 2,499 Kenyan Shillings (USD$30) monthly, with 95% of these participants reporting barriers to care. Fifty-three percent lived in rural areas, and 56% of those living in rural areas cited at least one barrier to care, in contrast to 44% of participants living in urban/suburban districts. Twenty-nine percent of participants had two or more CVD diagnoses. The most common CVD diagnoses were hypertension (62%), congestive heart failure (23%), and stroke (19%). The most common CVD risk factors were family history of CVD (34%) and diabetes (25%).

Conclusion: These findings highlight the role of the emergency and primary care physician in identifying patients with undiagnosed CVD and emphasize the need to address barriers to care when developing novel policies and programs to address Kenya's emerging CVD epidemic.

OHIO POSTER FINALIST - Yahui Li

Information-Seeking Behavior of Third Year Medical Students

First Author: Li, Yahui; Mullapudi, Manasa Layton, Beth; Labuda-Schrop, Susan

Introduction/Purpose: Patient outcomes may be improved by reliable information for physicians at point-of-care. According to Gonzalez-Gonzalez et al. (2007), primary care physicians (working in settings where consultations are of short duration) have time to answer only 1 in 5 questions.Knowing how to find information is an essential competency for medical students and physicians. When educating medical students, it is important to understand the information needs and behaviors of students in the clinical setting.

Methods: All third-year medical students on family medicine rotations were asked through e-mail to participate in the study. During the family medicine rotation of their third year, medical students at Northeast Ohio Medical University were observed during patient encounters. Information was collected about length of encounter, where a question related to patient care was generated, type of question asked, question type as categorized by Ely's taxonomy, success of inquiry, and mode used to answer questions.

Results: Of a possible 13 participants, five students volunteered. Eighty patient encounters involving the five students were observed. All students used their mobile devices to answer questions. Students averaged 1.03 questions per encounter, with an average encounter length of 35 minutes and 57 seconds. The number of questions did not correlate with the encounter length. Students found needed information 85% of the time. Most questions occurred when the student was outside of the room and the patient was in the room. Drug-related questions were the most common type, with "What is drug x?" being the most frequently asked question, followed by questions about diagnosis.

Conclusion: Assuming that these results are generalizable for medical students, information literacy education should focus on teaching students how to find drug and diagnosis information rapidly at the point of patient care. Because this is a small population and it focuses on primary care, further studies are necessary to determine the information education needs of all medical students as well as physicians.

ONTARIO POSTER FINALIST - Salman Aziz

Does frailty impact geriatric outcomes in older men with Prostate Cancer undergoing Chemotherapy?

First Author: Salman Aziz Other Others: Manokumar T, Rizvi F, Breunis H, Joshua AM, Tannock I, Alibhai SMH

Background: Metastatic castration-resistant prostate cancer (mCRPC) is characterized as disease progression despite adequate androgen deprivation therapy (ADT). Although chemotherapy for mCRPC prolongs survival, whether its impact on elderly-relevant outcomes and toxicity differ by frailty status is not known.

Method: Men aged 65+ with mCRPC who were starting first-line chemotherapy were enrolled in this longitudinal prospective pilot study. Elderly-relevant information was collected at baseline and before the start of each chemotherapy cycle. Frailty was assessed by the Vulnerable Elders Survey (VES-13), functional status by OARS-IADL, social activities limitation and support by MOS measures, and FACT-G and FACT-P for general and prostate-specific quality of life (QOL), respectively. Physical function was assessed by timed up and go (TUG), timed chair stands, and grip strength. Changes in outcomes were analyzed between frail vs. non-frail patients using Student's t-test and linear regression.

Results: 21 patients (mean age 74), of whom 11 were frail (VES-13 = 3), were assessed. Generally, at baseline frail patients were slightly older and scored lower than non-frail patients in QOL, functional status, physical function, and social support and activities. However, frail patients improved more than non-frail patients in all domains except TUG. 18% of frail patients died during the course of therapy compared to no deaths in non-frail patients.

Conclusion: Frail patients, as determined by VES-13 = 3, with mCRPC may represent a heterogeneous population; one group destined to die soon and the other who may do well with chemotherapy. Further RESEARCH and patient recruitment is needed to determine whether a subset of frail older patients would benefit from first-line chemotherapy treatment.

ONTARIO POSTER FINALIST - Januvi Jegatheswaran

Infective Endocarditis among patients with Staphylococcus aureus Bacteremia: A Tale of Two Populations

First Author: Januvi Jegatheswaran Ram Venkatesh Anantha Daniel Luke Pepe Tina Mele Johan Delport John K. McCormick

Introduction: *Staphylococcus aureus*-associated endocarditis remains a persistent and challenging problem that has resisted advances in medical and surgical therapies. Intravenous drug users (IVDUs) are especially susceptible to developing infective endocarditis (IE) from *S. aureus* bacteremia (SAB). We sought to compare clinical outcomes between IVDUs and non-IVDUs with *S. aureus*-associated IE at our tertiary-care centre.

Methods: We retrospectively reviewed all patients with SAB and IE admitted to our institution between January 2007 and December 2012. Hospital records were used to identify age, gender, medical comorbidities, infectious complications, surgical intervention (including heart valve replacements and tissue debridement), length of hospital stay, and mortality. Continuous and dichotomous variables were compared by Mann Whitney U test and Pearson chi-square test respectively. Survival was calculated by the Kaplan Meier method, and comparisons were conducted by log-rank analysis. P values less than 0.05 were considered statistically significant.

Results: We identified 78 IEs in our study: 55 patients (71%) were intravenous drug users (IVDU), while 23 (29%) were non-IVDU. IVDUs (median age of 35 years [95% CI: 34-38 years]) were significantly younger than non-IVDUs (median age of 66 years [95% CI: 59-74 years], $p< 0.0001$), albeit with similar gender distribution. IVDUs also had a significantly higher incidence of comorbid liver diseases such as Hepatitis B/C infections (69%) compared to non-IVDUs (0%, $p< 0.0001$). The incidence of methicillin resistant *S. aureus* (MRSA) was similar among both groups: 31% of IVDUs with IE had MRSA, while 26% of non-IVDUs had MRSA ($p= 0.88$). IVDUs with IE had a significantly shorter hospital stay (median 13 days [95% CI: 12-20 days]) compared to non-IVDUs (median 23 days [95% CI: 20-38 days], $p= 0.0013$). Significantly fewer IVDUs underwent operative intervention (9%) compared to non-IVDUs (26%, $p= 0.048$). The 30-day mortality in our study was 24% while overall mortality was 33%: we observed a higher 30-day mortality (25%) for IVDUs compared to non-IVDUs (21%) although this was not statistically significant ($p= 0.081$).

Conclusion*:* Two distinct populations, IVDU and non-IVDU, are affected by *S. aureus*-associated IE. Genetic and molecular differences among *S. aureus* strains likely allow this versatile pathogen to affect multiple patient populations. Further studies that incorporate the molecular analyses of SAB with clinical aspects of the disease may help identify novel therapeutic strategies and potentially improve patient outcomes.

ONTARIO POSTER FINALIST - Tenneille Loo

A Global Evaluation of Interdisciplinary Patient Safety Education

First Author: Tenneille Loo Co-Authors: Agnes Leotsakos

Introduction: Interdisciplinary learning is an important educational approach to encourage the understanding of the positive impact of effective teamwork, safe delivery of high quality health services, and better patient outcomes. Complex patients frequently require tailored and specialized care, and thus, often require the consultation services of general internal medicine and/or internal medicine specialty services as well as the collaboration of other health care professionals. By virtue of treating a complicated patient, the resultant workup and treatment regimen is often multifaceted, thus increasing the possibility for patient safety issues to occur. Joint planning, decision-making, and goal-setting and can contribute to health care professional trainees' understanding and respect of other disciplines and an appreciation to the value of effective health care teams. The professional ability for collaboration and capacity to work in teams arises during the early educational years and is strengthened through interdisciplinary learning. Given this, major organizations, including the World Health Organization (WHO) have strongly advocated for early interdisciplinary patient safety teaching. However, with a paucity of interventional studies and reviews, and no guidelines, there is no consensus about how such recommendations should be implemented. This literature review is the first to investigate the frequency, types, and outcomes of the global uptake of interdisciplinary patient safety education landscape after the publication of the WHO Patient Safety Curriculum Guide, and to elucidate the different curriculum development needs between developed and developing countries. By exploring the structural components of the training, challenges in initiating such programs, as well as the outcomes, it will also serve as the foundation to develop evidence-based guidelines.

Methods: A scoping study using Ovid MEDLINE (1946 to 2013), PsycINFO (1806 to 2013), Embase Classic + Embase (1947 to 2013), Embase (1974 to 2013), using the key words "interdisciplinary," "patient safety," and "students." Duplicate papers, non-trainee studies, non-interdisciplinary training studies, and non-primary articles were excluded. Papers relevant to internal medicine were included.

Results: Out of 98 abstracts, 7 journal articles met inclusion criteria. A total of 31 programs were described. All were relatively newly implemented, optional, and pilot studies that were not formally introduced in the curriculum of each institution. They varied in all parameters assessed: number of participants per faculty and discipline, trainee education level, duration (1 session, year-long course), resources utilized to develop the programs, teaching methods, frequency of sessions, topics, resources utilized (simulation, didactic, ward, online learning), and short- and long-term outcome measurements. Although the trainees targeted were mainly in medicine, nursing, and pharmacy, some studies additionally included graduate trainees in health policy.

Conclusion: The global implementation of programs is currently not standardized, and varied by the number and length of sessions, topics (medication safety, communication, expected roles of each health care professional), and resources utilized (simulation, didactic, ward, online learning). The next steps for the WHO are to create specific recommendations and guidelines to provide a structured framework and to standardize the current programs.

PENNSYLVANIA POSTER FINALIST - Ronald Nicholas Bogdasarian

Quality Improvement in Medical Education and Practice: An Interactive Anatomic Atlas for Self-Instruction

First Author: Ronald Nicholas Bogdasarian (1); Adam Fusick, MS3 (1); Richard S Pieters MD, MEd, FACR (2); TJ FitzGerald MD (2) 1) The Commonwealth Medical College 2) University of Massachusetts Radiation Oncology

Introduction: The United States Medical Licensing Examination (USMLE) continues to add CT, MRI, and radiograph based questions to board examinations. This trend is based on the principle that accurate interpretation of medical images improves outcomes. Currently, medical students lack an educational resource focused on the radiological content of the USMLE National Boards. An educational quality improvement project provides this resource through an interactive anatomy atlas. This atlas offers promise as a self-instruction tool for medical students and healthcare professionals to learn anatomy and clinical correlates as well as to review basic science.

Methods: The Eclipse radiation therapy planning system, based on de-identified CT images, utilizes sequential axial images to generate 3-D images. This technology allows each anatomical structure to be outlined and exported to Adobe for labeling. Axial, coronal, and sagittal CT-images, radiographs, and 3-D images are combined to create a comprehensive anatomy atlas. Each labeled image is sequentially paired with an identical, unlabeled image to produce a flashcard-like format. Experienced third year medical students authored USMLE style questions to challenge the user, making the atlas truly interactive. A section of abnormal CT, MRI, and radiograph images is included with questions.

Results: Medical and physician assistant student feedback suggests that this tool enhances comprehension of anatomy, its spatial relationships, and pathological variations. Participants have reported that these images provide an efficient, engaging method for self-instruction that prepares them to confidently interpret images during board exams and clinical practice, ultimately improving medical care.

Conclusion: This interactive anatomy atlas provides synchronous instruction in normal anatomy, the anatomy of disease, and advanced imaging. The atlas can be used for student and professional self-instruction and testing, with a focus on the USMLE National Board Exam Step One. Early introduction and late reintroduction of radiology in medical education and practice should improve student and professional competency and quality of care.

PENNSYLVANIA POSTER FINALIST - Sucharita Mukherjee

The Prevalence and Correlates of Lifetime Mental Disorders and Trauma Exposures in Urban and Rural Settings: Results from the National Comorbidity Survey Replication (NCS-R)

First Author: Sucharita Mukherjee Additional Authors: Erik B. Lehman, MSc Jennifer S. McCall-Hosenfeld, MD, MSc

Introduction: Mental health disorders are a product of both genetics and environment. Distinctions between rural and urban environments are likely to produce different frequencies of traumatic exposures, and thus differences in the occurrence of mental health disorders. Since rural patients are more limited in their ability to access appropriate mental healthcare, it is important to determine the frequency of mental health disorders and trauma exposures across the rural-urban continuum. It is hypothesized that the prevalence of lifetime mental health disorders and frequency of trauma exposures will differ by placement on the rural-urban continuum.

Methods: The National Comorbidity Survey Replication was used to assess a range of psychiatric disorders and related correlates among a nationally representative sample of the U.S. population (N= 9,282). Rurality was designated using the Department of Agriculture's 2003 rural-urban continuum codes (RUCC), which differentiate counties into nine level of increasing rurality by population density and proximity to metropolitan areas. Lifetime mental health disorders examined were post-traumatic stress disorder (PTSD), anxiety disorders, major depressive disorder, mood disorders, impulse-control disorders, and substance abuse. Trauma exposures were classified as war-related, accident-related, disaster-related, interpersonal or other. Ordinal logistic regression models were used to examine odds of lifetime mental health disorders and trauma exposures by placement on the rural-urban continuum, adjusted for relevant covariates.

Results: Seventy-five percent of participants came from RUCC 1-3 (metropolitan) 12% from RUCC 4-5 (nonmetropolitan, urban population>=20,000), and 13% from RUCC 6-7 (nonmetropolitan, urban population<20,000) counties. The most common disorder reported was any anxiety disorder (*f*=38.4%). Drug abuse was more common for respondents residing in metropolitan areas (*f*=8.74%, p=0.018) when compared to nonmetropolitan areas. A one-category increase in rurality was associated with decreased odds for war-related trauma (aOR = 0.86, 95%CI 0.78,0.95). Rurality was not independently associated with risk for any other lifetime mental health disorders or trauma exposure.

Conclusion: Across the rural-urban continuum, the frequencies of lifetime mental health disorders and most trauma exposures are similar. Rural communities suffer from a shortage of mental healthcare resources, reflecting a relative deficit to address the mental health needs of rural-residents.

SOUTH CAROLINA POSTER FINALIST - Eric K. Singhi

Liver Estrogen Signaling and the Metabolic Response to Dietary Fats and Carbohydrates

First Author: Eric K. Singhi Melissa N. Martinez, John M. Stafford, MD/PhD

Coronary Heart Disease (CHD) is an important health issue in developed countries. In fact, nearly one-third of Americans over the age of 35 die from CHD each year. Although many of the risk factors for CHD are non-modifiable i.e. age, male sex, and family history of CHD, some risk factors can be controlled for such as an unhealthy diet.

The metabolic consequences of overconsumption are especially important to understand as an excess intake of dietary fats and carbohydrates has been shown to have a profound impact on glucose tolerance, insulin sensitivity, and lipid metabolism. Although many of today's popular diet strategies are targeted towards improving the complications of obesity and reducing risks of CHD, identifying individuals who are best served by a specific type of diet remains a challenge.

Previous RESEARCH has demonstrated that women are better protected from CHD than men. By contrast, some studies also suggest that high-carbohydrate diets may be more harmful for women than men. With this in mind, we asked if there is a differential effect of estrogen signaling on glucose vs. lipids. Because the liver integrates glucose and lipid metabolism, we decided to explore hepatic estrogen signaling to better understand the mechanistic role that estrogen plays in the metabolic response to different macronutrient compositions. In order to determine the impact of high-fat vs. high-sucrose diet feeding in the presence or absence of hepatic estrogen signaling, we studied 12 week old female C57BL/6 mice lacking estrogen receptor alpha (ERalpha) specifically in the liver compared to their wild-type littermates. We fed them diets that were high in fat or high in sucrose for 8 weeks.

To assess glucose tolerance, an index of insulin sensitivity, we performed intraperitoneal glucose tolerance tests. We also used a high performance liquid chromatography system to examine differences in lipid profiles. We determined that a knockout model of hepatic ERalpha (LKO-ERalpha) worsened glucose tolerance on high-fat diet feeding. Interestingly, female mice with LKO-ERalpha showed improved glucose tolerance on high-sucrose feeding, but their lipid profile was worse than that of the wild-type controls. Thus, we believe that liver estrogen signaling is beneficial for glucose metabolism in the setting of a high-fat diet, but may be harmful in the context of high-carbohydrate feeding. These findings may have important health benefits in helping women choose the most appropriate diet for weight loss, both pre and post menopause, to minimize complications of obesity.

SOUTH CAROLINA POSTER FINALIST - Sonia Bhandari

The Development and Testing of Health Literacy Quick Start Guides for Geriatric Practices

First Author: Sonia Bhandari, BS, Leigh F. Callahan, PhD

Background: Health Literacy (HL) refers to skills that empower patients to effectively function in the healthcare environment while understanding information, services, and individual needs. Limited HL impacts nearly 48% of Americans, including many older adults whose independence is jeopardized because of weakened understanding, compromised patient safety and reduced clinical outcomes. The Health Literacy Universal Precautions Toolkit (HLUPT) was created in 2010 to help physicians learn of ways to better interact with patients with low HL levels. The HLUPT was later adapted into easy-to-read quick start guides for providers to use to promote HL in their patient encounters and practices. The guides include tool descriptions, implementation methods, and resources. This manuscript describes the importance of implementing tools to promote HL in geriatric practices and explains the guide testing process.

Methods: Two six-page guides were developed with tools from the HLUPT and previous toolkits for rheumatology and cardiology sub-specialties. The guides were tested in 3 practices and retirement community clinics with 19 healthcare providers, including clinicians and administrative staff. The providers were given pre-review questionnaires and both guides to implement in their practices. After 4 weeks, providers gave feedback via post-review questionnaires, conference calls. Results: The guides were well accepted by the providers and many found the tools and resources useful. Tools such as the Brown-Bag Medication Review and Teach-Back Method were used widely throughout the clinic settings. Providers stated they would continue to support their practice modifications.

Conclusion: Some providers felt that the single-teaching encounter used to inform the providers of the tools was not enough coaching for proper tool implementation. Results showed that a champion amongst the reviewers is imperative to motivate the providers to be active in the implementation process. The guides aim to offer providers practical guidance for structuring encounters to promote HL and improve patient safety, satisfaction.

TENNESSEE POSTER FINALIST - Tamera Means

The effect of an Individual's Race, Age, and Gender on how they view exemption from Informed Consent.

First Author: Tamera Means Second Author: Sumaya Mekkaoui, Third Author: Nina Gentile, MD.

At times, patients enrolled into clinical studies in an emergency setting are unable to provide consent for themselves. In very specific circumstances, prospective consent may be waived and the study is conducted under FDA Code 50.24,

Exemption From Informed Consent (EFIC). While EFIC has been used for over 15 years to conduct acute care RESEARCH , little is known about participants' attitudes and perceptions of the process and especially if the attitudes and perceptions are effectedby the individual's race or ethnicity, age, and gender. We predict that participants' attitudes and perceptions about EFIC are influenced by their race/ethnicity, age, and gender.

Methods:Our retrospective study reviewed 241 respondents' answers to a survey conducted as part of the community consultation activities required in preparation for a clinical trial utilizing EFIC. We studied how different race/ethnicity, age, and gender groups perceive survey questions related to EFIC. ANOVA without replication compared answers about participants' past RESEARCH participation and whether or not they felt the surveyor/RESEARCHers would listen to their opinions. We also compared opinion scale questions rating how respondents felt about the use of exception for informed consent. Results: Survey answers to EFIC opinion scale questions differed by race/ethnicity, and age. Whites and respondents aged 25-50 were more accepting of EFIC. Hispanics and the group aged below 24 were the least accepting of EFIC. Our ANOVA analysis showed a significant difference between racial/ethnicities ($P<0.001$) and age ($P<0.02$), but no difference between genders. In relation to whether or not RESEARCHers would listen, Asians, ages 25-50, and males responded most positively while blacks, participants 24 and younger, and females reacted most negatively. However, our ANOVA analysis showed no significant difference within any categories.

Conclusion: In an urban, racially diverse community, respondents to a survey of opinion relating to use of exception from informed consent in clinical RESEARCH differed by both age and race or ethnicity. These data support the need for broad community consultation prior for studies using EFIC; and, it supports the need to engage diverse communities in the development of federal regulations relating to clinical RESEARCH in the emergency setting.

TEXAS POSTER FINALIST - Johanna McLendon

Bridging inpatient and outpatient care to improve screening and prevention – a student led pilot project using AHRQ-ePSS

First Author: Johanna McLendon Second Author: Nathalie Kolandjian

Introduction: The US Preventive Services Task Force has developed a mobile application called AHRQ-ePSS for primary care providers to identify recommended screening and prevention measures for each patient based on certain criteria. Use of this application in the inpatient setting may present a valuable opportunity to improve screening and prevention if hospitalists make recommendations to outpatient providers and if screening is performed during hospitalization. The purpose of this inquiry is to determine the practicality of the AHRQ-ePSS mobile application as a method for bridging inpatient and outpatient care.

Methods: Review of clinic records from a federally-funded clinic in Harlingen, TX was performed for 36 patients admitted to an acute care facility over the course of one month. The patient population included adult males and adult non-pregnant females. Grades A and B recommendations were identified for each patient based on age, gender, tobacco use and sexual activity using the AHRQ-ePSS mobile application. Data was collected from outpatient records regarding adherence to recommendations and any deficiencies were noted on patient discharge orders.

Results: Charts from 36 patients (14 Males, 22 females) ranging from ages 21 to 90 were reviewed. Recommendations for common chronic disorders showed that 100% of patients received appropriate screening for hypertension, diabetes mellitus, lipid disorders and obesity. 58% of men aged 45 to 79 and women aged 55 and 79 were taking a preventive dose of aspirin. Screening for sexually transmitted diseases was documented in 10% of patients. 30% of women for whom it was recommended were screened for chlamydia. For high risk patients, 13% received syphilis screening and 40% were screened for gonorrhea. HIV risk was assessed in 73% of patients with one patient determined to be high risk. Eight patients received HIV screening. 83% of tobacco users received smoking cessation counseling. 86% of adults with risk factors received diet counseling. 88% received PHQ-9 depression screening. 52% of women aged 50 to 74 had documentation of a mammogram within the past 2 years. 58% of those aged 50 to 75 received colorectal cancer screening. 50% of women aged 21 to 65 had documentation of cervical cancer screening within the past 3 years.

Conclusion: The AHRQ-ePSS mobile application facilitated identification of appropriate screening and prevention recommendations for each patient. Chart review showed a lack of screening for sexually transmitted diseases and cancer. Using the mobile application can help identify deficits in screening and promote continuity of care in both inpatient and outpatient settings.

VIRGINIA POSTER FINALIST - Jacqueline Britz

Exploring Challenges and Policy Solutions for improving access to healthcare for vulnerable populations: Lessons from the UK National Health Service

First Author: Jacqueline Britz

Background: Vulnerable populations in the United Kingdom (UK), similar to other countries throughout the world, face many obstacles to accessing healthcare. The English Department of Health is currently consulting on a proposal that may end free access to primary healthcare for some migrants, in response to concerns over budget constraints and the perceived costs and extent of "health tourism" in the United Kingdom (UK). This RESEARCH project, conducted in collaboration with Doctors of the World UK, explored the existing model of healthcare in the UK and potential implications of the proposed restrictions to healthcare. The final report presents recommendations for policymakers and key stakeholders to promote more equitable access to healthcare. The themes and recommendations that emerged from this RESEARCH project have relevance beyond the UK, and could provide valuable insights into opportunities and challenges for promoting health equity in the Unites States.

Methods: A literature review of undocumented migrants' access to healthcare in England was performed and a broad variety of stakeholders, including Members of Parliament, senior professionals from the Department of Health and Public Heath England, clinicians, and staff from charities with extensive experience with migrants, were interviewed. A coding strategy was developed integrating elements of thematic coding and framework analysis. Collection, analysis, and interpretation of data were guided by the Dahlgren and Whitehead Social Model of Health and the Commission on Social Determinants of Health Conceptual Framework.

Findings, Recommendations, and Conclusions: There are a number of factors that compromise the health of vulnerable migrants in England, including dire financial circumstances, unstable housing and other living conditions, and barriers to accessing healthcare (e.g. confusion over entitlements and administrative barriers, fear, discrimination, and charging). The Government's proposal to restrict access to healthcare in England based on immigration status would threaten the health of vulnerable individuals and public health, given the importance of primary care in the prevention and early detection of infectious diseases. This proposal would also increase pressure (and consequently costs) on already over-burdened accident and emergency (A&E) departments as well as conflict with the Government's legal and ethical obligations. This report therefore recommends that the Government should not implement restrictions on access to NHS primary care based on immigration status. Interviews with experts identified several key principles of successful models of healthcare that should be integrated within the NHS structure to promote health equity, including the following: accountability and transparency, aligning incentives, collaboration and integration, effective collection and sharing of data, and changing cultural norms. This report calls for a coordinated and multisectoral strategy to addressing health inequalities in the UK, and outlines specific recommendations from which other developed countries may benefit.

VIRGINIA POSTER FINALIST - Joshua Trebach

Extragenital Gonorrhea and Chlamydia in Exposed Women Attending Two Baltimore City Sexually Transmitted Diseases Clinics

First Author: Joshua Trebach, BS, Division of Infectious Diseases, Johns Hopkins University School of Medicine, Baltimore, MD, Patrick Chaulk, MD, Baltimore City Health Department, Khalil Ghanem, MD, PhD, Johns Hopkins University

Introduction: Recommendations from the CDC call for pharyngeal screening of *Neisseria gonorrhoeae* (GC) and rectal screening of GC and *Chlamydia trachomatis* (CT) in HIV-infected and at-risk men who have sex with men (MSM). There are currently no recommendations to routinely screen women at extragenital sites. Our aim was to define the prevalence of extragenital GC and CT in women accessing care at two public STD clinics in Baltimore and compare it to the prevalence of extragenital infections in MSM and men who have sex with women (MSW).

Methods: All patients who reported extragenital exposures between 6/1/2011 and 5/31/2013 were included in this analysis. We used logistic regression models to identify risk factors for extragenital infections. Point estimates with 95% confidence intervals (CI) are presented.

Results: A total of 10,539 patients were included in this analysis (88% African American, mean age 29 years, 42% women, 7% MSM, 2.5% HIV infected). The prevalence estimates of any extragenital GC and CT were: 2.4% [95% CI: 1.9-2.9] GC and 3.7% [95% CI: 3.1-4.4] CT in women; 2.6% [95% CI: 2.2-3.1] GC and 1.6% [95% CI: 1.3-2.0] CT in MSW; 18.9% [95% CI: 16.0-22.0] GC and 11.8% [95% CI: 9.4-14.5] CT in MSM. Among women, 30.1% [95% CI: 23.3-37.7] of all cases of GC and 12.8% [95% CI: 9.8-16.2] of all cases of CT would have been missed if extragenital testing were not done. Age less than or equal to 18 years was the strongest predictor of extragenital infections in women—it was associated with increased probability of pharyngeal GC [OR 3.85, 95% CI 1.9-7.9], pharyngeal CT [OR 3.74, 95% CI 1.8-7.9], and rectal CT [OR 23.57, 95% CI 7.2-76.8). IV drug use was only associated with an increased risk of pharyngeal GC [OR 5.59, 95% CI 1.5-20.4].

Conclusions: Although the prevalence of extragenital gonorrhea and chlamydia is highest among MSM, nearly one third of gonorrhea cases in women would be missed with genital-only testing. Screening for rectal CT, pharyngeal CT and pharyngeal GC should be considered in young women attending STD clinics when extragenital exposures are reported.

WASHINGTON POSTER FINALIST - Chen Xie

Chart documentation of communication with families of patients surviving critical illness

First Author: Chen Xie, Ruth A. Engelberg, Catherine L. Hough, Ann C. Long, Anna M. Ungar, J. Randall Curtis, Erin K. Kross

Introduction: Family members of patients who survive a stay in the intensive care unit (ICU) rate satisfaction with clinician communication lower than families of patients who die in the ICU. To explore areas for improvement in communication with families of ICU survivors, we assessed medical record documentation of clinician communication with families and its association with family ratings of communication.

Methods: Participants were part of an ongoing inception cohort study of survivors of acute lung injury and their families at an urban university-affiliated level I trauma center. Patient characteristics were obtained from patient surveys and medical records. Details of documentation of clinician communication with families in the ICU were obtained from patients' medical records using standardized abstraction methods. After discharge, up to 3 family members per patient completed surveys rating quality of clinician communication using the Quality of Communication (QOC) questionnaire. Descriptive statistics were used to describe frequency of documentation of clinician communication with families. Multivariable regression models clustered by patient and adjusted for patient age, sex, race, ICU length of stay, comorbidity score and primary diagnosis were used to explore associations between patient characteristics and the frequency of chart-documented clinician communication with families as well as associations between the frequency of chart-documented communication and family QOC ratings.

Results: Sixty-three patients (mean age 54 years, 87% white, 63% male, median ICU stay 12.5 days) and 92 family members (mean age 52 years, 88% white, 35% male) participated. Frequency of documentation varied by clinician type and communication topic. Forty-three percent of patient records contained at least one family communication note written by a physician; these patients tended to be older, non-white or had longer ICU stays (all $p<0.05$). Records for 11% of patients had documentation of a multidisciplinary family meeting; in the adjusted model, family members of these patients gave higher ratings on the QOC item "using words you understand" ($p<0.01$). While only 6% of patients had a note documenting communication by a palliative care specialist, in the adjusted model these families gave significantly higher ratings on multiple QOC items.

Conclusion: Physician documentation of family communication and documentation of multidisciplinary family meetings were infrequent among patients surviving critical illness. Documentation of a family meeting was associated with higher family satisfaction with communication, as was the presence of a note documenting communication by a palliative care specialist. These may represent potential targets for improvement in quality of care.

WEST VIRGINIA POSTER FINALIST - Brandon P Lucke-Wold

Perk-Mediated ER Stress: Linking Acute Blast-Induced Neurotrauma with Tau-dependent Neurodegeneration

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Blast-induced traumatic brain injury (bTBI) is the 'hallmark injury' of modern warfare with up to 20% of U.S. servicemen and women being exposed. Despite the large clinical prevalence, the pathogenesis of neural injury after exposure to bTBI is poorly understood. Specifically, how blast-induced neurotrauma leads to an increased risk for development of neurodegenerative disease such as chronic traumatic encephalopathy (CTE) is unclear. Using a novel shock tube model of blast injury designed to simulate clinically relevant blast wave parameters we sought to illuminate the underlying mechanism of injury. Endoplasmic Reticulum (ER) stress has been implicated in both preclinical and clinical studies of neural injury and neurodegenerative disease including ischemic stroke. It has not, however, previously been investigated in neurotrauma. In this work we seek to elucidate the contribution of PERK-mediated ER stress on neural injury over time in young adult male rats.

The present study investigates acute post-injury time points (1.5, 3, 6, 12, and 24 h) in order to characterize the role of the PERK-mediated ER stress pathway on acute neural injury following moderate blast exposure. rtPCR data showed increased gene expression of ER stress marker *chop* ($F(6,21) = 16.01$, $p<0.001$) at 3 h. Protein analyses exhibited an increase in protein levels of CHOP at 24 h ($t = 3.838$, $p< 0.05$) and phosphorylation of eIF2a at 0.5h ($t=5.447$, $p<0.05$). Salubrinal, an ER stress modulator, reduced CHOP ($F(2,15) = 9.172$, $p<0.01$) and p-eIF2a ($F(2,15) = 5.145$, $p<0.05$) at 24h and 0.5h following blast exposure; respectively. Salubrinal also ameliorated increased impulsive behavior on the elevated plus maze ($F(3,20) = 7.510$, $p<0.01$). We examined cell type-specific effects and the role of PERK-mediated ER stress in tau phosphorylation events identified through co-localization studies with immunohistochemistry. Caspase12, a marker of apoptosis, was co-localized with CHOP in neurons (overlap coefficient, $r = 0.991$), but not in astrocytes (overlap coefficient, $r = 0.131$). AT270, a marker of tau hyperphosphorylation, was co-localized with the ER stress marker IRE1a in both human CTE brains (overlap coefficient, $r = 0.904$) and repetitive blast rat brains (overlap coefficient, $r = 0.807$).

Elucidating the role that PERK-mediated ER stress plays in these events may lead to increased understanding of the mechanistic link between acute brain injury and chronic neurodegenerative diseases. The increased understanding will lead to improved diagnostic accuracy, and will ultimately contribute to novel therapeutic targets for neurotrauma and neurodegenerative diseases.