American College of Physicians- Minnesota Chapter Annual Abstract Competition

Minneapolis Convention Center

November 7, 2014

Abstracts Submitted for Competition

### Medical Students

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<th>Clinical Vignette--Medical Student</th>
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<td><strong>Paul Anagale</strong></td>
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<td>Complex disease burden in Native American health: a Case Report</td>
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**Introduction:** This case report highlights the challenges faced by Native American patients who present with a unique spectrum of social problems and medical disease complicated by acute medical illness.

**Case Description:** The patient is a 24 year old male who presented with lower extremity “bruising” and “scabs”. He has cystic fibrosis and history of bilateral lung transplantation, cystic fibrosis related diabetes, and cystic fibrosis related pancreatic insufficiency. Personal/social history included recent IV drug use, cocaine use, skin-popping, homelessness, and poor access to healthcare. The clinical course was as follows: in view of his recent IV drug use and new rash, a workup for endocarditis was performed. No vegetations were found on transesophageal echocardiogram, but two of four blood cultures were positive for bacillus cereus. B. cereus is most often a contaminant when isolated from blood, but can cause endocarditis associated with IV drug use, and has actually been cultured from heroin itself. The clinical course was complicated and required pulmonary, cardiology, infectious disease, and psychiatry specialists; social work services to identify a program for outpatient, out-of-state suboxone therapy; and identification of a physician with specific DEA certification to prescribe suboxone. After hospital discharge, the patient has been lost to follow-up, indicating that his health issues were only partially understood.

**Discussion:** This case illustrates the potential medical and social complexity of acute disease and the frequently associated spectrum of chronic conditions among Native Americans. Statistical information indicates that Native Americans suffer from higher rates of substance abuse, suicide, drug and alcohol related death, diabetes, infant and maternal mortality, and all cause mortality compared to other races of the US. In recent years the Midwest population of Natives, composed primarily of Ojibwe and Lakota, grew from roughly 400,000 to 450,000. There are 11 Tribal reservations in the state of Minnesota, with 8 bands of Ojibwe and 4 bands of Lakota. There are 4 Indian Health Service hospitals in Minnesota, 11 Tribal run facilities, and 2 urban Native clinics in the Twin Cities. Healthcare teams in rural Tribal areas typically do not have adequate capabilities to manage medically and socially complex problems. With a large number of Native Americans in the
Midwest area, Minnesota physicians should appreciate the disease burden faced by their local Tribes. In addition, there is an aspect of Native culture that we could not adequately address for our patient; specifically, he expressed beliefs in Native spirituality that would aid in the process of his healing. Studies show that healthcare within Native communities that is culturally sensitive is a powerful form of medicine. Minneapolis physicians can gain an understanding of Tribal culture thru exploratory visits to the Minneapolis Indian Center, simple literature searches, and even Native ceremonial attendance.

Brendon Boe  
Markedly Elevated Brain-type Natriuretic Peptide Level in a Multiple Myeloma Patient

Brain-type Natriuretic Peptide (BNP) is released from ventricular myocardium in response to volume overload. It has clinical utility in diagnosing heart failure as well and guiding therapeutic choices for patients with heart failure. Following is a case where there appeared to be an inappropriate correlation between the patient’s volume status, cardiomyopathy and an exaggerated elevation in BNP. Case Description: A 55 year old male with past medical history of Multiple Myeloma and chemotherapy associated cardiomyopathy presented with confusion, somnolence and low urine output. Patient was found to be uremic with acute renal failure. His creatinine was 7.7 (baseline 2.2) and BUN was 82. On admit, the patient appeared to be hypovolemic and was started on IV fluids. He quickly developed orthopnea, marked dyspnea and bilateral basilar rales. He did not respond to diuretic therapy and the decision was made to dialyze the patient. The patient had a BNP level of 2192 ng/L at the initiation of dialysis. Echocardiograph demonstrated low ejection fraction of 30-35%. Although the patient had a marked improvement of symptomatology and physical exam status even after hemodialysis, his BNP levels continued to climb – specifically the BNP level returned at 4335 ng/L after his first run of dialysis. As daily dialysis progressed, the patient’s physical exam and symptoms continued to improve, but his BNP levels continued to rise markedly, eventually peaking at 16604 ng/L. It was apparent that the BNP level was unreliable for assessment of volume states and decompensated heart failure; therefore, treatment decisions were based upon physical exam, symptomatology, and alternative laboratory criteria. This case demonstrates the importance of a thorough physical exam in conjunction with laboratory values in driving clinical decision making in a patient with dyspnea. Although this patient’s BNP continued to rise precipitously, his physical exam and symptomatology improved greatly while on hemodialysis. Recognition of a falsely elevated BNP level is critical in order to avoid overutilization of resources and/or over diuresis. In addition, further research is needed to investigate the relationship between Multiple Myeloma and BNP levels.

Sean Cantwell, M.D.  
Necrobiotic Xanthogranuloma: More than Skin-deep

Cutaneous ulcers are common in the internal medicine practice; some ulcers may be the only presenting sign of more serious diseases. Necrobiotic xanthogranuloma (NXG) is a rare, chronic, progressive...
disease that often presents with only cutaneous lesions. If left untreated, NXG can result in negative outcomes as nerve palsies, ocular complications (including blindness), multiple myeloma, organ system dysfunction, and lifestyle limitations attributable to severe pain. Case Description A 51-year-old woman presented to her local physician with two yellow-brown nodules on the left lower leg. The nodules were excised and shown to be noncancerous. Initially, biopsy sites were healing, but later on scaly, red, itchy, and painful lesions developed in the same area. Additionally, yellow plaques started to develop on the upper and lower eyelids, causing itchy, red, and watery eyes. These periorbital lesions were excised, but no further treatment was provided. The lower-extremity lesions slowly progressed over several months, prompting dermatologic evaluation; a diagnosis of necrobiosis lipoidica diabeticorum was given. The patient was treated with corticosteroid cream that resulted in minimal improvement of her pruritus and scaling. New lesions continued to develop on the left posterior thigh, right thigh, and bilateral buttocks, following a similar progression to the earlier lesions and coalescing into indurated plaques that started to ulcerate. A new biopsy showed granulomatous inflammation. Corticosteroid injections proved ineffective as pain and swelling increased and the leg became secondarily infected, with purulent drainage from the ulcers. The patient was admitted to the hospital and treated with intravenous antibiotics. Skin biopsy supported a diagnosis of NXG. Serum protein electrophoresis showed a monoclonal immunoglobulin G lambda spike, and a bone marrow biopsy revealed atypical plasma cells consistent with an early plasma cell dyscrasia. A hematologist was consulted and the patient responded well to chemotherapy. Discussion This case demonstrates that seemingly benign, ulcerated skin lesions may indicate serious pathology. Although NXG is a debilitating disease, its initial presentation is often limited to minor skin lesions that first appear on the trunk or extremities and subsequently involve the periorbital area. NXG has documented associations with hematologic disorders, as most patients with NXG have a serum monoclonal gammopathy. Skin biopsy may show microscopic similarities between necrobiosis lipoidica diabeticorum and NXG, but clinically these disorders follow a different course, and the prior is usually not associated with a serum paraprotein. The internist should consider NXG in patients who present with chronic, nonhealing, cutaneous ulcers, as this is imperative to the timely initiation of treatment and may prevent the onset of irreversible yet avoidable complications.

John Conley  
Fiona He, Nadia Wesche

Hydroxychloroquine cardiotoxicity leading to restrictive cardiomyopathy

The development of cardiotoxicity and restrictive cardiomyopathy is a rare but potentially fatal complication of hydroxychloroquine (HCQ) therapy used in the treatment of rheumatologic disorders such as systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA). Impaired renal function may contribute to toxicity as chloroquine drugs undergo both renal and hepatic clearance. 78-year-old woman with a history of SLE, RA, infiltrating ductal carcinoma of the breast s/p..
mastectomy/chemotherapy/radiation, and chronic kidney disease stage III initially presented with chest pressure and dependent edema. Troponin was elevated to 1.7 without EKG changes. Coronary angiogram demonstrated non-obstructive coronary artery disease, but an echocardiogram was notable for increased wall thickness with severe diastolic dysfunction and a left ventricular thrombus. She was discharged home on Warfarin. Six weeks later, she was admitted for scheduled right heart catheterization, which showed reduced cardiac output, borderline pulmonary hypertension, and increased bilateral filling pressures. Since her initial presentation, she had felt well without dyspnea or chest pain, and had improvement in edema. Physical exam was notable for absent vibratory sensation in the lower extremities bilaterally below the knees. She appeared euvoelmic and without any signs of rheumatologic disease. Admission labs showed light chains in her urine concerning for multiple myeloma or amyloidosis, however serum protein electrophoresis was normal. Troponin was stably elevated in 1.8 to 2.3 range. EKG showed low voltage in all leads, 1st degree AV block, and no evidence of ischemia. This patient had been taking HCQ 200mg twice daily since her diagnosis with SLE in the late 1990s, and had not experienced RA or SLE manifestations for many years. Cardiac MRI was considered, but not performed due to risks of contrast with renal failure. The patient underwent endomyocardial biopsy after cardiac function was optimized. Biopsy was negative for amyloidosis, but showed interstitial fibrosis, myocyte hypertrophy with significant myocyte disarray, and cytoplasmic vacuolization, which are consistent with HCQ cardiotoxicity. HCQ was discontinued and the patient was discharged with afterload reducing agents for management of her biventricular heart failure. Rheumatology follow up was scheduled to discuss HCQ replacement. This case illustrates the potential for severe cardiac complications with HCQ use, and the difficulties with diagnosis. A recent literature review cited approximately 70 cases of cardiotoxicity related to chloroquine drugs; of these about half were biopsy proven cases of HCQ cardiotoxicity. Retinal toxicity due to HCQ is thought to develop faster in patients with renal impairment, suggesting a greater probability of cardiotoxicity in renal impairment as well. Given the risk of rare cardiac complications, regular EKG and echocardiography monitoring may need to be considered in patients receiving HCQ therapy.

Zachary Crees
Meltiady Issa, MD

Spontaneous, intramuscular swelling in an elderly female

Acquired factor inhibitors are rare coagulopathies, of which factor VIII inhibitor or acquired hemophilia A is the most common, mainly affecting older adults. Bleeding is the most common manifestation and often constitutes a medical emergency, with reported mortality rates as high as 22% from directly and indirectly related complications. Should an internist suspect hemophilia A, an urgent hematology consultation is recommended to mitigate these complications. A 74-year-old female with a history of rheumatoid arthritis and hypothyroidism presented to her primary care physician with painful muscular swelling, bruising and fatigue for 2 weeks. She first noted right inner arm swelling that became bruised and subsequently developed left arm swelling and right
calf pain which progressively extended up into her right thigh and down her left leg. She denied trauma or similar episodes previously. She had undergone prior surgeries without transfusion and had no family history of bleeding disorders. She denied using NSAIDs, aspirin or warfarin. Physical examination revealed conjunctival pallor with significant swelling and large ecchymoses on all extremities. Initial labs revealed normocytic anemia with hemoglobin of 10.5. The next day she felt worse and presented to the ER with a hemoglobin of 8.5, reticulocytosis and an elevated creatine kinase. Coagulation studies revealed a normal protime (PT) of 13.7 and normal fibrinogen activity but an elevated partial thrombin time (PTT) of 118. She required admission with hematology consultation. No lupus anticoagulant was detected. A 1:1 mixing study revealed a factor inhibitor, prompting transfusion of 2 units of cryoprecipitate. Further testing revealed adequate VWF activity and factor VIII activity of <1%, confirming the diagnosis of high titer, acquired factor VIII inhibitor. Prednisone and factor VIII inhibitor bypassing activity (FEIBA) were initiated. Her hemoglobin slowly improved over 5 days as did her hematomas and ecchymoses. Her FEIBA was gradually decreased and stopped with no evidence of re-bleeding. She was discharged home on 3 weeks of prednisone with scheduled follow-up to repeat coagulation studies. This case illustrates a classic presentation of a relatively rare but potentially life-threatening, acquired coagulopathy. Acquired hemophilia A has been reported in association with autoimmune disorders and malignancies. So if an elderly patient with this background presents with acute onset hematomas, ecchymoses, and no history of coagulopathy or trauma, then the presence of an acquired factor inhibitor should be suspected. Diagnosis is supported by a solitary prolonged PTT that fails to correct on mixing with normal plasma. Invasive diagnostic procedures and intramuscular injections should be avoided due to bleeding risk. Acutely, inhibitors of low titer are treated with factor VIII concentrates or DDAVP while higher titers often require activated prothrombin complexes such as FEIBA. Long term management aims to eliminate the inhibitor through immunosuppressive medications including prednisone, cyclophosphamide and rituximab.

Maros Cunderlik
Andrew Olson, MD

Seizing the Opportunity to Avoid Premature Closure.
Determining etiology of an apparent syncopal episode is essential to the subsequent treatment and prevention of future episodes. The diagnostic process is often complicated by the fact that several non-syncopal diseases can mimic syncope and most syncope is not associated with life threatening etiologies. Case: A 49 year old man was found on the floor of an elevator one evening by his colleagues while working as a custodian. In the Emergency Department he reported waking up to people slapping him in the face. The episode was not directly observed and the last thing he recalled was walking into the elevator approximately 30 minutes earlier. His pants were wet in the ED but was unsure if he was incontinent. He had no complaints of tongue biting, chest pain or dyspnea and reported no prodromal symptoms. He did report two similar episodes in the past three months which were
both unwitnessed. Past medical history was significant for a distant
tory history of head injury as a teen and meningitis at nine months with
sucesssive right arm contracture. His physical exam was unremarkable
with no cardiovascular or neurological abnormalities except his right
ar arm weakness with contracture. Further workup including ECG, head
CT, electrolytes and glucose showed no abnormalities. He was admitted
to the hospital overnight for further evaluation. Next morning the
patient was noted to be "out of it" and had a brief episode of loss of
consciousness. ECG showed sinus slowing without PR prolongation
leading to a sinus arrest with 24 seconds of asystole. As a result an
emergent permanent pacemaker placement was performed. However,
the patient continued to have episodes of hypoxia, pacemaker
dependent bradycardia and altered mental status after the pacemaker
was placed. Given these findings a video EEG was performed that
revealed interictal epileptiform discharges in the right frontotemporal
area consistent with seizure activity. Consequently the patient was
treated with levetiracetam and remains seizure and asystole free at six
months following the initial hospitalization. In conclusion, ictal asystole
is a rare but potentially life threatening complication of epileptic
seizures. As this case demonstrates an episode of apparent syncope
with evidence of sinus slowing or asystole warrants both detailed
cardiac and neurologic evaluation and evaluation should not "stop with
the heart."

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<th>Arie DeGrio</th>
<th>Cheyne-Stokes Respiration Is Not Always Neurological</th>
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| Angie Volkert, Ellen Overson | Cheyne-Stokes respiration is a cyclical breathing pattern characterized by an apneic episode followed by a hyperventilatory response to increased carbon dioxide in the blood. It is seen in pathologic central nervous system conditions, heart failure, and end of life care. Here we highlight a case where Cheyne-Stokes respiration is the lone physical exam finding in a heart failure patient where the initial presenting symptom was altered mental status. A 78-year-old man was brought to the Emergency Department with the chief complaint of mental status changes, in the setting of increased depression and active suicidal ideation. On admission, the most profound features of his presentation were mental status changes and the Cheyne-Stokes respirations. Because of the acute worsening mentation, neurologic pathologies were initially considered the most important. The neurologic work up targeted processes significant to the central nervous system, namely occlusion to a vessel supplying the respiratory control center, an infectious manifestation, or disequilibrium in autonomic function. With an unremarkable neurologic workup concluded, our patient’s undiagnosed condition started affecting other organs in addition to the brain. His liver and kidney function tests were beginning to elevate and his progressive decline sparked discussions about transfer to another facility. After reassessing, a broader diagnostic workup was implemented that included an echocardiogram to check for heart failure. Cardiovascular pathology was not originally considered because the initial presentation did not reveal any of the classic heart failure signs. Additionally, an echocardiogram just five months previous showed a normal ejection fraction. However, repeat echocardiogram
revealed an ejection fraction of 25% and with diuresis and fluid restriction an improvement was noted in altered mentation and reduction of Cheyne-Stokes respiration intensity. Within several days, our patient’s mental status improved back to baseline. His cyclical respiration pattern, though still present, no longer included apneic phases and severe hyperventilatory responses. This case illustrates how heart failure is still a pertinent diagnostic consideration in a patient with Cheyne-Stokes respirations even when neurological and psychiatric processes are distracting from the true underlying pathology. Early workup and treatment for heart failure can lead to quicker symptom resolution, prevention of unnecessary tests and imaging, and shortened hospitalizations. An echocardiogram is an important diagnostic tool in achieving optimal results in patients presenting with Chenye-Stokes respiration.

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<th>Yuri Hanada</th>
<th>Persistent Fever: A Case of Concurrent, but Unrelated, Infection and Malignancy</th>
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| Kathryn S. Handlogten, MD, Bradley W. Anderson, MD, Arya B. Mohabbat, MD | A 72-year-old man with an oncologic history significant for melanoma and metastatic head and neck squamous cell carcinoma of unknown primary presented to the Emergency Department with a three week history of daily fevers up to 39.5°C, chills, night sweats, and malaise. Upon hospital admission, he was febrile, diaphoretic, and hypotensive. He denied rash, myalgias, nausea/vomiting, headache, confusion, and respiratory, gastrointestinal, or genitourinary symptoms. Of note, the patient lost approximately 100 pounds over the past year with a commercial diet plan. Physical exam was remarkable for mild splenomegaly. Labs were notable for pancytopenia, mildly elevated AST, mild indirect hyperbilirubinemia, hypoalbuminemia, negative blood cultures, and an unremarkable peripheral smear. Further history revealed that one week prior to symptoms, the patient noticed several attached ticks after gooseberry hunting in southern Iowa. Additional tests revealed a high antibody titer and positive PCR test for Ehrlichia chaffeensis. The patient was diagnosed with human monocytic ehrlichiosis (HME) and discharged with a ten-day course of doxycycline. Despite treatment, his symptoms persisted. Upon re-evaluation two days after antibiotic completion, the pancytopenia had resolved, and repeat infectious work-up, including E. chaffeensis PCR and tick-borne illness serologies were negative. Flow cytometry immunophenotyping was unremarkable; however, serum electrophoresis demonstrated an M spike. Subsequent PET scan showed an enlarged spleen with diffuse uptake throughout the spleen and skeleton. Bone marrow biopsy suggested a reactive process, with moderate hypercellularity accompanied by a minor left-shift and scant granulomas. Marrow microbiology testing was unrevealing. Due to continued fevers and malaise up to two months after his initial presentation, the patient elected to proceed with diagnostic splenectomy. Pathology reported an immunophenotypically distinct lymphocytic population replacing the splenic white pulp and infiltrating the red pulp, consistent with a final diagnosis of splenic marginal zone lymphoma (SMZL). The patient’s symptoms subsequently resolved. This case illustrates first, the importance of maintaining a broad differential for fever of unknown
For patients with suspected subacute or chronic HME, the differential should include other zoonotic infections and lymphoma. Second, doxycycline resistance or symptomatic relapses after treatment have not been reported with ehrlichiosis. Therefore, incomplete medication course, additional infection, or a non-infectious cause must be considered. Lastly, SMZL is a rare, indolent B-cell lymphoma in which patients typically present with splenomegaly and absent lymphadenopathy. Anemia, lymphocytosis, neutropenia, and monoclonal gammopathy may be seen. Unique features to this case include the presence of B symptoms, which are rare with SMZL, and the lack of bone marrow findings, as SMZL invariably involves the bone marrow. SMZL has been associated with infectious agents, including HCV, EBV, and malaria; however, there is no established relationship between lymphoma and ehrlichiosis in humans.

Kathleen Ireland  
Aati Bhatt

**The Diagnostic Challenge of Sarcoidosis**

Sarcoidosis is a rare multi-organ disease characterized by granulomatous inflammation. Resembling histoplasmosis and tuberculosis both clinically and radiologically, it is a challenging diagnosis of exclusion. A 30 year old previously healthy homeless African American gentleman presented to inpatient medicine service with one week of dry cough and progressive dyspnea that failed outpatient community acquired pneumonia treatment. He endorsed subjective fevers and night sweats, but denied weight loss. The patient smoked a cigar daily and occasionally used marijuana, but reported no occupational or sick contact exposures. Family history was unknown. On exam he was febrile to 102°F, in no respiratory distress, without lymphadenopathy and had a surprisingly benign lung exam. Remainder of exam was also negative. Labs were notable for leukocytosis and elevated CRP. PPD, respiratory virus panel and legionella testing were negative. Chest CT revealed diffuse nodular opacities with reactive mediastinal hilar adenopathy. Amphotericin and Bactrim were started empirically out of concern for underlying infectious etiology. However and extensive infectious workup returned negative. A node biopsy was obtained and pathology consistent with Sarcoidosis. Stains were negative for TB and fungal elements. The patient was started on prednisone and Bactrim prophylaxis. He was discharged 2 days later with significant clinical improvement. This case illustrates the complexity of diagnosing Sarcoidosis and the value of biopsy in its identification. The differential for this patient was broad, including conditions like atypical infection and hypersensitivity pneumonitis. Radiographic findings noted above are certainly consistent with Sarcoidosis, but also mimicking conditions such as TB and Histoplasmosis. This patient endorsed serious constitutional symptoms and had risk factors for TB and Histoplasmosis, highlighting the importance of a systematic approach to work-up in the diagnosis of Sarcoidosis.

Besma Jaber  
John Schwerkoske, MD

**All That Wheezes Isn’t Asthma – and Sometimes It”s In Your Genes.**

Asthma is a common cause of respiratory distress with defining pathologic features. When these characteristics are absent, the
underlying diagnosis should be questioned for other potential etiologies. THE CASE: A 33 year-old female with history of anemia, anxiety, angioedema and asthma requiring frequent intubation over the last year presented with worsening respiratory distress. She remained tachypneic in persistent distress despite continuous nebulized albuterol and non-invasive positive pressure ventilation. Given her history, she was treated for an acute asthma exacerbation; steroids and magnesium were administered followed by epinephrine for a history of angioedema. However, she worsened and was intubated. The patient had a history of recurrent intubations, approximately one to two per month, preceded by a prodrome of abdominal pain and mild lactic acidosis in the last year. She stated compliance with an appropriate medication regimen for severe persistent asthma including inhaled corticosteroids. Her uncontrolled symptoms, along with a confirmed negative pulmonary workup and persistent generalized weakness, prompted exploration for an alternative diagnosis. Other sources for recurrent respiratory failure were explored including vocal cord dysfunction, angioedema, psycho-somatization, and conversion disorder. Due to an isolated lactic acidosis, concern for an underlying metabolic etiology was explored and plasma acylcarnitine levels, urine organic acid panel, C4/C3, pyruvic acids, and a cyanide level were obtained. Urine organic acid panel returned positive for elevated Kreb cycle intermediates including 2-hydroxybutyrate, 3-hydroxyisobutyrate, 3-hydroxybutyrate, 2-ethyl-3-hydroxypropionate, fumarate, malate, pyruvate, acetooacetate, and 2-oxoglutarate suggestive of an underlying mitochondrial myopathy. A genetic workup was initiated to determine subtype. There is evidence mitochondrial disorders are some of the most common inherited genetic diseases. However, these diagnoses are often elusive due to the wide phenotypic range and involvement of multiple organ systems. The absence of neurologic involvement, a common finding, and transient respiratory distress made the diagnosis of a metabolic etiology a challenge in this patient, especially given the momentum of her asthma diagnosis. Metabolic disorders can affect every organ system and should be on the differential for patients with poorly classified disease processes refractory to conventional therapy. Mitochondrial myopathies are a common diagnosis of metabolic derangement especially in patients with isolated lactic acidosis in the absence of tissue hypo-perfusion.

Michael Jaeger
Ali Jazayeri,MD

Stuck in the middle: Management of Brain Lesions in an HIV positive patient

52 year old male with a medical history significant for HIV, on HAART, CD4 count of 1100, and tobacco dependence presented to his Infectious Diseases clinic with left sided weakness. Five days prior to his clinic visit the patient awoke with sudden onset of weakness that got progressively worse since onset. Physical exam was significant for increased tone in the left arm, strength 4/5 in the left upper extremity, 3/5 grip strength, 1/5 intrinsic hand muscles strength, and strength 4/5 in the lower extremity. A head CT was obtained which showed a right sided brain lesion. After admission to the hospital for further work up a MRI of the brain demonstrated multiple rim-enhancing lesions in both
cerebral hemispheres with significant mass effect, and midline shift. The differential diagnosis included infectious causes, including toxoplasmosis and cryptosporidium, primary CNS malignancy, and metastatic disease. Given the patient’s robust CD4 count, metastatic disease was the working diagnosis. Full body CT was ordered, Neurosurgery recommended no surgical intervention but did recommend close neurological checks, and Lumbar Puncture looking for infectious etiology. They did not feel there was an indication for steroids to decrease brain edema. Patient was sent for IR guided LP and Neurology was also consulted. Contrary to Neurosurgery’s recommendation Neurology recommended against an LP because of increased risk of herniation, and strongly recommended high dose steroids, however the primary team received those recommendations after the lumbar puncture was performed. Steroids were given and the patient was closely monitored for change in neurological function after the lumbar puncture, and remained stable. The CT of the chest, abdomen, and pelvis showed a large mass in the right lung and adrenal masses. Biopsy of the adrenal masses showed adenocarcinoma consistent with lung metastasis and the patient was diagnosed with stage IV Non-Small Cell Lung Cancer. Radiation Oncology and Oncology were consulted and the patient elected to undergo palliative chemotherapy and whole brain radiation. He showed improvement in his left sided arm and leg weakness after initiation of steroids and was discharged home to continue care as an outpatient. This case illustrates that despite the potential for rare diagnosis in HIV patients, more common disease process should not be ignored in the differential. HIV patients with low CD4 counts (below 200) are at greater risk for CNS lesions caused by opportunistic infections and Primary CNS Lymphoma. This patient’s CD4 count was 1100 and the differential for brain lesions would be similar to an immune-competent patient. Often, treatment decisions need to be made with limited information and weighing the risks and benefits of those treatments is an everyday practice for physicians. With this patient administration of steroids was delayed because of conflicting recommendations from consulting teams.

**Samu Miller**
Beth Theilen, MD, PhD; Andrew P.J. Olson, MD

**Smoking + weight loss + lung mass = Not so fast**
Granulomatosis with polyangiitis (GPA) is a small-vessel vasculitis that typically affects the kidneys and both the upper and lower respiratory tracts. It often presents with non-specific constitutional symptoms, similar to other systemic illness, thus making timely diagnosis difficult. Therefore, a systematic approach to finding the diagnosis is essential. A 70-year-old Caucasian woman with a history of arthritis, prior tuberculosis (TB) exposure with history of positive PPD and a 50 pack-year smoking history presented to the hospital with 3 months of progressive cough productive of clear, occasionally blood streaked sputum, chills, anorexia, fatigue and ten-pound weight loss. She visited her primary care physician on multiple occasions and chest radiographs showed multiple nodules in the lung apices. She was diagnosed with community-acquired pneumonia and completed a ten-day course of levofloxacin. Her symptoms failed to improve so she presented to the
hospital to facilitate a workup for likely malignancy. Examination was notable for tachycardia and a 1 cm tender cervical lymph node. A broad workup was initiated which showed elevated inflammatory markers, hyponatremia, hypoalbuminemia, and leukocytosis with neutrophilia. Infection and malignancy were initially high on the differential diagnosis. Serial sputum samples for AFB were sent to rule out active pulmonary TB, ANA and ANCA serologies were sent, and bronchoscopy with needle biopsy was scheduled to assess for malignancy and the high likelihood of cancer was discussed with the patient. On day two of admission, she developed an erythematous, tender region on the nasal bridge and bilateral swelling and tenderness of the wrists and MCP joints. Pulmonology performed a bronchoscopy with fine needle aspiration, which showed a necrotizing pneumonia but no malignant cells and BAL cultures remained sterile. Notably, c-ANCA and anti-proteinase-3 antibodies were positive. Given the constellation of symptoms, she was started on steroids and rituximab for GPA with rapid improvement in her symptoms. This was an interesting presentation and diagnosis of GPA. Our patient had multiple risk factors and exposures that pointed toward other diagnoses, making the pretest probability of cancer relatively high in the case. Most often, diseases will not present as they do in the textbook. For this reason an organized, systematic approach to clinical reasoning is essential. If the process of diagnosis is performed systematically, we can hopefully minimize inappropriate tests and misdiagnoses.

Caleb Murphy
Peter Cathcart, MD; Andrew Olson, MD

The Eyes Don’t Lie

Central pontine myelinolysis (CPM) is a rare acute neurological disorder often resulting from rapid hyponatremia correction. However, CPM can also present in patients with liver disease, alcohol abuse, and malnutrition. A 45-year-old woman with ESLD due to alcohol requiring weekly paracentesis as well as recurrent hepatic encephalopathy was admitted with acute kidney injury and peritonitis. She was administered fluids and antibiotics. Three days following admission, the patient suffered a respiratory arrest of unknown etiology, was intubated, and transferred to the ICU. Shortly after transfer to ICU, she experienced a generalized tonic-clonic seizure. From family interviews, it was learned that similar seizures had occurred to her in the past, likely due to alcohol withdrawal. Head CT at this time showed no hemorrhage or any other abnormal findings. Chest CT revealed patchy consolidation throughout the lungs. As the patient recovered and was extubated, she regained consciousness with some communication but then, three days after her seizure, her ability to communicate began to worsen. Worsening hepatic encephalopathy was suspected and treated aggressively with no improvement. The next day, when performing a physical exam, it was noticed that the patient was able to make eye contact and communicate by blinking. The exam also revealed hyperreflexia and Babinski sign bilaterally. The symptoms of upper motor neuron damage with locked-in syndrome, when considered in the context of the rapid rise in sodium and the patient’s history of liver disease and alcohol abuse, aroused suspicion of CPM. Upon chart review, it was noted that the patient’s sodium levels rose from 142 to
159 meq/L in a two day span prior to her mental status worsening. Brain MRI the next day revealed abnormal patchy foci within the central pons consistent with CPM. She continued to have severe neurological dysfunction and worsening respiratory failure and expired two weeks later. The clinical diagnosis of CPM was confirmed by autopsy. This case illustrates the value of a thorough physical exam when evaluating altered mental status to avoid diagnostic error. While at admission the patient’s altered mental status was likely due to hepatic encephalopathy, a new condition (CPM) developed. Using physical examination clues to avoid premature closure and diagnosis momentum led to a proper diagnosis.

**Dustin Potter**

**Differential recovery of nephrogenic diabetes insipidus in two patients following cessation of lithium treatment**

Lithium is an element used to treat bipolar disorder which can lead to nephrogenic diabetes insipidus (DI) in some patients with a percentage of 1.8 – 85% reported depending on lithium duration, dose, level, slow-release formulation, and clinical nonresponse. The primary treatment of DI consists of discontinuation of lithium, when possible, and ensuring a proper maintenance of fluid intake, low sodium diet, thiazide diuretics or indomethacin in an attempt to reduce urine output. However, discontinuation of lithium does not always lead to resolution of DI. In the literature, recovery from DI has been reported to be largely variable. Two case reports highlight continuation of nephrogenic diabetes insipidus despite having discontinued lithium 57 months and 10 years prior in two separate patients. We present two patients at the Minneapolis VA hospital who developed lithium induced diabetes insipidus and had very different outcomes following cessation of lithium treatment.

**Caroline Roberts**

**Kendahl Moser-Bleil, MD**

**Iatrogenic Tricyclic Antidepressant Toxicity in a Middle-aged Male with End-stage Renal Disease**

Despite the introduction of selective serotonin reuptake inhibitors, tricyclic antidepressants (TCAs) continue to have clinical relevance. They are used in adults to treat depression, pain, and migraine headaches. Antidepressants in general were in the top ten causes of toxic exposures in 2007 and 2008. TCAs are metabolized hepaticaly and cleared renaly. Therefore, it continues to be imperative that internists recognize the TCA toxidrome and consider renal impairment when dosing TCAs. Case Description: A forty-six year-old male with a history of end-stage renal disease (ESRD), currently hemodialysis-dependent, was admitted after acute onset dizziness and transient left arm weakness in transplant clinic. STAT head CT was negative. No focal neurologic deficits persisted in the Emergency Department (ED). He did have slurred speech and significant lethargy in the ED, but ammonia and bedside venous blood gas were normal. He was admitted for further encephalopathy work-up. On admission, additional etiologies of the patient’s altered mental status were investigated. Urine toxicology was negative, and blood ethanol was 0.00. Acetaminophen and salicylate levels were low. Narcan was given with no effect. Additional history was obtained, which revealed two weeks of severe dry mouth,
confusion, and slurred speech. His medications were closely reviewed. These included amitriptyline, nortriptyline, and gabapentin, all for neuropathic pain and none renally dosed. Therefore, we considered TCA and gabapentin toxicity as causes of his encephalopathy. He was straight catheterized for 1.5 liters of urine, and his speech was much more intelligible after consumption of ice chips. His QRS was prolonged. Urinary retention, dry mouth, ECG changes, and tachycardia were consistent with the TCA toxidrome. The TCA toxidrome also includes chest pain, palpitations, hypotension, convulsions, respiratory depression, dry skin, blurred vision, fever, ileus, rigidity, and mydriasis. The TCA toxidrome results from the multi-faceted mechanism of action of TCAs, including inhibition of serotonin and norepinephrine reuptake at the synapse, direct alpha adrenergic blockade, anticholinergic action, and cardiac myocyte fast sodium channel blockade. We held our patient’s gabapentin, amitriptyline, and nortriptyline, and his symptoms significantly improved. At discharge, the working diagnosis was altered mental status secondary to chronic TCA toxicity, likely exacerbated by the addition of gabapentin a few days prior to admission, in a patient with ESRD. Discussion: TCA toxicity can be lethal, but it can also be effectively addressed if recognized. Seventy percent of individuals that attempt suicide by intentional TCA overdose die before arrival at a medical facility. However, of the thirty percent that reach a hospital, less than five percent die. This illustrates that the continued awareness among internists of the TCA toxidrome is essential to continued effective patient care. Also, it is critical that internists prescribing TCAs remember that these drugs require renal dosing. References: Medscape: "Tricyclic Antidepressant Toxicity"

**EBV-related plasmacytoma-like post-transplant lymphoproliferative disorder in a liver transplant recipient.**

Post-transplant lymphoproliferative disorder (PTLD) is a frequent and critically important complication of organ transplantation. Its development is typically associated with Epstein-Barr virus (EBV) primary infection or reactivation in the context of chronic immune suppression. Presentation is highly variable, varying from solid organ tumors to hematologic malignancies. A 33 year-old man with history of primary sclerosing cholangitis and ulcerative colitis, 8 years status-post living donor liver transplant, was admitted for progressive fatigue, confusion, and jaundice, after being recently treated for a shingles rash with valgancyclovir and gabapentin. His immunosuppression regimen contained prednisone, tacrolimus, and high-dose azathioprine. On exam, he was markedly jaundiced and intermittently somnolent/disoriented. Labs indicated severe acute kidney injury (seemingly mixed pre- and intra-renal), pancytopenia (without evidence for hemolysis), a supratherapeutic tacrolimus level, and a MELD score of 34. Blood/urine cultures, as well as extensive viral serology testing for common post-transplant infections, returned negative. CT scan of the abdomen indicated mildly progressed hepatosplenomegaly and portal hypertension, but no acute interval pathology compared to prior studies. Initially, this acute decompensation was attributed to renal toxicity and marrow suppression from his various medications. He was
treated aggressively with lactulose to relieve his encephalopathy, which was only mildly successful. Fluid rehydration with albumin and saline led to a slight improvement in renal function. A bone marrow biopsy was collected to determine the cause of his worsening pancytopenia; in the meantime, he developed neutropenic fever requiring cefepime and filgastrim, and anemia/thrombocytopenia requiring multiple transfusions. He next developed a new, progressive hypercalcemia, workup for which found low 1, 25-Vitamin D and undetectable parathyroid hormone. Initial bone marrow flow cytometry argued against myelodysplasia, but marrow PCR returned positive for a marked EBV DNA titer (previously negative in the serum). Serum/urine electrophoresis demonstrated significant elevation of kappa and lambda light chains. A diagnosis of plasmacytoma-like PTLD was suspected. Tacrolimus and azathioprine were withdrawn, and while MELD score and hypercalcemia improved slightly, pancytopenia persisted. He currently remains on the transplant list. This case illustrates a rare presentation of a common and clinically serious transplant-related complication. Multiple myeloma, typically associated with elderly patients, can occur even in young post-transplant patients, and is in this case referred to as plasmacytoma-like PTLD, or PTLD-MM. Such patients serve as a reminder for the importance of judicious immune suppression, and the delicate balance between risks of graft rejection and infection/malignancy.

Justin Shipman
Winning Medical Student Clinical Vignette

Atypical Tularemia Presentation with Primarily Gastrointestinal Symptoms

Tularemia usually presents with one of six major clinical forms: ulceroglandular, glandular, oculoglandular, pharyngeal, typhoidal, or pneumonic. Tularemia is a challenging diagnosis to make because of its varied presentation, however it is considerably more difficult to identify when it presents in an unusual way. A 43 year old male sought medical care on June 9th with a constellation of symptoms including fever, vomiting, cough, and severe diarrhea. On the day of admission, he had begun to suffer from orthostasis. He was considered as part of a cluster of family members who presented with similar symptoms after being involved in a community clean-up day on May 29th. Specifically, these family members were exposed to urine and animal feces that others involved in the clean-up were not. Physical exam findings included decreased air flow in the lungs bilaterally, diffuse abdominal pain with no hepatomegaly, and a large lymph node on the side of his neck. Laboratory data showed elevated WBCs and liver enzymes, hyponatremia, and hypokalemia. Chest x-ray revealed patchy opacities bilaterally, right perihilar infiltrates, and blunting of the right costophrenic angle. Empiric therapy with doxycycline, metronidazole, piperacillin/tazobactam, and amphotericin was started to cover likely bacterial organisms. Tests for infectious diarrhea included c. difficile, legionella, giardia, cryptosporidium, salmonella, shigella, campylobacter, e.coli, aeromonas, norovirus, and yersinia. A hepatitis panel and HIV antigen testing were also done due to the patient’s past history of drug use. All tests came back negative. During this time, empiric treatment was switched to vancomycin, ciprofloxacin, and
Piperacillin/tazobactam via recommendation by infectious disease. Further laboratory testing was done for tularemia, q fever, leptospira, rotavirus, and adenovirus. All tests came back negative, except for tularemia which had a titer of 1:40. Further testing was done a month later and the titer was 1:2560, which was considered diagnostic for tularemia. The patient spent a total of 10 days in the hospital. His nausea, fever, and diarrhea slowly improved and he was discharged after these symptoms had resolved. One month after admit, he continues to have headaches and remains 30 pounds below his pre-sickness weight due to the severe diarrhea and loss of appetite caused by tularemia. This case illustrates the severity and variability of symptoms that can be present in a patient with tularemia. Not only did this patient have an unusual presentation with primarily gastrointestinal symptoms, but he was also outside the typical geographic areas for tularemia. This case represents the importance of maintaining a broad differential in order to diagnose a disease that is presenting in an uncharacteristic pattern and geographical region.

Erica Tauck

"Doc, It’s Not in My Head" Gastric Outlet Obstruction Secondary to Pancreatic Pseudocyst.

Patients with acute pancreatitis are at risk for developing potentially life threatening sequelae—such as, necrotizing pancreatitis, pseudoaneurysm, pseudocysts and walled-off pancreatic necrosis. Less common is gastric outlet obstruction due to a pseudocyst. Case: A 24 y/o with PMH of obesity and recent gallstone pancreatitis with CT confirmed necrotizing pancreatitis. Patient was managed conservatively. He was afebrile, had a normal leukocyte count and minimal to no abdominal pain. He was discharged home from outside facility. Over a period of three weeks, the patient developed difficulty swallowing. He described difficulty initiating swallowing and food “getting stuck” in the substernal region. In addition, he reported that any food that did “make it down” “came right back up”. The dysphagia progressed to include both solids and liquids. The patient reported a forty pound weight loss. The patient acknowledged epigastric pain but reported it as mild and non-radiating. The Patient underwent an outpatient ENT evaluation with fiber optic evaluation and video swallow study. No pathology was noted. Symptoms persisted; the patient required hospitalization for IV fluids and was transferred for further evaluation. Vitals were stable. Physical exam revealed unremarkable pharynx / neck and obese abdomen with minimal pain to epigastric and left upper quadrant with palpation. Lab abnormalities included AST 40 U/L; ALT 58 U/L; lipase 347 U/L and amylase 116 U/L. Bilirubin, alkaline phosphatase and CBC were normal. CT of abdomen and pelvis was read by radiologist as revealing two benign pseudocysts. Due to ongoing dysphagia with poor oral intake and emesis, ENT was re-consulted. Esophagogram was performed and was unremarkable. ENT recommended psych consult. A second CT of abdomen and pelvis was obtained which revealed no changes from the first report. A gastroenterology consult was obtained. The gastroenterologist reviewed the CT images with the radiologist and noted that in fact there was only one pseudocyst. It was bilobed - measuring 12.6 cm in
greatest diameter. The lobe involving the pancreatic head measured 7 cm in diameter and compressed the gastric antrum as well as the sweep of the duodenum. Hounsfield Unit were 7. There was a discrete wall. The patient was considered a candidate for transgastric drainage of the pseudocyst and was transferred to the University of Minnesota for the procedure. Lesson: This case demonstrates an atypical presentation (dysphagia) of gastric outlet obstruction due to pancreatic pseudocyst. Diagnosis was delayed due to the atypical presentation and misinterpretation of imaging. It highlights the importance of physician collaboration and maintaining a high suspicion for complications of pancreatic pseudocysts.

Christine Tran
Juan Bowen, MD

Bad Connections: Clinical Presentation and Hospital Course of a Patient with Vascular Ehlers-Danlos Syndrome

Vascular Ehlers-Danlos syndrome (vEDS) is caused by an autosomal dominant mutation in the COL3A1 gene, which encodes for type III procollagen. Affected persons are deficient in type III collagen, an important vascular structural protein. The clinical consequences of the vascular and tissue fragility in vEDS include arterial dissections and rupture of hollow organs. Case Presentation: A young woman initially presented at age 32 after experiencing spontaneous episodes of pneumothorax and hemothorax. She also had fragile skin and suffered from chronic headaches. Genetic testing identified a COL3A1 mutation. Her next clinical event was left renal artery dissection at age 39. At age 42, she developed a pulsatile headache and was found to have bilateral carotid-cavernous sinus fistulas, which resolved spontaneously after one year. At age 46, a gastric perforation occurred during upper endoscopy and she required emergency laparotomy. During the postoperative period, a hepatic artery aneurysm ruptured; this was treated with endovascular coil embolization. Three months later, she required emergency surgery again for a spontaneous colonic perforation. Subsequently, she did well until she developed pulsatile headache again at age 49 and a right-sided carotid-cavernous sinus fistula was found. She developed a right sixth cranial nerve palsy and remained stable for one year. At age 50, she experienced acute abdominal pain and hypotension. Celiac artery dissection was found and treated with placement of a stent graft. Over the next seven weeks, she developed several additional vascular emergencies, including spontaneous massive hemothorax and compartment syndrome in her right forearm. On hospital day 54, she was found to have an acute right-sided hemothorax. Her family was at the bedside, and the decision was made to transition her to comfort care measures; she died the next day. Discussion: Of the four major EDS types, vascular Ehlers-Danlos syndrome carries the highest risk of mortality. Clinical consequences include arterial aneurysms and dissections, and also rupture of hollow organs, including the bowel and pregnant uterus. The median survival is 48 years. Clinicians caring for patients with vascular EDS should be aware of these risks when evaluating acute symptoms. The increased risk of complications associated with surgical and vascular procedures needs to be considered when making treatment decisions.
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<th>Elyse Zarling</th>
<th>The Impact of Anchoring Bias in Interfacility Referrals</th>
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<td>Anchoring bias is the tendency to fixate on the first available or a specific piece of information, resulting in a skewed perception of a patient’s clinical presentation. This case report describes a patient encounter in which anchoring bias skewed the approach of the primary and consulting teams. A 68 year old man was transferred to the Minneapolis VAMC for further work-up and management of acute kidney injury, hypercalcemia, hypernatremia, anemia, and newly diagnosed 7cm cecal mass with bone lesions seen on CT. He initially presented to his primary care physician two days earlier with fatigue. Work-up as an inpatient, including an abdominal CT, showed the above. The initial work-up also included a SPEP, which was pending on transfer but not commented on in transfer documentation. Once at the Minneapolis VAMC the patient was given IV fluids and pamidronate to treat suspected hypercalcemia of malignancy, and GI was consulted for a diagnostic colonoscopy. On VAMC hospital day 2, chart review demonstrated the SPEP from the outside hospital was positive with a total serum protein of 11 and a monoclonal M spike of 5.8, predominately IgG Kappa, and a follow-up UPEP was ordered. It was not until hospital day 5 that hematology/oncology was consulted after tissue biopsy of the cecal mass demonstrated invasive adenocarcinoma. In the initial review of the patient, the consulting team focused on the new diagnoses of cecal adenocarcinoma, overlooking the positive SPEP. After speaking with the primary team they were informed of the previous positive SPEP. The following day, the patient’s bone marrow biopsy demonstrated 80% cellularity with 80-90% myeloma cells. He was given the diagnosis of both invasive cecal adenocarcinoma and multiple myeloma. This case demonstrates the importance of a thorough investigation of patient medical records by each participating physician and the hazard of anchoring onto a given finding or diagnosis. Anchoring here began at the time of transfer when the transfer diagnosis was listed as “colon cancer with bone metastasis” without mention of the pending SPEP. It was perpetuated by the primary team by way of delayed hematology/oncology consultation because his symptoms were initially assumed to be associated with the colon cancer. Although multiple notes by the primary and consulting teams mentioned the possibility of multiple myeloma, this was initially overlooked because of his suspected colon cancer diagnosis. Although it can seem efficient and advantageous, anchoring bias can lead to incorrect or missed diagnoses. It is important to acknowledge the effects of anchoring in order to maintain a comprehensive differential, especially in an interfacility transfer.</td>
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| Xin Zhang  
Dr. Hyun Kim | Sudden Onset of Reversible Posterior Leukoencephalopathy Syndrome and Stress Cardiomyopathy |
|--------------|------------------------------------------------------------------------------------------|
| A 65-year-old woman, with history of recently diagnosed metastatic renal cell carcinoma, was brought into the emergency department with altered mental status. Per husband, she was found awake but non-responsive to his questions. There were no recent changes, except for starting Sunitinib three days earlier. On physical exam, she was afebrile,
normotensive, tachycardic, disoriented, unable to follow commands, and without focal neurological impairment. The initial differential diagnosis in the emergency department included trauma, CVA, metabolic disturbance, infections, and metastases. Evaluation with CT and CTA revealed no evidence of intracranial hemorrhage or stroke. EKG showed sinus rhythm with ST elevation in anterior leads. Labs were significant for elevated BNP and troponin. She became progressively obtunded and was intubated for airway protection. Cath lab was accessed for concern of acute myocardial infarction. While coronary angiography was normal, the follow up echocardiogram revealed drastically reduced ejection fraction at 15-20%. With her rapid progression of symptoms, brain MRI was obtained and demonstrated reversible posterior leukoencephalopathy syndrome (RPLS). She was diagnosed with RPLS and stress cardiomyopathy secondary to Sunitinib toxicity. After stopping Sunitinib therapy, she rapidly recovered and was discharged to home after three days. This case illustrates two of Sunitinib’s rare side effects and the importance of broad differential. In several case reports, Sunitinib has been linked to RPLS and Takotsubo syndrome, and its discontinuation predictably reverses these syndromes. Widening the differential for altered mental status and recognition of drug toxicity were essential in this patient’s treatment.

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<th>Elizabeth Aby</th>
<th>Scott Reule, Hassan Ibrahim, Jack Lake</th>
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<td><strong>Research- Medical Students</strong></td>
<td><strong>Listing Patients for Simultaneous Liver/Kidney Transplantation:</strong></td>
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| | Formal metrics to decide between liver transplant alone (LTA) vs. simultaneous liver-kidney transplantation (SLK) have not been developed. On January 1st, 2009, the University of Minnesota adopted an approach whereby a nephrologist is given full autonomy to decide whether LTA vs SLK should be offered to patients with end stage liver disease and impaired kidney function. The hypothesis being tested is that formal Nephrology input will reduce allocation to SLK at no expense to recipient outcomes. Methods. 447 adults transplanted between 2003-2012 were divided into two eras, pre- and post- explicit Nephrology involvement in the decision to list for SLK. Nephrology input consisted of a formal consult and in 10-20% of patients the performance of a kidney biopsy. Results. 447 adults underwent deceased donor liver transplantation (DDLT) between 2003 and 2012 (LTA, n =384; SLK, n = 63). Annualized percentages of SLK performed decreased over the time (17.1% to 8.1% in 2012). After adjustment for age, sex, and race subjects receiving LTA in the most recent era were more likely to be HCV positive (AOR 3.34, p < 0.001), while subjects receiving SLK in the most recent era were less likely to have hypertension (AOR 0.05, p =0.02). Stratified by era, survival of recipients of both LTA and SLK were comparable at one year (SLK, p = 0.76; LTA p = 0.8). No era differences in re-hospitalization post transplantation were observed in those receiving LTA, whereas those receiving SLK were less likely to be hospitalized in the first 30 days post transplantation in the most recent era (p = 0.03). There were no differences at one year post-transplant in serum creatinine or the percentage of patients on dialysis. Conclusions. Explicit nephrology involvement in decision-making regarding listing for SLK has resulted in
fewer numbers of SLK performed. These data suggest that delegating the responsibility of allocating LTA vs. SLK in patients with kidney disease to Nephrology may result in more efficient use of kidneys with no appreciable adverse consequences to recipients.

| **Prakriti Gaba**  
Mallory GW, Gibson WS, Min PH, Zhao CZ, Sandroni P, Gorman DA, Stead SM, Klassen BT, Lee KH.  
**Winning abstract for Research/Quality Improvement for Medical Students**  
Deep Brain Stimulation of the Nucleus Accumbens for Patients with Central Post-Stroke Pain  
Deep brain stimulation (DBS) is a widely accepted therapy for a variety of neurologic disorders. However, results of DBS for chronic pain have been variable. Classically, the periventricular gray region (PVG) and the ventralis caudalis of the thalamus have been the primary targets either alone or in combination. Recently, we implanted electrodes for three patients in the nucleus accumbens (NAC), a new target, in combination with PVG for central post stroke pain (CPSP) and now present extended follow-up. Methods: Visual analog pain scale (VAS) scores prior to implantation and the perioperative period were compared to follow-up VAS scores. fMRI studies were conducted in two of the patients, and a formal pain disability index (PDI) and patient satisfaction questionnaire were also performed. Results: Short term results at 3-11 months (a mean VAS score of 4) demonstrated a sustained reduction in VAS scores from baseline (a mean VAS score of 9) in all three of the patients. Two of the patients have been implanted for greater than 2.5 years, one of which continues to have significant benefit with maintained reductions in VAS ratings (a VAS score of 5) and a significant reduction in PDI from 46 to 29 out of 70. The other patient experienced a subsequent stroke that has resulted in further debility and a recurrence in pain between follow-up intervals (with VAS score of 10). All three patients saw improvement in activities of daily living, their home responsibilities and social interaction after surgery, though one patient has since passed away. fMRI studies of two of the patients indicated BOLD signal in the insular and pre-frontal regions, suggesting potential involvement of these neural structures in pain reduction. Conclusions: The NAC may be an effective adjunctive target for CPSP as improvements were seen with respect to PDI and VAS in all three patients, with one patient showing sustained benefit at greater than 2.5 years after surgery. Our imaging findings suggest that downstream signals to the insular and pre-frontal regions may underlie the benefit of NAC DBS in CPSP. However further prospective studies are warranted to verify these results. |

| **Brent Schotl**  
Monique Spillmann, Kun Zhou, Evan Odean Lynne Bemis  
**The Presence and Detection of Non-Coding RNAs in the Urine of Ovarian Cancer Patients**  
Ovarian cancer proves to be an incredibly deadly and devastating disease due to the late stage of initial diagnosis, which can be attributed to the anatomical location of the ovaries, making them inaccessible by palpation, and the cancer may be associated with little pain prior to metastasis. The current ovarian cancer screening technique looks for Carcinoma Antigen 125, but has such a poor specificity that it is no longer recommended to be used as an ovarian cancer screening method. Ovarian cancer has been associated with many molecular changes leading to very heterogeneous tumors, causing difficulty in diagnosis due to a lack of a reliable biomarker. We
predicted that we would be able to detect non-coding RNAs in the urine of ovarian cancer patients and develop a test to determine an increased likelihood of an individual having ovarian cancer. Methods: Our initial research focused on the detection and deep sequencing of RNA particles in as little as 100μL of urine of ovarian cancer patients. In the original sequencing data, we were able to detect millions of reads of highly prevalent small noncoding RNAs, including a large number and variety of microRNAs. Many of these microRNAs have shown a propensity for regulating multiple gene targets on different genes involved in ovarian cancer, and therefore could contribute to heterogeneity of ovarian cancer. Our next step was to determine which of these microRNAs would help to distinguish between ovarian cancer patients and non-ovarian cancer patients. Using qRT-PCR, we measured levels of common microRNAs and other noncoding RNAs in a set of ten blinded surgical patients to see if we could separate out ovarian cancer patients from benign surgical patients. Results: We were able to detect and deep sequence RNA in human urine, and separate out ovarian cancer patients from non-cancer patients with 80% accuracy. However, we did find a unique subset of ovarian cancer patients that have markedly lower levels of microRNAs and were always able to be discerned from normal controls likely due to a mutation in an enzyme responsible for proper cleavage and production of microRNAs, which is also associated with a much poorer prognosis. Conclusion: Differentiation of ovarian cancer patients from noncancer patients was successful, but not 100% accurate due to tumor heterogeneity, but we were able to detect a special subset of ovarian cancer patients from the microRNAs in a simple urine test. We are currently researching the regulatory potential of some of the noncoding RNAs found in the patient sample urine and are working on expanding our study using a greater number of non-coding RNAs and a larger patient base to allow for better distinction and diagnosis of patients with ovarian cancer.

Quality Improvement- Medical Students

Gina Piscitello

Public Health Integration into Medical Education

Public health integration into medicine can lead to the improvement of patient care and reduction of health disparities, but is not included uniformly throughout medical education in the United States. The purpose of this quality improvement project is to integrate public health topics into the medical school curriculum at University of Minnesota by 2017. To accomplish this goal, grassroots support was garnered among medical students to advocate for this inclusion resulting in administration support. With this support, plans were made to integrate public health topics throughout all four years of medical student education by working with course directors. Survey data from students is obtained before and after integration occurs to evaluate the benefit of this inclusion. The first courses to begin the integration process include Foundations of Clinical Thinking (FCT), a course for all first and second year medical students, and the Family Medicine Clerkship, a class for all third and fourth year medical students. Over the past year, some public health topics have been integrated into the Family Medicine Clerkship while ideas have been
obtained for how to better incorporate public health into FCT. While limited integration has occurred, progress will continue to occur with the recent formation of a public health and health policy workgroup established by the medical school. The continued inclusion of public health topics in medical education will strengthen the care physicians can provide for all patients.

Residents

Quality Improvement - Residents

Joel Beachey, MD  
Urshila Durani, Elsie T. Mensah, Priya Vijayvargiya, John T. Ratelle, Sara Reppert

Winning Abstract for Quality Improvement - Residents

Reducing Unnecessary Routine Lab Tests for Hospitalized Medical Patients

Routine ordering of basic blood tests in the hospital drives up healthcare costs, increases risk of iatrogenic anemia and nosocomial infections, and extends length of stay. Reducing unnecessary labs may ultimately improve patient safety and outcomes, increase satisfaction, and lessen financial burden. Objective: We aimed to reduce the number of routine complete blood counts (CBCs) and electrolyte panels ordered on Medicine teaching services at Mayo Clinic Hospital in Rochester, MN. Methods: This quality improvement project took place at Mayo Clinic Hospital, Saint Mary’s Campus, and involved two general medicine teaching services. Stakeholders were identified, including patients, providers, nurses, lab technicians, and hospital administrators. Interviews were conducted with members of each group in order to determine factors contributing to the problem, and a root cause analysis was performed outlining those factors and barriers to change. Factors contributing to the ordering of unnecessary lab tests included resident inexperience, unclear expectations set by supervising physicians, and ease of ordering daily morning labs. Based on root cause analysis, provider education was selected as an intervention strategy. For the initial Plan-Do-Study-Act (PDSA), residents were asked to list “Daily Labs” as a numbered problem in their progress notes and indicate whether daily CBCs and/or electrolyte panels were necessary for each patient. The outcome measured was the average number of routine labs per patient. Total numbers of CBCs and electrolyte panels were measured for three days before and after the intervention, and data was compiled in a run-chart. Results: 54 patients were admitted to the medicine 1 and 3 teaching services during our 6-day period of analysis. 71 CBCs and 125 electrolyte panels were ordered on 32 patients in the 3 days preceding intervention. 45 CBCs and 68 electrolyte panels were ordered on 34 patients in the 3 days post-intervention. The average number of labs per patient-day for the three days prior to intervention was 2.7. The average number of labs per patient-day for the three days after intervention was 1.8. Conclusion: Encouraging providers to routinely consider and document necessity of daily labs led to a 33% reduction in tests ordered per patient-day. While the scope of duration in this initial PDSA cycle was limited, results indicate that provider training and accountability can potentially decrease unnecessary routine lab tests. Future PDSA cycles can be designed to assess sustainability and applicability of this intervention in addition to assessing impact on patient outcomes and cost of care.
| Zachary Clements, MD  
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<th>Daniel Townsend</th>
<th>Management of PICC Associated DVT: A QI Project</th>
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<td>Peripheral inserted central catheter (PICC) placement is used frequently in the inpatient setting with deep vein thrombosis (DVT) being its most common complication. Inappropriate management of upper extremity DVT's can have significant morbidity and mortality including pulmonary embolism, stroke, and post thrombotic syndrome. In addition the cost of inappropriate management of PICC&quot;s is notable. Our QI project was designed to evaluate and improve the hospitalist management of this common clinical problem. A chart review was performed on patients with PICC associated DVT at Regions Hospital, St. Paul, MN from 2012-2014. A chart review with data analysis was conducted on the management and treatment for these patients. In depth chart review revealed that the majority of the sixty-eight adult patients with PICC associated DVT were found to have incorrect treatment and/or management. Forty-nine of the sixty-eight patients were found to have either mismanagement of the PICC line, inappropriate anticoagulation treatment, or both based on American College of Chest Physician and International guidelines. Common errors included inappropriate discontinuation of PICC line with replacement in contralateral arm and duration/dosing of anticoagulation. Three patients developed sequelae as a result of improper anticoagulation treatment including two patients with pulmonary embolism (one with concomitant lower extremity DVT) and one post-thrombotic syndrome. We developed both educational and EPIC instruction link based interventions to improve the management and treatment of PICC associated DVT. We are in the process of giving a power point presentation along with pre and post-test analysis. The EPIC linked instruction was designed to help guide physician on the appropriate management of PICC associated DVT. The intent is to monitor the impact of this intervention over the course of the next 6 months to verify improvement in this common clinical scenario.</td>
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| Margaret Doose, MD  
| Timothy Capecchi,  
| Arianne Baldomero,  
| Michael Newmann,  
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<th>Loretta Pfannes</th>
<th>Routine HIV Screening in Minnesota—Catching up with the Guidelines</th>
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<td>In April 2013 the United States Preventative Task Force (USPTF) recommended routine human immunodeficiency virus (HIV) screening in all patients ages 15-65 regardless of known risk factors. This recommendation was based on a number of studies including evidence that one in five infected patients are unaware of their HIV status, 10-25% of infected patients report no risk factors, and evidence that early initiation of antiretroviral therapy decreases transmission. Additionally, given a 0.14% prevalence of HIV in the state of Minnesota and 0.74% in Minneapolis and 0.36% in St. Paul, with cost-effectiveness of routine screening being demonstrated in communities with a prevalence ranging from 0.05% to 0.2%, it was felt that routine screening would be beneficial in the metro setting. The goal of his project was to assess physician compliance in the Twin Cities metro area one year after implementation of the USPTF guideline. Methods: We selected five sites in the Health Partners system—The Center for International Health (CIH), Midway Clinic, University Avenue Clinic, Woodbury Clinic and Stillwater Medical Group. We sampled 20 patients from each clinic,</td>
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equally distributed among providers, who were between ages 15-65 and were seen for routine health maintenance in May of 2014 by attending internal medicine physicians. We looked to see if an HIV test was offered or ever performed in the Health Partners system. In addition, we analyzed HIV risk factors and documentation of sexual history. Results: A two proportion Z test was used to compare the sites as well as to compare data between genders. 33% of women had been previously screened; however only 13.5% of those eligible for one-time screening had testing offered. For male patients, 22% had HIV testing previously while only 8.6% of those eligible for their first screening had testing offered. While some patients at each site had HIV testing performed previously, there were differences in sites with 0% of those eligible for initial HIV screening being offered testing at 3 sites, while 50% of those eligible for screening had it offered to them at the CIH and 12.5% being offered testing at another site. Additionally, documentation of a sexual history was also poor with only 44% of male patients having a documented sexual history and 75% of females having a documented sexual history. Conclusion: Our baseline QI data demonstrates suboptimal compliance with the CDC and USPSTF recommendations on routine HIV screening in patients ages 15-65. Our next step will be to present this data to the Health Partners Preventive Care committee this fall. We will recommend adding HIV to the health maintenance tab in the electronic medical record and recommend consideration of nursing prompts for documentation of sexual history.

Marossa Durman, MD
Rebecca Hanson MD,
Melanie Lo MD,
Rebecca Zadroga MD,
David Williams MD.

Antibiotic Stewardship Program- Current Practices in Management of Simple Cellulitis at HCMC
Simple cellulitis is an acute spreading infection of the skin extending to the subcutaneous tissue with minimal or no signs of systemic manifestation. It’s one of the most common diagnoses for hospitalized patients at HCMC. The purpose of the study was to evaluate current clinical management of cellulitis at our institution. METHODS: A brief survey was administered to Internal Medicine, EM / IM and Family Medicine Residents in regards to their clinical management of cellulitis in hospitalized patients. It was a voluntary survey. RESULTS: 53% of eligible residents responded the survey. Questions included in survey involved typical antibiotics used to treat cellulitis, reasons why provider chose to cover for gram negatives / anaerobes as well as gram positives, reasons why an ID consult was placed, typical duration of therapy and when imagining was considered necessary. One of the most common reasons to include Vancomycin in the treatment of the disease was personal history of MRSA (75% residents). Approximately 80% of residents included gram negative / anaerobic coverage additionally to gram positives if the patient they were treating had a diagnosis of diabetes. Among the most common reasons to request an ID consult were definition of duration of therapy, no response to current treatment, immunosuppression status and history of recurrent cellulitis. The most common duration of therapy prescribed in our hospital is 7 days. Less than 20% of the time imagining is ordered in their diagnosis workup. CONCLUSIONS: Reasons why residents in our institution treat cellulitis with vancomycin and broad spectrum
antibiotics are more much varied that criteria offered in clinical guidelines. There is potential to help educate residents in the current clinical guidelines to treat cellulitis that might be somewhat different to what’s actually being done right now. Further studies / projects could be targeted to help residents in clinical decisions in regards to treatment for cellulitis.

**Matthew Goers, MD**
Nabiha Shamsi, MD; Kevin Rank, MD; Ryan Griefer, MD; Neal Boeder, MD; Karyn Baum, MD

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<tr>
<th><strong>Time to Tap and Antibiotic Administration: Decreasing Length of Stay in Patients with Spontaneous Bacterial Peritonitis</strong></th>
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<td>Spontaneous Bacterial Peritonitis (SBP) remains the most frequent bacterial infection in hospitalized patients with cirrhosis, accounting for 10-30% of all infections in such patients. Standards for timely antibiotic administration are in place for other types of infections to limit mortality, however none currently are in place for SBP. We questioned whether early diagnosis by paracentesis and early antibiotic administration would decrease inpatient mortality, ICU admissions and hospital length of stay (LOS) in patients with SBP.</td>
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<td>Methods</td>
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<td>Retrospective chart data from 45 patients was obtained focusing on inpatient admissions for SBP in cirrhosis patients. Patients transferred from outside facilities with a previous diagnosis of SBP and/or started on antibiotics by time of arrival were excluded from the study. Time of initial antibiotic administration and time of diagnostic paracentesis was recorded. Primary end points were length of hospital stay (LOS), inpatient mortality, and admissions to the ICU.</td>
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<td>Results</td>
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<td>Mean time to tap averaged 25.4 hours (SD 26.3 hours), with a median time to tap of 16 hours. Time to initial antibiotic administration averaged 21.33 hours, though the median time was 9.0 hours. Overall length of stay ranged from 1 day to 51 days, with 11 patients requiring ICU care (24%) during their hospitalization. Overall 12 patients died while inpatient (26.6% mortality). Based on this data, delayed paracenteses were associated with a 40% increased risk of admission to the ICU (p=0.31). In addition, delayed antibiotic administration correlated with a 26% increase in mortality (p=0.43). A statistically significant increase in LOS was associated with later times of paracenteses (p = 0.005), and there appeared to be a linear association between delays in paracenteses and prolonged LOS. For patients receiving late antibiotics (defined as &gt;6 hours) a significant increase in LOS occurred (p= 0.02). Conclusion This data demonstrates delaying antibiotics and paracenteses increases LOC in cirrhosis patients. Mortality and ICU admissions also appear to be affected by these delays. This data clearly emphasizes the need for timely interventions in patients with cirrhosis, prompting the need for early management and diagnosis of suspected SBP. There remains a need for larger prospective validation trials to further explore the overall benefits of early diagnosis and management of SBP.</td>
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**Kyle Mairose, MD**
Lacy Schwarze, Matt Mundy, Richard Mahr

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<th><strong>Why are they on that? Improving communication about anti-platelet agents following coronary stenting through provider counseling and EMR order sets.</strong></th>
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| Clopidogrel is a commonly used antiplatelet agent that has a variety of uses and indications and a variable length of therapy depending on the indication. It is also an expensive and risky medication if its duration is
prematurely halted or extended without indication. At Regions Hospital we implemented a quality improvement project that focused on updating problems lists to reflect intended indication and duration of anti-platelet drugs as patients left the cardiac catheterization suite following stent placement. Methods: We analyzed data including date of the catheterization, whether the problem list for the patient included the catheterization date, type of stent place, and anticipated duration of therapy, as well as whether the medication prescription included an indication and/or duration. The intent was to take data from 100 patients both before and after the intervention (retrospective and prospective, respectively). The intervention was directed teaching of catheterization suite staff to update patient problem lists to include the above information. Then we changed the post-catheterization order set so that the medication orders would easily include an indication on the medication bottle. Results: Pre-intervention n=101, post intervention n=100. For pre vs post intervention, the problem list accurately reported date of stenting (24% vs 98%), type of stent (34% vs 98%), and expected duration of therapy (2% vs 98%). The medication list pre vs post-intervention included indication (3% vs 73%) and duration of therapy (4% vs 20%) of the time. The p value was less than 0.001 for all categories. Conclusions: Counseling and order set adjustment had measurable impacts on the information present on patient problem lists and patient prescriptions. This was done with the intent to make it easier for both providers and patients to understand the indication and expected duration for anti-platelet agent use. The next planned intervention is to further adjust the post-catheterization order set to reflect expected duration of therapy on the medication bottles.

E. Kendahl Moser-Bleil, MD
Rena Singleton, MD; Paula Skarda, MD

Hepatitis C Birth Cohort Screening: A Boom in New Diagnosis of Chronic Hepatitis C Infection.

Hepatitis C virus (HCV) is the most common chronic bloodborne pathogen in the United States (US) and is a leading cause of complications from chronic liver disease. According to data from 1999 to 2008 collected by the US Preventative Services Task Force (USPSTF), about three-fourths of individuals in the US living with HCV infection were born between 1945 and 1965 (the “Baby Boomer” birth cohort). Many were infected before the discovery of HCV, and only 25-50% of patients with chronic HCV infection are aware of their infection. HCV screening has traditionally focused on patients with known history of risk factors. Previous studies assessing HCV screening patterns at private healthcare or managed care organizations report that only 1-12% of eligible adults are ever tested for HCV. The Centers for Disease Control and Prevention (as of August 2012) and the USPSTF (as of June 2013) now recommend a one-time screening for HCV infection in all individuals in the “Baby Boomer” birth cohort; if fully implemented, primary care birth cohort screening would identify an estimated 808,580 new cases (85.9% of all undiagnosed cases in the birth cohort, compared with 21% under risk-based screening). Six primary care sites in the HealthPartners system were included: Center for International Health, Inver Grove Heights Clinic, Midway Clinic, Stillwater Medical...
Group, University Avenue Clinic and Woodbury Clinic. A random sample of 20 patients born between 1945-1965, seen for routine health maintenance in June 2014 by staff Internal Medicine Physicians, were included. Notes from the clinic visit, data from the laboratory tab and history tab were reviewed to document HCV screening at current or past visits and documentation of risk factors. Patient’s age, gender, race and any history of IV drug use, hemodialysis, ALT elevation, HIV, exposure to HCV or blood product transfusion or transplant prior to 1992 were recorded. Two sites had no patients screened for HCV, three sites each had one patient screened for HCV. One site, the Center for International Health, had a 75% HCV screening rate as HCV screening is included as part of the establish care visit for all patients who are recent immigrants to the US. At all sites, many patient charts had no documentation of presence or absence of HCV risk factors. The frequency of HCV screening in primary care settings in individuals born between 1945 and 1965 is low. There is also incomplete documentation HCV risk factors in Epic. We propose that an Epic prompt be integrated into the electronic medical record (EMR) one-time HCV screening for all patients born between 1945 and 1965, regardless of risk factors. We also propose an Epic prompt be integrated into the EMR for providers to update HCV risk factors on an annual basis.

Thoetchai Peeraphatdit, MD
Niyada Naksuk, Paola Ricci

Adherence to Hepatocellular Carcinoma Diagnostic Guidelines: Single Veterans Affairs Medical Center (VAMC) Experience

Background & Aims: Non-invasive diagnostic criteria for cirrhotic hepatocellular carcinoma (HCC) were established by EASL (2001, 2012) and AASLD (2005, 2010) management guidelines. We aimed to evaluate adherence to the changing diagnostic algorithm over time at our institution and identify factors associated with non-adherence.

Methods: Between September 2001 (at time of the first non-invasive guideline published) and December 2012, 194 consecutive cirrhotic HCC cases were included. Non-adherent biopsy was defined as cases diagnosed by either biopsy in spite of their meeting non-invasive criteria or by biopsy instead of optional second imaging modality. Non-adherent non-biopsy was defined as cases diagnosed without biopsy when non-invasive criteria were not met. Results: Mean age was 61±8 years and 99% were male. Median tumor size was 4±3 cm and AFP level was 27 IQR [8, 259] ng/mL. From 2001 to 2012, the rate of non-adherence has improved from 52% to 27% (p<0.001). Overall, 37% were cases of non-adherent biopsy. When compared to adherent cases, the non-adherent biopsy cases were associated with receiving only CT scan (OR 2.9, 95% CI 1.6-5.5, p<0.001) and less likely to receive both CT and MRI (OR 0.2, 95% CI 0.1-0.4, p<0.001). Non-adherent non-biopsy was identified in 13% of cases. This group was associated with higher AFP level (536 IQR [9, 1050] ng/mL vs. 29 IQR [9, 221] ng/mL, p=0.02) and receiving only CT scan (OR 3.2, 95% CI 1.3-7.9, p=0.01), when compared to adherent group. Age, tumor number and size did not affect the adherence rate. Conclusions: In our center, guideline adherence for diagnosis of HCC has improved over time. The increasing utilization of MRI has led to the decrease of unnecessary use of liver biopsy in diagnosis of HCC.
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<td>Andrew Rosenbaum, MD, Ruth Bates, MD, Christopher McCoy, MD, and Roger Yu, MD</td>
<td>Quantification of delayed awareness of clinically significant test results in general and ICU settings without an automated alert system on academic medical services.</td>
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Delayed recognition of clinically significant test results (CSTR) accounts for approximately 7% of all medical errors, leading to delayed institution of appropriate management strategies and worse clinical outcomes. A significant focus in the EMR (electronic medical record) era has been to minimize delays in reporting test results without unintentionally placing further burdens on medical providers. Our study sought to provide a quantitative magnitude analysis of existing delays in awareness of CSTR in general and ICU settings in a proprietary EMR without an automated alert system on our academic medical services. METHODS: Troponin T values were utilized and 419 laboratory values were collected retrospectively over a period of two months between January and February of 2013. Time from laboratory result to first recognition by a provider (physician or advanced practitioner) was collected utilizing specialized software integrated into our EMR system. Contextual data regarding the primary service, location of the patient (ICU vs. non-ICU) and time of day were collected. RESULTS: Mean time to final troponin acknowledgement was 47 ± 70 min and median time was 20 min (IQR 6-54 min). Median time to final troponin acknowledgement varied significantly based on time of day with a range of 11 min (IQR 4-29 min) to 33 min (IQR 8-69 min, ANOVA, p<0.01). See Table 1 for breakdown of mean response times by time of day. Time to acknowledgement varied significantly between cardiology and non-cardiology services (55 min vs. 37 min, p=0.01) but not significantly between ICU and non-ICU services (49 min vs. 45 min, p=NS). Troponin values were obtained on average at 2.1 ± 5.3 days after admission. There was no correlation between time since admission and delayed awareness of troponin (Spearman’s rho test, ρ=0.0014, p=NS). CONCLUSIONS: There were significant delays in acknowledgment of troponin laboratory values, which varied by time of day and primary service. An automated notification service may be effective in decreasing the time to acknowledgement. |

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<td>Christina Tieu, MD Andrew Halvorsen and Ericka Tung</td>
<td>An analysis of demographic factors associated with poor advance care planning completion rates in a resident-run primary care clinic</td>
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Advance care planning (ACP) plays a critical role in promoting patient autonomy, designation of surrogate decision makers and communication between providers, patients and families. Its importance is being increasingly recognized after the passage of the Patient Self-Determination Act and it is an emerging quality metric, currently included as a measure in the Physician Quality Reporting System. Despite such robust interest, the national completion rate still hovers around 5 to 15%. Furthermore, the quality of completed ACP documents is unknown. This QI project aimed to measure the magnitude of these issues in a resident-run primary care clinic, analyze the patient populations at highest risk, and propose an intervention to
address these issues. METHODS A retrospective case study was conducted using data obtained from a Primary Care Internal Medicine Residency Continuity Clinic at Mayo Clinic, Rochester, MN in 2013. Rochester has a population of over 110,000, 12.7% of which are ages 65+ and 12.4% are foreign-born. The electronic medical record was used to obtain data on all patients age 65+ in a single Primary Care Internal Medicine Residency Continuity Clinic. Data collected included age, medical complexity, presence of chronic medical conditions, number of medications, marital status, ethnicity, religion, and need for an interpreter. To assess potential differences in percent of patients with ACP documents across categories within demographic variables, Pearson’s χ² tests for equal proportions were used. Outcomes included presence and quality of ACP documents. High quality documents designated a surrogate decision maker and documented healthcare values and code status. RESULTS A total of 282 patients were included. Of these, 61(22%) patients had an ACP document uploaded in the electronic medical record. Of these documents, 36% were Mayo Clinic-specific, 48% were outside documents and 16% were POLST. Overall quality of documents was poor to moderate, with designation of code status being a prevalent deficit. Analysis of demographic data revealed that a patient’s need for an interpreter was associated with lower completion rates (2.4% p:0.001), whereas patients with a current or prior spouse had higher completion rates (23.8% p:0.05). No significant difference was found between patients of differing medical complexity, conditions or number of medications. This suggests that social, as opposed to medical, patient-specific variables have a greater effect on successful completion of ACP documents and that the quality of completed documents may be improved upon significantly. Based on this analysis, an intervention is proposed in which patient education material will be sent through the electronic Mayo Patient Portal to all geriatric patients prior to their annual general medical exam. The content will be translated into multiple languages, outline definitions for code status, POA and health care values and suggest discussion points that patients may share with their family members.

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<th>Vidhu Anand, MD</th>
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<td>Anand S, Garg SK, Lopez-Olivo MA, Singh JA</td>
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**Winning Abstract for Research- Residents**

**Ofatumumab for Rheumatoid Arthritis: A Cochrane Systematic Review and Meta-analysis**

Ofatumumab is a unique anti-CD20 monoclonal antibody with its epitope more proximal and distinct from the epitope recognized by rituximab or by other anti-CD20 monoclonal antibodies. The proximity of this epitope probably accounts for the high efficiency of B-cell killing than other B-cell deleting antibodies and makes it ideal for use in Rheumatoid Arthritis (RA). We conducted a systematic review and meta-analysis assessing the benefits and harms of ofatumumab in reducing disease activity, pain, and improving function in people with RA. We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2014, Issue 1), MEDLINE (from 1946), EMBASE (from 1947), ClinicalTrials.gov, International Clinical Trials Registry Platform (ICTRP) search portal for randomized controlled trials.
comparing ofatumumab alone, or in combination with disease-modifying anti-rheumatic drugs (DMARDs) or biologics, to placebo or DMARDs or biologics alone or in combination with DMARDs, with no restrictions with regard to the dosage. Two authors independently assessed search results, trial quality and risk of bias, and extracted data. Our search identified three trials with low risk of bias, including 654 patients (383: ofatumumab and 271: placebo), for analysis. A stable methotrexate dose was allowed in all patients. Benefits Compared with placebo, patients in the ofatumumab group were 2.3 times more likely to achieve an ACR 20 (20% clinical improvement) response (RR 2.3, 95% confidence interval (CI) 1.76 to 3.01). Similarly, patients in ofatumumab group are 3.1 times more likely to achieve an ACR50 (RR 3.12, 95% CI 1.98 to 4.91). The number needed to treat to achieve an ACR 50 response was 6. Only one trial found improvement in ACR70 response. A significant reduction in disease activity was found in ofatumumab-treated patients compared to placebo. The quality of life was also significantly improved with the ofatumumab treatment, as measured by SF-36 summary score (MD 2.48, 95% CI 2.23, 2.73). Harms In terms of withdrawal, total withdrawals and withdrawals due to adverse events were not statistically different between ofatumumab and placebo. However, withdrawal due to lack of efficacy were 4 times higher in the placebo group compared to ofatumumab treated patients (RR 0.24, 95% CI 0.10 to 0.60). The risk of adverse events was 1.5 (95%CI 1.37 to 1.72) in ofatumumab group compared to placebo, the incidence of serious adverse events was however not significantly different between ofatumumab and placebo (RR 1.72, 95% CI 0.91 to 3.26). The heterogeneity of the included trials was low(I²=0%). This systematic review and meta-analysis suggests that ofatumumab is efficacious and safe in the treatment of rheumatoid arthritis compared to placebo. The adverse events profile appears to be acceptable at the present but long-term trials and post-marketing surveillance are required to assess sustained efficacy and harms.

Arianne Baldomero, MD
Gyorgy Simon, PhD; Nishant Sahni, MS, MD

Serum Procalcitonin versus Systemic Inflammatory Response Syndrome Criteria as an Indicator for Bacterial Infection in Transplant Patients

Serum Procalcitonin versus Systemic Inflammatory Response Syndrome Criteria as an Indicator for Bacterial Infection in Transplant Patients Arianne K. Baldomero, MD (1); Gyorgy Simon, PhD (2); Nishant Sahni, MS, MD (1) (1) Division of General Internal Medicine, University of Minnesota, Minneapolis, MN (2) Biomedical Health Informatics, University of Minnesota, Minneapolis, MN INTRODUCTION Serum procalcitonin (PCT) is increasingly being used in clinical settings to diagnose bacterial infections and guide antibiotic therapy, although clinical trials on the diagnostic performance of serum PCT in the transplant population is lacking. We evaluated the diagnostic performance of serum PCT compared to systemic inflammatory response syndrome (SIRS) criteria as an indicator for bacterial infection and bacterial-sepsis induced hypotension in transplant patients. METHODS All transplant patients admitted to the Fairview Health System with serum PCT measurements between November 2011 and
December 2013 were included in this retrospective study. We compared the frequency of the individual components of the SIRS criteria (WBC >12 or <4 X 10^9/L, body temperature >100.4 or <98.6F, heart rate <90 beats per minute, and respiratory rate >20 per minute) corresponding to the 24 hours during which the serum PCT was measured among patients with and without bacterial infection and patients with and without bacterial-sepsis induced hypotension. Comparisons were analyzed with chi-square test and multivariate logistic regression. RESULTS Seventy-six transplant patient encounters (mean age, 59 years, 67.5% males) were included in the analysis. Forty (52.6%) had bacterial infection of whom 20 (26.3%) had bacterial-sepsis induced hypotension. None of the individual components of the SIRS criteria nor SIRS score of two or more discriminated patients with and without bacterial infection. Serum PCT was found to be statistically significant in detecting bacterial infection (P<0.001) and bacterial-sepsis induced hypotension (P<0.001). The area under the receiver operating characteristic curves was higher for serum PCT (AUC for bacterial infection 0.78; AUC for bacterial-sepsis induced hypotension 0.79) compared to SIRS score of two or more (AUC for bacterial infection 0.54; AUC for bacterial-sepsis induced hypotension 0.57). CONCLUSION Serum PCT outperformed the clinical variables that are included in the SIRS criteria in detecting bacterial infection and bacterial-sepsis induced hypotension in transplant patients. A reassessment of the practice of using the SIRS score to screen for bacterial infection in the transplant population is needed and consideration needs to be given incorporating serum PCT values into the SIRS criteria.

Mike Bierle, MD
Tanya Tajouri, Viabhav Vaidya, Abhiram Prasad, Nandan Anavekar

Inverted Takotsubo Cardiomyopathy in the Critical Care Setting
Inverted takotsubo cardiomyopathy is a rare variant of stress-induced cardiomyopathy resulting in basilar left ventricular dysfunction with preserved apical function. Stress cardiomyopathies are typically thought to present as a mimic of acute coronary syndrome, though it can also cause congestive heart failure and cardiogenic shock. The right ventricle can be affected, but little is known about the clinical impact of this finding. We present 6 cases of acute heart failure with echocardiographic findings consistent with inverted takotsubo cardiomyopathy. Methods: Echocardiograms obtained in the coronary care unit at a tertiary referral hospital from 2010 to 2013 were reviewed for regional wall motion abnormalities. Cases were selected based on findings of hypokinesis, akinesis or dyskinesis of the basal and midventricular segments in the setting of preserved or hyperkinetic apical segments. They were evaluated for inclusion based on the Mayo Clinic criteria for takotsubo cardiomyopathy. Results: 5 cases met inclusion criteria while 1 case was excluded for the diagnosis of biopsy-proven eosinophilic myocarditis. Precipitating causes were clonidine withdrawal, cauda equina syndrome, eclampsia, embolic stroke and self-inflicted gun-shot wound to the head. Eighty percent of the patients were female, with an average age of 39 years. All patients had an identifiable physical stress. Only 1 patient had traditional cardiac risk factors, though 3 had a history of anxiety and/or depression. The
most common presenting symptoms were dyspnea and nausea. All patients had an elevated troponin, BNP and prolonged QTc. Four patients had right ventricular involvement, all of whom developed acute heart failure. Four of our patients survived to follow up and all demonstrated full recovery. Conclusion: Patients in this study were observed to have an association between right ventricular involvement and acute heart failure, a novel finding in inverted takotsubo cardiomyopathy. Clinicians should be aware of this, as it may alter management and necessitate specialized care. The identification of a mimic (myocarditis) reinforces that the imaging phenotypes of stress cardiomyopathies are not specific.

Ameet Doshi, MD
Roman Melamed, MD; Mike Ornes, MD; Eduardo Ehrenwald, MD; William Dickey, MD

Retrospective analysis of systemic and catheter-directed thrombolysis for pulmonary embolism
Pulmonary embolism (PE) accounts for significant morbidity and mortality in hospitalized patients. Thrombolysis is recommended for treatment of massive and select cases of submassive PE. Systemic administration of the thrombolytic agent via a peripheral vein is most common, but pulmonary artery catheter-directed infusion is also available and allows for local drug delivery using reduced doses. The objective of this study was to review outcomes and complications of systemic and catheter-directed tissue plasminogen activator (tPA) administration in a center with substantial expertise in both methods, and to develop site-specific best practice recommendations. Methods: A retrospective review was conducted among all patients admitted to a tertiary care hospital during a 3-year period who were diagnosed with PE and received thrombolytic therapy. The following outcomes were examined in patients who had received tPA using systemic (n=10) and catheter-directed (n=28) administration: systolic blood pressure (SBP), heart rate (HR), shock index, SpO2/FiO2 ratio 24 hours after tPA administration, and prevalence of hemorrhage (minor, major, intracranial). Unpaired t-tests were used to evaluate differences in means across administration groups. Results: The mean tPA dose was 90 mg (range 50-100) in the systemic group and 51 mg (range 35-80) in the catheter-directed group. Mean SBP 24 hours after tPA administration in the systemic and catheter-directed groups was 118 and 125, respectively (p=0.33). Mean HR was 83 (0.95) in both groups, mean shock index was 0.72 and 0.69 (0.99), and mean SpO2/FiO2 ratio was 333 and 360 (0.56). The prevalence of any hemorrhagic complication was 20% in the systemic group and 22% in the catheter-directed group (p=0.99). Conclusions: In this small cohort of patients with PE, there was no marked difference in SBP, HR, shock index, SpO2/FiO2 ratio, or hemorrhage in patients who had received systemic versus catheter-directed thrombolytics. In conjunction with guidelines from major professional societies, these data can inform hospital-specific practice recommendations.

Sushil Kumar Garg, MD
Pandya CJ, Richards RJ, Abdollahi M, Barkun A, Kumar A

Antibiotics for induction of remission in acute flare up of ulcerative colitis
Acute exacerbations in ulcerative colitis (UC) can possibly result from a wide range of factors including but not limited to stress, medications and infections. Bacterial infections could possibly be a trigger for a flare
up of UC. Biologic plausibility and clinical improvement following antibiotics in patients with acute UC flare resulted in trials to scientifically examine the efficacy of its empiric use in patients with an acute flare. Objectives The primary objective was to determine the efficacy and safety of empiric antibiotics for induction of remission in patients with acute exacerbation of ulcerative colitis. Search methods A comprehensive search of databases Pubmed, MEDLINE, EMBASE, cochrane database was done until March 2014 studying treatment with antibiotics in acute flare in UC patients. Selection criteria Studies selected for analysis included randomized controlled trials (RCTs) comparing antibiotics versus placebo in patients with acute exacerbation of UC confirmed through any combination of clinical, endoscopic and histological criteria. Data collection and analysis Three independent investigators individually reviewed the studies for eligibility using predefined criteria, extracted data and assessed the characteristics of each study. The primary outcome was induction of remission. Secondary outcomes included clinical, histologic, or endoscopic improvement. We calculated the risk ratio (RR) and corresponding 95% confidence interval (CI) for dichotomous outcomes. We used random effect model for meta analysis and assessed heterogeneity using I². Main results A total of eleven studies were identified of which six studies were included in the meta-analyses. Five studies were excluded because they evaluated long term response in patients with chronic relapsing UC and none enrolled either patients with acute exacerbations or flare-up of UC. A total of 320 patients in the 6 studies were randomized to either antibiotics or placebo for periods ranging between 5-14 days. Studies included a variety of antibiotics including Vancomycin, Metronidazole, Tobramycin, Ciprofloxacin and Rifaximin. Although with differing spectrum of microbial coverage, broadly all were directed against gut flora. The majority of included studies were rated as high risk of bias. There was no statistically significant difference in clinical remission rates between antibiotics and placebo. Seventy five per cent (120/161) of patients receiving antibiotics achieved remission compared to sixty two percent (99/159) of placebo patients (RR 1.17, 95% CI 0.95 to 1.43). GRADE analyses rated the overall quality of the evidence for the outcomes induction of clinical remission is very low due to small sample size and poor quality of included studies. Our analysis shows that antibiotics have not been shown to be effective for the treatment of an acute exacerbation of UC. Authors’ conclusions Routine antibiotic use has not been shown to be effective for the treatment of an acute exacerbation of UC.

Fiona He, MD
Michael R. Verneris, Sarah Cooley, Bruce R. Blazar, Margaret L. MacMillan, Angela Panoskaltsis-Mortara

Relationship of Epidermal Growth Factor to Cyclosporine-Associated Magnesium Wasting and Clinical Outcomes Post-Allogeneic Hematopoietic Cell Transplantation

Hypomagnesemia is a frequent complication of allogeneic hematopoietic cell transplantation (HCT) and is related to cyclosporine-induced renal magnesium (Mg) loss. Recently, a link between EGF, Mg, and cyclosporine (CSA) in renal transplant recipients has been proposed through renal downregulation of EGF, but similar associations have not
been investigated post-allogeneic HCT. We hypothesized that lower serum EGF would be associated with higher CSA levels, acute graft versus host disease (GVHD) status, and more severe Mg wasting after allogeneic HCT. Methods: 107 adult allogeneic HCT recipients from the University of Minnesota had EGF levels measured by magnetic bead array at day +100 post-allogeneic HCT. Clinical variables collected for analysis included patient age, sex, underlying diagnosis, donor type, HCT conditioning regimen, maximum acute GVHD overall grade and organ involvement prior to day +100, chronic GVHD status, response to treatment of GVHD, Mg supplementation, and concurrent immunosuppressive drug therapy. Lab variables analyzed included serum creatinine and estimated glomerular filtration rate (GFR), immune suppressive drug levels, Mg levels, and lymphocyte subsets. Results: 54 patients had acute GVHD (grade I-II n= 34, grade III-IV n=20) and 53 patients did not have acute GVHD prior to day +100. The median serum EGF in this cohort was 101 pg/mL. Levels of EGF at day +100 showed no relationship with age, underlying diagnosis, donor type, or conditioning intensity. EGF was significantly lower in patients who had acute GVHD grade III-IV prior to day +100 and nearly 3-fold lower in those with upper GI GVHD involvement versus no upper GI GVHD involvement (median 43 pg/mL versus 119 pg/ml, p=0.007). Mg requirements were not associated with serum EGF overall, but those with EGF > 100 pg/mL had higher Mg requirements (average daily dose (1060 ± 142 mg/day versus 600 ±85 mg mg/day, p=0.02). Serum EGF levels > 100 pg/mL at day +100 were associated with improved 2-year survival (RR 0.46, 95% CI 0.22 – 0.94, p=0.03). Conclusions: Patients with prior grade III-IV acute GVHD, and in particular upper GI GVHD, had lower EGF levels at day +100. While studies in renal transplantation identified a connection between urinary EGF, Mg wasting, and diminished renal function, circulating levels of EGF in allogeneic HCT did not show a similar correlation. Differences in EGF post-allogeneic HCT are predominantly due to grade III-IV GVHD status, although a potential contribution from CSA effect on the kidney cannot be ruled out.

Lauren Katkish, MD  
Pankaj Gupta, MD

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<th>Lauren Katkish, MD</th>
<th>Pseudohyperkalemia in Chronic Lymphocytic Leukemia: longitudinal analysis and review of the literature</th>
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<td>Pseudohyperkalemia in patients with leukocytosis due to chronic lymphocytic leukemia (CLL) is well-documented in case studies, but the incidence of pseudohyperkalemia and its relationship to white blood cell (WBC) or absolute lymphocyte counts (ALC) is unknown. Of concern, artifactually elevated potassium levels have triggered administration of unnecessary and potentially life-threatening potassium-lowering treatments including emergent dialysis. A blood collection and processing protocol to minimize or eliminate pseudohyperkalemia, or a reliable method to “correct” potassium levels for the degree of leukocytosis, is yet to be determined. METHODS: We studied 310 patients diagnosed with CLL from 1997-2014 at the Minneapolis VA. Patients with WBC ≥ 50.0 x 109/L underwent further scrutiny; those with alternative causes for hyperkalemia were excluded. WBC, ALC and potassium levels yielded 1,175 data points over 275 patient-years from 58 eligible male patients, age 49-95 years</td>
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at diagnosis, with WBC 5.4-282.6 x 10⁹/L. Potassium values were correlated with WBC count and ALC. Potassium values were also calculated as the percentage of and the numeric value above/below the normal mean or the upper limit of normal (ULN) to account for changes in the normal range of potassium over time. Data and statistical analyses were performed using GraphPad Prism v5.0f. Literature review was conducted using Ovid Medline, Pubmed, CINAHL, and Embase databases. RESULTS: Overall, 216/1175 (18%) of evaluable potassium values were >ULN in patients with no factor other than CLL contributing to the elevated potassium values. The likelihood of potassium values >ULN increased with increasing WBC counts, reaching 70% when the WBC count was ≥200 x 10⁹/L (P <0.0001; Chi-squared analysis) and 60% when ALC was ≥150 x 10⁹/L (P <0.0001; Chi-squared analysis). Consistently, the average potassium values increased with rising WBC or ALC, reaching 5.55 mmol/L (considerably above the ULN) when WBC were ≥8805; 250 x 10⁹/L. There was a linear relationship between potassium levels and WBC or ALC, supporting the conclusion that blood counts were the major factor influencing the potassium values. CONCLUSIONS: The linear increase of potassium value with rising WBC in patients with CLL reported here may be useful in determining whether a patient has true or “pseudo” hyperkalemia. A reliable way to determine the in vivo potassium level, either by direct measurement or calculation with a correction factor, may prevent potentially life-threatening and costly potassium-lowering therapies. We recommend that electronic medical record systems flag clinicians to the potential for pseudohyperkalemia in patients with CLL and a WBC count ≥8805; 50.0 x 10⁹/L, to increase awareness of this phenomenon across all clinical practices. Our findings are of relevance to the general medical community since patients with CLL and elevated WBC are often followed by their primary providers for extended periods of time.

Hidong Kim, MD
Patrick B. Johnston,
Betsy R. LaPlant,
Stephen M. Ansell,
David J. Inwards, Luis F. Porrata, Ivan

CXCR4 Expression in Mantle Cell Lymphoma and Mobilization with Plerixafor for ASCT Does Not Negatively Impact Progression-Free Survival

Mantle cell lymphoma (MCL) is a B-cell malignancy comprising 5-10% of all non-Hodgkin lymphoma (NHL) cases. Autologous hematopoietic stem cell transplant has emerged as a viable therapy for many patients with MCL. An important step in the harvesting of peripheral blood hematopoietic stem cells (HSC) is mobilizing CD34+ HSC to the peripheral blood. Chemokines are crucial in regulating the mobilization of HSC. One such regulatory chemokine is CXCL12, which binds to the CXCR4 chemokine receptor on HSC to promote colonization of bone marrow by HSC. Blocking the CXCL12-CXCR4 interaction interferes with HSC homing to bone marrow, and increases HSC harvest from peripheral blood. The novel compound plerixafor is an antagonist of CXCR4, and has been successful in mobilization of HSC for autologous stem cell transplants for NHL and multiple myeloma. Increased mobilization of HSC in peripheral blood, however, carries the risk of increased mobilization of lymphoma cells. Since MCL expresses CXCR4, we sought to determine whether administration of plerixafor can adversely affect outcome in transplantation. We report survival results
of autologous peripheral blood stem cell transplants (ASCT) for patients with MCL who were treated with and without plerixafor for HSC mobilization prior to ASCT at Mayo Clinic. Methods: This study is a retrospective cohort study of all adult patients who underwent ASCT for treatment of MCL at Mayo Clinic from 1993 to 2013. Patients were divided into two cohorts: (1) patients treated with plerixafor for HSC mobilization prior to ASCT, and (2) patients not treated with plerixafor prior to ASCT. The primary outcome was relapse of MCL. Overall survival from diagnosis and transplant were also analyzed. Results: One hundred sixty-nine patients underwent ASCT; 55 patients received plerixafor, and 114 patients did not receive plerixafor. The two patient cohorts were similar in male predominance, and ages at MCL diagnosis and ASCT. Median progression-free survival from ASCT was 3.4 years in the plerixafor cohort compared with 3.6 years in the non-plerixafor cohort (p = 0.69). Median overall survival from ASCT was not reached in the plerixafor cohort compared with 5.7 years in the non-plerixafor cohort (p = 0.95). Median overall survival from MCL diagnosis was 8.9 years in the plerixafor cohort compared with 7.6 years in the non-plerixafor cohort (p = 0.71). Conclusions: ASCT for treatment of MCL performed at Mayo Clinic resulted in no statistically significant differences in progression-free and overall survival between patients receiving and patients not receiving plerixafor for CD34+ HSC mobilization prior to ASCT. The results of this study indicate that HSC mobilization using plerixafor is not associated with decreased progression-free or overall survival from ASCT in MCL. There appears to be no clinically significant mobilization of lymphoma cells associated with plerixafor mobilization of HSC.

David Miranda, MD
Yader Sandoval, M.D,
Steven R. Goldsmith, M.D., Bradley A. Bart, M.D., Fouad A. Bachour, M.D.

Survival In Patients With Out-of-Hospital Cardiac Arrest with Vfib/Vtach Rhythm In The Absence of ST-Segment Elevation Myocardial Infarction Undergoing Coronary Angiography vs. No Coronary Angiography
The role of coronary angiography (CA) in patients surviving out-of-hospital cardiac arrest (OHCA) without ST-segment elevation myocardial infarction (STEMI) is controversial. We sought to describe the characteristics and in-hospital mortality of patients with OHCA and Vfib/Vtach rhythm (SR) without STEMI undergoing CA vs. no CA. Methods: Retrospective analysis of 117 patients with OHCA-SR without STEMI between July 2007 and April 2014. Patients were categorized into those undergoing CA vs. no CA. Baseline characteristics including APACHE score were compared. Primary outcome observed was in-hospital mortality. Results: Among 117 patients, 91 (78%) underwent CA and 26 (22%) did not undergo CA. Patients undergoing CA were older (56 vs. 47 years old, p=0.02), had lower creatinine (0.9 vs. 1.3, p<=0.001) and lower APACHE scores (mean 21 vs. 25, p<0.001). While 48 (53%) had severe coronary artery disease (>70% stenosis), only 18 (20%) had an unstable, culprit lesion. In-hospital mortality was lower in patients undergoing CA vs. no CA (14 vs. 58%, p<0.001). Conclusion: Among patients presenting with OHCA-SR in the absence of STEMI, those undergoing CA have significantly lower in-hospital mortality in contrast to patients not undergoing CA. These findings should be
interpreted in the context of potential selection bias, as patients undergoing CA had lower APACHE scores, less renal dysfunction and a higher rate of witnessed-cardiac arrests. Randomized studies are urgently needed to address the optimal management of these patients.

**Vincent Pureza, MD**  
**Hirad Yarmohammadi, Fateh Bazerbachi, Chadi Alraies, Sirtaz Adatya**

**The Predisposition to Thrombus Formation in Patients with Left Ventricular Assist Devices: The Minnesota experience (Don’t Cha Know?)**

The continuous-flow left ventricular assist device (LVAD) has become a mainstay of therapy for many patients with advanced heart failure. LVAD therapy has been shown to improve quality of life and prolong survival. However, a major concern is the morbidity and mortality brought upon by device thrombosis. There exists a great need to better understand the presentation and progression of device thrombosis in patients undergoing LVAD therapy. Our goal is to describe clinical features that may predispose patients to device thrombosis, and to analyze the association between these features and the risk of future thrombotic events. We hypothesize that certain clinical features, including markedly elevated lactate dehydrogenase (LDH) levels and subtherapeutic international normalized ratios (INR) predispose LVAD patients to thrombus formation. We reviewed the medical records of 53 LVAD patients who were hospitalized for suspected LVAD thrombosis. In this cohort, elevations in LDH, and subtherapeutic INR levels are associated with increased risk of thrombotic events in LVAD patients. Moreover, marked elevations in LDH were detected one month prior to the events. Early detection of high-risk patients may be feasible with improved outpatient monitoring, and earlier onset of treatment may preclude device exchange.

**Nelson Telles, MD**  
**Abul N. Khan, Ratna C. Boppana, Hayden L. Smith**

**Spontaneous coronary artery dissection: a case**

Spontaneous coronary artery dissection (SCAD) is a rare and often lethal cause of acute coronary syndrome, which typically affects young women and otherwise healthy individuals. SCAD can be diagnosed in patients undergoing coronary angiography and can be underestimated. Special techniques such as optical coherence tomography (OCT) and intravascular ultrasound should be used when there is suspicion of the condition. In the majority of cases, the left anterior descending (LAD) artery is involved; however, a few cases of the right coronary artery (RCA) involvement have been reported. This article describes three cases of SCAD in women of different ages, all presenting with chest pain. Coronary angiography in conjunction with OCT was used for diagnosis in two of the cases. One of the patients had involvement of the proximal RCA and underwent percutaneous coronary intervention, whereas the other two patients had mid-LAD disease and were treated conservatively with medical therapy. Presently, there are no specific guidelines for the treatment of SCAD, and therapy is individualized according to extent and severity of the condition.

**Clinical Vignette- Residents**
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<tr>
<th>Author</th>
<th>Title</th>
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<tr>
<td>Umama Adil, MD</td>
<td>Clinical Vignette Finalist- Residents</td>
<td><strong>Recurrent pneumothoraces: are we missing something?</strong>&lt;br&gt;Recurrent pneumothorax can have multiple causes. However, in a young female patient of reproductive age, catamenial pneumothorax should be a part of the differential. Case discussion: 32 year old lady presented to the ED with complaint of throat pain with odynophagia associated with fever for 3 days. Head CT revealed a peri-tonsillar abscess and an incidental finding of right sided pneumothorax. Patient was treated with antibiotics and chest tube. The pneumothorax was thought to be due to a possible extension of the abscess, although she did not look toxic enough for mediastinitis. Patient again presented to the ED 8 months later, but this time with sudden onset SOB and right sided chest wall pain. Was found to have a pneumothorax, again treated with chest tube placement. On follow up in pulmonology clinic, a more detailed history revealed that both episodes of pneumothoraces were associated with the beginning of her menstrual cycle, and that she has a history of secondary infertility attributed to endometriosis. A diagnosis of catamenial pneumothorax was made and she later underwent video assisted thoracotomy with repair of diaphragmatic defects. She is now on hormonal therapy for long term treatment. Discussion: Evaluation of recurrent pneumothoraces in a female of child-bearing age should include catamenial pneumothorax as one of the differentials. Diagnosing the condition essentially requires a good history with a high index of suspicion. Unfortunately, a gynecological history is almost always missed in a medicine clinic encounter. This case reflects the importance of incorporating it into our clinical practices, as some diagnoses may be overlooked otherwise.</td>
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<td>Amina Adil, MD Kazmi FN., Kalra A., Almquist AK.</td>
<td>Evaluation of Syncope: Should Hyperventilation Be Part of the Algorithm?</td>
<td>A 64-year-old man presented for evaluation of syncope. There was a 6-months history of episodes of acute-onset dyspnea that usually manifested at rest, lasted 30-60 seconds, and abated spontaneously. Past medical history was significant for essential hypertension, hyperlipidemia, tobacco use and peripheral vascular disease. There was no history of obstructive coronary artery disease. Physical examination demonstrated stable vital signs; cardiac and neurological examinations were unremarkable. A 12-lead electrocardiogram was normal. Cardiac troponin I was not detectable. Electroencephalography (EEG) was performed for suspicion of a seizure episode. Hyperventilation during EEG to elicit a seizure resulted in ST-segment elevation in the inferior leads (Figure 1), that resolved spontaneously with normal ventilation. Coronary arteriography demonstrated non-obstructive, indeterminate single-vessel disease in mid left-dominant left circumflex coronary artery. Hyperventilation during coronary arteriography caused complete occlusion of left circumflex coronary artery at the site of indeterminate lesion (Figure 2), causing inferior ST-segment elevation. Percutaneous coronary intervention was performed. Discharge medications included diltiazem, isosorbide dinitrate, aspirin, statin and beta-blocker. Coronary artery vasospasm usually manifests as an acute coronary syndrome. Electrocardiographic changes can include ST-elevation if there is complete occlusion due to vasospasm leading to transmural infarction,</td>
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as demonstrated in our case. Hyperventilation is a useful bedside maneuver that be can utilized to induce coronary vasospasm that usually occurs at the site of focal indeterminate coronary stenosis. Pharmacological vasospasm with intracoronary ergonovie or acetylcholine is generally induced in the cardiac catheterization laboratory to establish the diagnosis. Management includes long-term prescription of calcium-channel antagonists and nitrate therapy.

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<tr>
<th>Kathryn Anderson, MD</th>
<th>Chikungunya: Acute fever, rash and debilitating arthralgias in a returning traveler from Haiti</th>
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<tr>
<td>Vincent Pureza, MD, PhD and Patricia F Walker, MD, DTM&amp;H, FASTMH</td>
<td>We report a case of chikungunya with characteristic fever, rash, and profound polyarthralgia imported to the United States from a large epidemic in Haiti. This case report highlights the clinical manifestations and natural history of the disease. It also serves to illustrate that chikungunya is an important emerging infection globally but particularly in the Americas and Europe where vectors await, immunity is low, and there is heavy traffic to and from epidemic areas. Clinicians should have CHIKV infection high on their differential for any returning traveler with a history of fever and joint pain, whether they are returning from a known epidemic locale or an area at imminent risk for introduction, such as the southeastern United States.</td>
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<th>Bradley Anderson, MD</th>
<th>Giant Pituitary Adenoma</th>
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| Mark L. Wieland     | Acromegaly is a rare clinical diagnosis whose detection is often mired by its slow progression. Pituitary adenomas serve as the most common causes of the growth hormone excess that causes the clinical features of acromegaly. While typically small, an estimated 5% of adenomas can measure >4 cm and are termed “giant.” A 45-year-old man presented for the outpatient evaluation of chronic progressive jaw misalignment. He also described an increase in shoe and (hockey) helmet size over three years, sweating, as well as development of skin tags. Coarse facial features and bilateral temporal visual field loss was noted on physical examination. The serum insulin-like growth factor 1 level was 872 ng/mL (reference range, 64-210 ng/mL), serum insulin-like growth factor binding protein 3 was 7.8 mcg/mL (reference range, 3.3-6.6 mcg/mL), serum macroprolactin 155 ng/mL (reference range, 3-13 ng/mL) and a.m. plasma corticotropin was 54 pg/mL (reference range, 10-60 pg/mL). These findings in conjunction with the patient’s physical features were consistent with a diagnosis of acromegaly. An MRI brain with contrast was performed which demonstrated a 3.5 cm superior to inferior x 4.3 cm right to left x 4.6 cm anterior to posterior homogeneously enhancing mass in an expanded sella turcica consistent with pituitary adenoma. The mass demonstrated invasion of the right cavernous sinus, encasement of the cavernous and supraclinoid segments of the right internal carotid artery (ICA) and encasement of the supraclinoid segment of the left ICA without luminal vessel narrowing. Following neurosurgical evaluation, the patient underwent transnasal endoscopic transphenoidal microscopic subtotal tumor resection with impending gamma knife radiosurgery therapy. Pituitary adenomas measuring >40 mm are termed as “giant” and pose considerable operative challenges, particularly when ICA encasement is present. Gamma knife radiosurgery is considered for adjuvant treatment when only subtotal resection is possible. Several clinical
manifestations may result from the excess of growth hormone that drives the pathophysiology of acromegaly including bony, cardiovascular, and respiratory complications in addition to the enhanced risk of gastrointestinal neoplasia. As such, following the recognition of this rare condition, a provider must consider additional screening and surveillance measures.

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<th>Htin Aung, MD</th>
<th>Entrapment of a Pacing Lead within a Chiari Network – Utility of Intracardiac Echo and a Laser Sheath</th>
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<td>Raul E. Espinosa M.D., Brian D. Powell M.D., Christopher J. McLeod M.B, Ch. B, Ph.D.</td>
<td>Although rare, Chiari networks are elaborate embryological remnants that can pose distinct challenges for catheter and pacing lead manipulation within the right atrium. Device entrapment may require open thoracotomy for removal, with significant morbidity. We report an unusual case of pacing lead entanglement within this structure, followed by prompt intracardiac echocardiographic identification and laser sheath removal. The patient is a 40-year-old woman without any prior cardiovascular disease, who was referred to our center with a 10-month history of intermittent palpitations and progressive exertional dyspnea. She was diagnosed with severe bi-ventricular heart failure on the basis of a non-ischemic cardiomyopathy, with a severe reduction in left ventricular function. An implantable cardioverter defibrillator (ICD) implantation was recommended as primary prevention against sudden cardiac death. The patient elected to proceed with ICD placement and an active fixation ventricular lead (Boston Scientific, Natick, Massachusetts) was placed securely in the right ventricular apex without difficulty. The passive fixation atrial lead (Medtronic, Minneapolis, Minnesota), however, became immobilized within the mid right atrium. It was not adjacent to any atrial wall and was proximal to the tricuspid valve. Despite multiple attempts at advancing and retracting the lead, it could not be dislodged. A small far-field atrial electrogram was visible through the programmer, and capture could not be obtained at maximum output. Based on a preoperative echocardiogram, entanglement within a prominent Chiari network was suspected, yet an intraoperative transthoracic echocardiogram was unrevealing. An 8-French intracardiac echocardiography (ICE) probe was then advanced to the right atrium from the right femoral vein. This confirmed that the tined lead was in fact entrapped within a complex Chiari network extending above the Eustachian valve. Gentle traction remained unsuccessful, and therefore with a 12-French excimer laser sheath (Spectranetics, Colorado Springs, Colorado) was advanced over the offending atrial lead. Three brief bursts of laser were necessary to free the tined lead from the Chiari network. Intracardiac echocardiogram did not show any pericardial effusion or damage to the tricuspid valve or surrounding structures. An active fixation atrial lead (Medtronic) was then placed without difficulty within the right atrial appendage. A follow-up transesophageal echocardiogram (TEE) four days later showed no significant adverse outcomes from the procedure.</td>
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<th>Emily Bahram-ahi, MD</th>
<th>The Painful Red Toes: Rare Bone Malignancy Presenting with Embolic Lesions</th>
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<td>Chris Stephenson, M.D.; John T. Ratelle, M.D.</td>
<td>Epithelioid hemangioendothelioma (EHE) is a rare vascular neoplasm of epithelioid endothelial cells that may present in soft tissue, bone, lungs</td>
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or liver, and frequently presents with multifocal lesions. While EHE is rare, it must be considered on the differential diagnosis for a patient with multiple lytic bone lesions. An 82-year-old male presented with several months of painful toe lesions and one month of fevers, night sweats, and weight loss. On exam, he had painful erythematous macules on several distal toes on both feet. Pathology of a skin biopsy of his left great toe pad was nonspecific, with immunostaining supportive of a reactive process. During hospitalization, he was found to have leukocytosis, elevated erythrocyte sedimentation rate and C-reactive protein, worsening normocytic anemia, and S. agalactiae bacteremia. An initial transesophageal echocardiography (TEE) showed no evidence of an intracardiac mass, thrombus, or vegetation; however, two weeks later, repeat TEE revealed large mobile masses attached to the descending thoracic aorta. Computed tomographic angiography (CTA) confirmed an irregularly ulcerated thrombus within the descending thoracic aorta and evidence of infarct to bilateral kidneys due to embolization. Systemic anticoagulation therapy with IV unfractionated heparin was initiated. Given his ongoing fevers, elevated inflammatory markers, and lack of clinical improvement on ceftriaxone, a positron emission tomography (PET) scan was performed, demonstrating multiple lytic bone lesions. CT-guided fine needle biopsy of a vertebral lesion was consistent with an epithelioid hemangioendothelioma neoplasm. He was discharged from the hospital on anticoagulation with Lovenox with Medical Oncology follow up to discuss treatment options. EHE is a rare vascular neoplasm, and represents less than 1% of bony neoplasms. EHE most commonly arises from soft tissues, but can occur in other sites such as the lung, liver and bones. While soft tissue variants are usually confined to a single tumor, the majority of EHE involving the skeleton is multifocal. The treatment for EHE involving the skeleton usually involves wide surgical excision in conjunction with radiation therapy; the role of chemotherapy is not well defined. Interestingly, it is possible for these tumors to originate in a vessel and resemble an intraluminal thrombus; therefore, further evaluation will be required to determine if the mass seen in this patient’s aorta is in fact another EHE lesion or a thrombus.

**Kathryn Baxstrom (Baker), MD**

**The 4 T’s of mediastinal masses: An unusual case of adenocarcinoma causing SVC syndrome in a 26-year-old female**

This is a case of a 26-year-old female presenting to her allergist with shortness of breath, facial congestion and mild periorbital edema. She had been managed by her primary care physician for allergies for two months with anti-histamines and prednisone. Upon referral to an allergist, a chest x-ray was performed which showed a massive pleural effusion and mediastinal mass. She was admitted for further management, including thoracentesis. On review of systems, she endorsed easy bruising, headaches and unintentional weight loss of 18 pounds. She had no previous medical problems and no family history of malignancies. CT chest obtained showed an 8.7 x 6.2 cm infiltrative mass in the anterior mediastinum, which surrounded and nearly obliterated the upper portion of the SVC. Differential offered by radiology included lymphoma, thymoma or teratoma. Pleural fluid was obtained for cytology, as well as needle core biopsy of the mediastinal...
mass. Initial pathology reports revealed an adenocarcinoma, in a background of fibrosis and calcifications; immunohistochemistry staining was consistent with an intestinal phenotype. EGD showed non-bleeding grade II varices secondary to SVC syndrome with no evidence of malignancy and colonoscopy was also negative. Further workup for primary malignancy included a CT scan of the abdomen and pelvis which showed a 4 cm solid ovarian mass. Serum cancer markers including AFP, HCG, CEA, Ca19-9, Ca 27.29, and Ca 125 were negative. Final diagnosis was adenocarcinoma of intestinal phenotype originating from a teratoma. Germ cell tumors typically arise in the gonads, though up to 5% occur extragonadally. Additionally, somatic malignant transformation (SMT) within a teratoma is an uncommon phenomenon, occurring in only about 7% of all mediastinal teratomas, and most commonly occurring as sarcomas. As of 2013, only 4 case reports of colonic-type adenocarcinoma arising within a primary teratoma had been reported. SMT can occur at primary or metastatic germ cell tumor sites. Differentiated teratomas with SMT provide a therapeutic dilemma for oncologists with the question being whether to direct the chemotherapy towards the germ cell tumor or the transformed histology? Our patient also adds an additional complication, as both her teratoma and her adenocarcinoma appear to be metastatic with the primary germ cell tumor site likely being her ovarian mass. Pleural involvement of her adenocarcinoma categorized her as advanced stage. Currently, the patient is receiving chemotherapy with FOLFOX, directed towards the somatic malignant transformation. Upon review of the patient’s course prior to diagnosis, she provided a picture of her face from 5 months prior, which showed no facial or neck swelling or plethora, no ruddiness of her cheeks and no periorbital swelling. Physicians should be suspect when treatment for common causes of facial congestion and swelling like viral illness or allergies do not improve symptoms.

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<tr>
<th>Fateh Bazerbachi, MD</th>
<th>Pseudoaneurysms of the gastroduodenal artery following recurrent pancreatitis presenting as painless jaundice</th>
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<td>Mohit Gupta, Shawn Mallery, Donna D'Souza, Martin Freeman</td>
<td>Pseudoaneurysms of a visceral artery is a delayed complication of pancreatitis. The most common artery to be involved is the splenic artery (46%) followed by the hepatic artery (22%) and the gastroduodenal artery (GDA) (1.5%). Prompt diagnosis and management of these lesions is imperative, as bleeding could be fatal, with a mortality rate of 100% for untreated bleeding, and 20% despite aggressive management. A 46-year-old caucasian female with a past medical history significant for alcohol abuse, and recurrent pancreatitis presented with complaints of jaundice, bloating and fatigue. The patient endorsed painless diarrhea, pale stools, and dark-colored urine over the past 10 days. She has been admitted for alcoholic pancreatitis episode 3 weeks ago. She appeared fatigued but not in distress, and was afebrile, with normal blood pressure and heart rate. She was significantly jaundiced, and her abdominal exam was unremarkable. Laboratory investigations showed a total bilirubin level of 14.3, alkaline phosphatase of 1037, AST of 256, and ALT of 73. A contrast enhanced CT scan of the abdomen was performed and demonstrated a pseudoaneurysm (8<em>9</em>10 cms) compressing the common bile duct, and</td>
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involving the proximal branch of the GDA with internal bleeding
(4.5*5*6 cms) and multiple pseudocysts; in the body (1.8*1.4*1.2 cms)
and in the tail of the pancreas (7.2*5.9*6 cms) (Figure 1). Coil
eMBOLization of the GDA was performed, and post procedure CT
showed no contrast extravasation, ruling out remnant hemorrhage
(Figure 2). One month follow-up postembolization revealed a total
bilirubin level of 2.3, alkaline phosphatase of 465, AST of 71, ALT of 32,
with complete clinical resolution. Pseudoaneurysm is a late
complication of pancreatitis. Usually, the presenting symptoms are
related to bleeding, which could be fatal despite aggressive
management. Self-limiting episodes of "herald bleeding" (also known as
sentinel bleeding) may precede catastrophic profuse bleeds. Other
symptoms may include abdominal pain, hematemesis, hematochezia,
and hemodynamic shock. The expanding pseudoaneurysm may very
rarely result in obstructive jaundice as the sole manifestation. This rare
presentation may occur in the setting of hemosuccuspancreaticus in
which the patient has jaundice, abdominal pain and GI bleed.
angiography is the gold standard diagnostic test, with a sensitivity of
nearly 100%. CT has a sensitivity of 67%, and ultrasonography of 50%
Pseudoaneurysms can be treated by either surgical (revascularization,
vessel ligation, aneurysmal sac exclusion) or endovascular interventions
(coil embolization, stent placement). TeacHing point In a patient with a
history of recurrent pancreatitis who is presenting with painless
jaundice, GDA pseudoaneurysms should be considered and ruled out
promptly, as delayed diagnostic work up may lead to fatal
consequences. These aneurysms can be effectively treated with coil
eMBOLization in hemodynamically stable patients.

Anne Becker, MD
An Unusual Case of Diarrhea in Minnesota
Introduction Diarrheal illness is common in Minnesota. The top
reportable causes of diarrhea in Minnesota include Salmonellosis,
Giardia, and Cryptosporidiosis. When a patient presented with >20
episodes of vomiting and watery diarrhea in a day, common things
were considered first. This case illustrates the need to consider more
exotic causes of illness in patients with recent travel. Case description
A previously healthy 38yo man presented to the ED with 20-30 episodes
of nonbloody vomiting and watery diarrhea over the past 24 hours. The
previous day he had returned from a month-long visit to India where he
was visiting friends and relatives. The patient was afebrile,
normotensive, tachycardic to the low 100s, with no supplemental O2
requirements. PE was unremarkable other than tachycardia; he was
nontoxic, with benign belly exam. Labs revealed leukocytosis, mixed
metabolic acidosis, elevated creatinine, pyuria, hematuria, and
hyperglycemia. He was admitted on day 2 (D2) of his illness; stool
cultures and O&P were sent, though viral gastroenteritis was
suspected. On D4, he continued to have ~20 episodes of watery
diarrhea daily requiring aggressive IVFs, and developed severe
hypokalemia and worsening acidosis (HCO3 7). Renal and ID teams
were consulted, he was transferred to the ICU for frequent K
monitoring and replacement on D6. Additionally, his IVF was changed
from NS to LR to provide bicarbonate. ID was concerned for Cholera as
etiology, and recommended contact precautions. On D7 his K dropped
to 1.6, and he received nearly 400 mEq K via MIVF, PICC, and peripheral IV. On D8, Vibrio cholerae was isolated in the stool culture. The patient was given azithromycin 1 gram PO. K returned to normal range, diarrhea frequency decreased and he began to tolerate PO intake. By discharge on D9, he was feeling much better and only required 40 mEq PO potassium replacement. Discussion Diarrheal illness in Minnesota is relatively common, but Cholera as the cause is rare. Based on review of annual communicable disease reports available online from the Minnesota Department of Health (MDH) (1997-2013), this is the first reported case of Cholera in Minnesota in 17 years. In retrospect, Cholera clearly fits the patient’s presentation; however, lack of first-hand experience among providers and laboratories can cause delay in formal diagnosis. It is important to consider non-endemic causes of disease in patients with acute illness and recent international travel. The mainstay in the treatment of Cholera is aggressive fluid and electrolyte replacement, as evidenced in our patient’s remarkable potassium deficit requiring multiple simultaneous routes for replacement. Antibiotics have been shown to reduce bacterial shedding, frequency and severity of diarrhea.

Jared Bird, MD
Panithaya Chareonthaitawee, M.D.

**Dyspnea: A Diagnostic Dilemma**

A 68 year old male presented to the Internal Medicine clinic with a four week history of worsening dyspnea on exertion. His past medical history included relapsing polychondritis on chronic immunosuppression, disseminated histoplasmosis treated with itraconazole, and mitral valve replacement for mitral stenosis. Despite these medical issues, he was active with minimal symptoms until one month prior when he could not climb one flight of stairs without marked dyspnea and could not tolerate higher elevations. Assessment: On exam a new onset diastolic murmur was noted. He had no evidence of lower extremity edema and JVP was normal. Due to his new murmur he was referred for transthoracic echocardiogram (TTE), which demonstrated a thickened pulmonary valve with severe pulmonary regurgitation. There was a mobile mass attached to the pulmonary valve concerning for endocarditis. Diagnosis/Management: He was admitted to the Cardiology service for probable endocarditis. A transesophageal echocardiogram demonstrated a mobile mass attached to the pulmonic valve. Blood cultures remained negative and he was treated with 6 weeks therapy with ceftriaxone while continuing itraconazole. A repeat echocardiogram showed no change in the size of the mass and he was referred for pulmonary valve replacement. Pathology of his valve demonstrated hyphae and histoplasmosis serology returned positive, consistent with a diagnosis of histoplasmosis endocarditis. Discussion: The evaluation of dyspnea on exertion during outpatient evaluation is best approached by differentiating acute causes of dyspnea versus chronic dyspnea. Of patients with chronic dyspnea, nearly 2/3rds of all cases will fall under the categories of asthma, COPD, interstitial lung disease, or cardiomyopathies. While the initial history and physical is important, only 67% of practicing pulmonologists were able to elicit the correct etiology based upon the initial clinical presentation alone. When focusing upon the next step of testing, history plays a large role in
determining the efficiency of further testing. For patients with a history of smoking, formal pulmonary function testing provides the highest yield. Patients with evidence of BNP elevation, new murmur, or heart enlargement are best served by echocardiography. All patients are recommended to undergo evaluation with a chest x-ray, and extended electrolyte panel. Histoplasmosis is one of the most common fungal infections in the United States. However, only 1 in 2000 patients develop disseminated disease. Chronic infections typically present without fevers and have skin or gastrointestinal lesions. Other potential sites of infection with disseminated histoplasmosis include adrenal lesions, CNS disease, or rarely endocarditis. It is recommended to begin treatment with amphotericin B for patients with disseminated histoplasmosis prior to consideration of transitioning to itraconazole to reduce side effects. For patients with endocarditis, IV antifungal treatment has been effective at eradication. However, for patients with significant valvular disease, valve replacement is the mainstay of treatment.

Johanna Bischof, MD

**Myocardial Rupture presenting as resuscitated cardiac arrest**

Case Report A 70 year old woman was brought to the emergency room after being found unresponsive by her daughter. On EMS arrival, she had a thready pulse with a rate in the 30s but was soon in full cardiac arrest. CPR was ongoing on arrival to the emergency department at which time an ultrasound was placed on her chest. The ultrasound demonstrated cardiac standstill, but also showed a large pericardial effusion with evidence of hemopericardium and clot. ACLS medications were administered while pericardiocentesis was attempted, but due to the organized clot in the pericardium this was unsuccessful. Thoracotomy was then pursued with release of pericardial tamponade and large blood clots. The patient received cardiac massage with intracardiac epinephrine, was defibrillated with internal paddles and regained a perfusing rhythm with a stable systolic blood pressure in the 140s. A small cardiac defect with trace bleeding was noted on the inferolateral aspect of the heart with associated ischemic myocardium – leading to the diagnosis of post-myocardial infarction free wall rupture. Cardiac surgery was consulted and determined the rupture was not amenable to surgical repair due to the extent of surrounding ischemic myocardium. Care was withdrawn with the family at her bedside, and she died 35 minutes later. Discussion: Post-myocardial infarction (MI) free wall rupture is a common cause of death after MI accounting for 14-26% of deaths. The actual incidence of free wall rupture is felt to be less than 2% of all patients receiving percutaneous coronary intervention (PCI) for ST elevation MI (STEMI), which is a decrease from >4% prior to availability of PCI. Risk factors for development of free wall rupture include: no previous history of MI, ST segment elevation or Q wave development, and peak CK-MB greater than 150 IU. These factors indicate rupture is more likely in a patient with a transmural infarct who has not had the opportunity to develop extensive collateral circulation. Other predictive factors are female sex, anterior location of infarction, and age >70. Free wall rupture manifests within 5 days of MI in 50% of cases, within 14 days in 90% of cases. Rupture can present with sudden death with ‘silent MI’ as was the case
above. It can also present with right heart failure progressing to pulseless electrical activity due to cardiac tamponade. Treatment of rupture is aimed at relief of tamponade and hemodynamic support until operative management is available. Inotropic support, pericardiocectesis, intraaortic balloon pump, open thoracotomy, and percutaneous cardiopulmonary bypass all have a role in management. Survival of post-MI ventricular free wall rupture is largely dependent on rapid recognition, and acuity of rupture. With optimal management, long term survival of subacute rupture was achieved in 48% of patients.

### Michael Blazar, MD

**Trying to Find Weight Lost? Get an Investigator and Search Warrant!**

A 65-year-old male smoker (60 pack-years) with diabetes (A1C: 8%) treated with metformin and glimepiride presents to his PCP for re-assessment of his 5-year, unintentional, and steady decline in weight. He weighed 204 lbs (BMI: 28) in 2008, and his weight is 163 in 2013. He feels well. He has had dentures since 2009 and notes decrease in his taste and appetite ever since then. He also mentions acute hematuria and diarrhea. He has had a negative screening colonoscopy in 2007. Four of his family members have had tumors: 3 head/neck and 1 pancreatic. His physical exam is unremarkable. His workup thus far for the weight loss has been unrevealing: CBC, BMP, liver enzymes, albumin, TSH, CXR, and CT abdomen/pelvis are normal. The prior differential for his weight loss was diabetes, decreased taste and appetite related to dentures, anorexia of aging, and smoking. With diarrhea now, there is concern for malabsorption. Stool testing is negative for Clostridium difficile and ova/parasites. An EGD is performed to evaluate for celiac disease and malignancy; it shows non-erosive gastropathy, and a duodenal biopsy is negative. His diarrhea resolves. Further occult malignancy evaluation ensues. Cystoscopy is performed and negative. His hematuria resolves. A CT chest/abdomen/pelvis is repeated and notable for severe emphysema, a pulmonary nodule, aortopulmonary and paratracheal lymphadenopathy, and a suspected pancreatic cyst. He receives a new diagnosis of moderate COPD, which could be another source of weight loss. However, he requires no treatment. His weight for his follow-up visit in 2014 is 154. The patient is very worried. While there are multiple explanations for weight loss, there is growing concern for occult malignancy. A laryngoscopy to evaluate for head/neck cancer is negative. MRI surveillance of the pancreatic lesion is unchanged. CT chest surveillance of the pulmonary nodule shows that the nodule appears to be a lymph node and has decreased in size. Strikingly, new mediastinal and hilar lymphadenopathy is observed. Biopsy of the lymph nodes leads to diagnosis of stage 3B metastatic adenocarcinoma (suspected foregut primary). While doing EGD for node biopsies, the pancreas lesion is observed and likely an intraductal mucinous pancreatic neoplasm. He is subsequently admitted for radiation therapy. His nadir weight is 137 (BMI: 19). Due to his significant weight loss and development of cachexia, he is deemed ineligible for concurrent chemoradiation. For his cachexia, megase and insulin are started and have not resulted in weight gain or improvement in appetite. Unintentional weight loss (>5%) in the elderly is a common and under-recognized problem. This case illustrates how a physician has
to be tenacious to make one or more diagnoses to explain weight loss. Early interventions in this weight loss can lead to improvements in weight, nutrition, and functional status.

**Michael Bourne, MD**  
LaTonya J. Hickson, MD

**Trading Methotrexate for a Mahurkar: IgA Nephropathy with DIC in a Patient with Rheumatoid Arthritis**

We describe a case of rapidly progressive glomerulonephritis secondary to IgA nephropathy after discontinuing methotrexate in a patient with rheumatoid arthritis. Her rapid renal decline in light of her multiple distracting comorbidities resulted in delayed diagnosis and increased morbidity with DIC and anuric renal failure requiring hemodialysis. A 65 year old woman with rheumatoid arthritis, hypertension, diabetes mellitus II, and congestive heart failure discontinued her methotrexate regimen of 30 years without recurrence of her joint pain. Shortly after, she began experiencing dyspnea and cough with worsening of her hypertension and edema. Her creatinine rose to 1.6 from a baseline of 0.6 over the following three months. Outpatient providers initially attributed her condition to overdiuresis and cardiorenal syndrome and her diuretics were decreased. Her dyspnea and fluid retention worsened, urine output decreased, and she began feeling nauseous, pruritic, and weak. She was shortly admitted to the hospital. On admission she was hypertensive and pale with periorbital edema. Exam noted diffuse rales and a systolic murmur with profound 3+ pitting edema in her legs, thighs, and back. Initial labs were significant for anemia, thrombocytopenia, hyperkalemia, and acidosis with a creatinine of 2.87. Curiously, her INR and PTT were prolonged. All these labs were previously normal. Chest x-ray revealed patchy bilateral infiltrates and renal ultrasound was normal. Urinalysis showed RBC casts, granular casts, and nephrotic range proteinuria. She shortly became anuric despite IV fluids and diuretics and her acidemia, thrombocytopenia, and hyperkalemia worsened. ANA was positive, all other antibodies were negative. Coagulation studies revealed uncompensated chronic DIC. She had a dialysis catheter placed and her kidney was biopsied after receiving cryoprecipitate and fresh frozen plasma. Her symptoms improved with dialysis though her fibrinogen, platelets, and clotting factor activity remained low. Biopsy returned positive for IgA Nephropathy with acute tubular necrosis without evidence of thrombotic microangiopathy. Given her DIC, a PET CT, lower extremity ultrasound, and bone marrow biopsy were obtained and were normal. She was discharged on steroids and began outpatient dialysis with frequent follow up. Outpatient providers initially sought to treat more probable causes of her renal dysfunction and had no compelling reason to obtain a kidney biopsy or suspect another process was at play given her comorbidities and symptoms. It is tempting to surmise that her methotrexate kept the IgA nephropathy at bay over the years because of their temporal association. However, this would be difficult to prove. Indeed, there are a few reported cases of IgA nephropathy being associated with rheumatoid arthritis and some evidence of immunologic link between the two. DIC linked directly to rheumatoid arthritis or IgA nephropathy has not been described and, as was done here, it is important to exclude other causes of DIC.

**Nicholas Boysen, MD**

A unique left ventricular infiltrate discovered in a 29-year old causing
Infiltrative cardiomyopathies are a subset of restrictive cardiomyopathies best diagnosed through cardiac MRI and often endomyocardial biopsy. These most commonly include amyloidosis, sarcoidosis and hemochromatosis. Generally, infiltrative cardiomyopathies are progressive diseases that present with clinical symptoms late in their course and are systemic in nature, involving multiple organs. Adipositas cordis, a rare histopathological condition characterized by scattered infiltration of the ventricular myocardium with adipose tissue is usually discovered on autopsy as a benign process but can occasionally present with ventricular arrhythmias resulting in death. A 29-year-old male with no prior cardiac disease, a past medical history of chronic hepatitis B, pulmonary embolism and testicular lymphoma at the age of 7 status post radical orchiectomy, treatment with chemoradiation, and subsequent radiation-induced development of end stage renal failure requiring kidney transplant, presented with sudden ventricular fibrillation cardiac arrest. He was at work as a bank teller and suddenly became unconscious, apneic and pulseless. EMS was called to the scene and an EKG demonstrated ventricular fibrillation arrest. He required three defibrillatory shocks to achieve ROSC and then was transported to a local hospital, where he was intubated and initiated on hypothermia protocol. After stabilization and extubation, he received a thorough cardiac workup including echocardiogram, angiogram, MRI and endomyocardial biopsy. The echocardiogram demonstrated a left ventricular ejection fraction of 50-55% as well as moderate concentric left ventricular wall thickening consistent with left ventricular hypertrophy. Cardiac angiogram demonstrated no evidence of coronary artery narrowing or disease. On cardiac MRI, hyperenhancement throughout the myocardium consistent with diffuse lipomatosus infiltration of the left ventricle was discovered. Fat suppression MRI sequences confirmed the diagnosis of adipositas cordis. The cardiac biopsy showed no H&E signs of iron or amyloid deposition. He remained hemodynamically stable throughout his admission without further arrhythmias and follow up plans for ICD placement, genetic testing and genetic counseling were scheduled at discharge from the hospital. Although extremely rare, this case reiterates the significance of proper cardiac evaluation in atypical cardiac arrest as well as the importance of integrating this condition into the infiltrative cardiomyopathy differential diagnosis. As a progressive disease, identification of this infiltrative process allows for proper arrhythmia prophylaxis, patient counseling and prognostic outlook on a potentially fatal condition.
Jorge Brenes-Salazar, MD

**Pernicious spells**

A 63-year old female with psoriatic arthritis was referred to the Cardiology Clinic for evaluation of unexplained spells concerning for syncope. Careful history taking revealed that the patient had actually been experiencing repeated falls over the past 6 months, preceded only by a few seconds of “imbalance” but no other prodrome. She denies any angina, congestive symptoms, palpitations, abnormal movements, incontinence or tongue biting, but did report numbness and tingling of her distal extremities that had been present for 2 years. Vital signs were within normal limits, including orthostatics. Salient features on physical examination included a markedly positive Romberg sign, broad-based but stable gait and decreased vibratory and pin-prick sensation in both feet and legs symmetrically. Previously ordered cardiac workup, including Holter monitor and echocardiogram were within normal limits. She did have however, a hemoglobin of 11.8 g/dL with an MCV of 109; comment on morphology included the presence of round macrocytes. In view of these, we ordered Vitamin B12 levels in serum, which were low (normal 180-914 ng/L), with methyl-malonic levels over 0.40 nmol/ml (normal less than this cut-off) confirming a suspicion of pernicious anemia with neurologic changes. The patient was started on 1 mg IM hydroxycobalamin injections weekly for 6 weeks (followed by maintenance dose every 2 months) with dramatic reduction in her falls and neuropathic symptoms. Although falls and syncope may be indistinguishable in as many as 10% of elderly patients, appropriate history taking can determine if truly the patient has sudden loss of consciousness followed by loss of postural tone. There have been rare occasions in which B12 deficiency manifests as syncope due to orthostatic hypotension, but in virtue of its potential effects on the neurologic system it does more frequently predispose to falls.

Kevin Brough, MD
Laura Pestana, Mark Nyman

**Edema, Effusions, and Shortness of Breath is Not Always Heart Failure**

CREST syndrome (Calcinosis cutis, Raynaud phenomenon, Esophageal dysmotility, Sclerodactyly, and Telangiectasia), a subset of Systemic sclerosis frequently has minimal skin involvement, and therefore, patients may present in diagnostically challenging ways. A 74 year old Caucasian female presented with a 4 month history of worsening exertional shortness of breath, lower extremity swelling, and chronic, recurrent bilateral pleural effusions. She was 3 months status post bare metal stent placement in the distal right coronary artery. Despite intervention, her symptoms worsened. Two days prior to arrival an echocardiogram showed stage I diastolic dysfunction, preserved left ventricular ejection fraction, concentric hypertrophy and an RVSP (right ventricular systolic pressure) of 100 mmHg. Despite transfusions and diuresis, her symptoms remained. A CT was negative for pulmonary embolus but confirmed the presence of bilateral pleural effusions. The radiologist also noted dilatation of the thoracic esophagus with a moderate amount of fluid and debris within it. BNP was >5000, serial troponins showed no significant delta, and her ECG while meeting minimal criteria for an inferior infarct, was unchanged from previous studies. Serum sodium was 125, osmolality 274, creatinine 0.7, and hemoglobin was stable at 9.2. Complete review of systems was negative except for shortness of breath and 2-3 pillow orthopnea.
Physical exam was significant for decreased breath sounds bilaterally with dullness to percussion, tightening of the skin to the PIPs, inability to fully flatten fingers when opposing flexor surfaces, a few scattered telangiectasias on her face, some exuberant exostoses related to her osteoarthritis of several DIPs, and 1+ bilateral lower extremity edema. No jugular venous distension or PMI displacement was appreciated. Upon specific questioning, the patient reported many years of pain and tingling in her fingers when exposed to cold even while wearing mittens. She denied trouble initiating swallowing, but had progressively avoided more solid foods. Bilateral thoracenteses were performed with great symptom relief. The pleural fluid was transudative. A pulmonary hypertension workup was initiated revealing elevated anti-nuclear and anti-centromere antibodies. She was diagnosed with CREST syndrome. Limited scleroderma (CREST) is associated with intimal proliferation and medial hypertrophy of the pulmonary circulation. Therefore, among patients with CREST syndrome, the incidence of pulmonary hypertension is up to 59%. It is essential that physicians consider whether the degree of symptoms is proportional to the known disease process. Our patient had symptoms and signs consistent with heart failure including shortness of breath, elevated RVSP, pleural effusions, and peripheral edema. However, the degree of her symptoms and lack of response to standard therapy were out of proportion to her echo findings. When other etiologies were carefully considered and a more thorough history and physical exam were performed, important details aided in determining the correct diagnosis.

Files Campbell, MD
Benji Matthews, MD

Fatal errors: the dangers of cognitive biases in medicine
Cognitive biases, such as premature closure and anchoring, are increasingly recognized as potential sources of medical errors. Premature closure describes the failure to consider other diagnoses once an acceptable diagnosis has been reached. Anchoring bias describes focusing either on a specific piece of information, such as a history, exam, lab, or imaging finding, or on a given diagnosis, and allowing it to constrain further evaluation or diagnostic consideration despite the accumulation of contrary evidence. We describe a case where cognitive biases contributed to missing a fatal diagnosis in a patient presenting with shortness of breath. Case description: A 67 year old gentleman with a past medical history of hypertension, hyperlipidemia, and chronic kidney disease was initially seen in clinic for shortness of breath. A non-contrast CT scan of the chest was done, and the clinic provider documented that the CT scan showed no signs of pulmonary embolism (PE). The patient’s dyspnea progressed, and he was seen in the emergency department, where he had an elevated troponin, and was admitted for non-ST segment elevation myocardial infarction (NSTEMI). Of note, he had isolated right ventricular (RV) dysfunction on echocardiography at this time. He underwent coronary angiography, which showed multi-vessel disease. These findings subsequently led to coronary artery bypass graft surgery (4 vessels). Intra-operatively, reduced RV function and RV dilation were noted on echocardiography. Shortly after removal of cardiopulmonary bypass, while still in the operating room, he developed metabolic acidosis and
hypotension, requiring replacement on bypass, intra-aortic balloon pump support, and vasopressor support for RV failure. Despite maximal vasopressors, fluids, and mechanical ventilation, the patient suffered pulseless electrical activity (PEA) arrest and died. Autopsy revealed the likely culprit: a bilateral (saddle) PE. Discussion: The case presented illustrates important cognitive biases present throughout medicine, and how they can affect evaluation, management, and outcomes of patients, sometimes resulting in missing a potentially fatal diagnosis. The specific biases that played a role in this case were premature closure and anchoring. Given an acceptable diagnosis of NSTEMI as the culprit for the patient’s dyspnea, the case was prematurely closed despite evidence of RV dysfunction. Documentation of a CT chest being negative for PE in the original clinic note also contributed to closing PE as a diagnostic possibility. However, this note was referring to a non-contrast CT, an inappropriate study for the evaluation of PE. The medical teams continued to anchor on the diagnosis of NSTEMI, as well as the unverified negative CT finding, despite persistent evidence of RV dysfunction in the patient. This case offers further education about the dangers of cognitive biases, and the need to consider and recognize them in ourselves when evaluating and treating patients.

Amanda Cartee, MD
Scott Thompson, MD
Thomas Beckman, M.D.

**Truly spontaneous atheroembolism?**

Cholesterol emboli syndrome is a rare complication of atherosclerosis after vascular manipulation. The clinical syndrome may include: painful blue or purple toe(s), livedo reticularis, eosinophilia, acute kidney injury, and/or preceding vascular manipulation. More rarely, atheroembolism can occur spontaneously. Case presentation: Mrs B. is a 52-year-old Caucasian female with type 2 diabetes mellitus, hypertension, hyperlipidemia, and nicotine dependence who presented with acute onset right foot and toe pain. She noted purple discoloration of right toes and lateral foot. Review of systems was positive for lower extremity claudication, but negative for symptoms suggestive of connective tissue disease, vasculitis, and hypercoagulability. She recently resumed smoking and marijuana use. Of note, prior imaging showed aortic atherosclerotic disease. Vital signs were normal except for hypertension. Physical examination was significant for reticular purple right toes 1 and 3-5, livedo reticularis, and hyperaglesia. Distal pulses were palpable. There were no carotid, abdominal, or femoral bruits or ophthalmic findings. CBC with differential, hypercoagulability studies, and creatinine were normal. HbA1c and lipids were at goal. TcPO2 in the right lower extremity was 0.53, while the left was normal. CT angiogram with iliac run offs showed a complete external iliac thrombosis with reconstitution of the right femoral artery. Echocardiography excluded cardiac embolus. The occluded vessel underwent thrombolysis and stenting followed by systemic anticoagulation. Her cutaneous manifestations improved. Discussion: The differential diagnosis of purple toes and livedo reticularis includes spontaneous cutaneous atheroembolism, vasculitis such as Buerger’s disease, connective tissue disease, and bacterial endocarditis. Buerger’s disease first requires exclusion of diabetes, which the patient had. Suspicion for connective tissue disease was low based on the initial interview and findings. She did not meet criteria for even possible...
endocarditis. With endorsement of claudication and prior imaging showing significant aortic atherosclerosis, vascular evaluation with TcPO2’s and CT angiography with lower extremity run-offs were obtained and greatly aided in diagnosis. Despite the lack of precipitating factor (i.e., vascular manipulation), the patient’s history, exam, and evaluation were most consistent with spontaneous atheroembolic disease. She had many risk factors: Caucasian, age >50, diabetes, hypertension, hyperlipidemia, known aortic atherosclerosis, and smoking history. These risk factors overlap with those for atherosclerosis, which is a large component of the pathogenesis of spontaneous embolic disease. More studies are needed to further define precipitating factors of “spontaneous” atheroembolism. Inflammation is a factor that may have a role in conversion to an unstable plaque1. Cigarettes stimulate an inflammatory response through the NF-kB pathway.2 In this case, we wonder if restarting smoking was a precipitating factor.  


Peter Cathcart, MD  
Hollie Krug MD  

How to diagnose an FUO  
Drug induced lupus is rarely diagnosed and often only in text books. Even more impressive is when it may be the first presumed episode of it's kind. A 63 year old man with history of atrial fibrillation, AICD, gout, and hyperlipidemia was admitted for fever with 1/4 positive blood cultures. He was started on antibiotics and worked up for concern of possible endocarditis. A transesophageal echocardiogram was performed and noted to be negative for vegetations. 6 other sets of blood culture and the positive culture was notable for coagulase negative staphylococcus. His fever persisted and was accompanied by increasingly worsening shoulder and hip joint pain. A fever of unknown origin work up was began. Viral panels, arbovirus PCR, blood smears, and ANA/ENA panel were performed. All were noted to be negative and patient became profoundly leukopenic and had a bone marrow performed. Bone marrow was read with rare lupus erythematus cells. This result was accompanied by a positive ANA, anti-DNA, and anti-histone antibodies. He was started on prednisone. On chart review, it was noted his most recent drug initiated was dofetilide, but was also on simvastatin and allopurinol (both known to cause DILE). He improved after cessation of dofetilide and initiation of prednisone. This case represents a unique clinical scenario of a fever of unknown origin work up resulting in a very rare diagnosis. Upon literature review this is the first suspected case of Drug induced lupus due to dofetilide.

Rima Chakraborty, MD  

Emphysematous Cystitis: Unveiled with Imaging  
Emphysematous cystitis is a rare form of a complicated UTI which is characterized by gas within the bladder lumen or wall. The infrequency along with its non-specific clinical symptoms makes it a diagnostic challenge. Diagnosis is often through incidental imaging. A 63 year old wheelchair-bound female with history of spina bifida, urinary and bowel incontinence, and recurrent UTIs, presented to our hospital with 4-5 days of altered mental status noted by her personal care attendant.
She endorsed polyuria and cough, but was unable to characterize the cough. Her ROS was otherwise negative and her vitals were stable. A urinalysis demonstrated leukocyte esterase, pyuria with positive nitrites, a leucocyte count of 6.6, a normal lactate of 0.9 and normal BMP, essentially unrevealing labs. Patient was started on appropriate antibiotic therapy of levofloxacin 750 mg BID for cystitis. A portable radiograph of the chest was also obtained which was concerning for free intraperitoneal air under R hemidiaphragm. Due to this finding, a CT of the abdomen and pelvis were ordered. The abdominal CT revealed air within the bladder versus within the wall of the bladder. Initially, given concern for cystitis, patient had been started on empiric antibiotics with levofloxacin, but had no improvement in mental status.

In setting of emphysematous cystitis, metronidazole was then added and a foley catheter placed for decompression, with subsequent improvement in mental status. The patient was discharged after several more days with planned outpatient follow up. This case illustrates a rare entity, emphysematous cystitis (EC). EC is typically observed in diabetes mellitus, and is twice as common in women versus men. Symptoms can vary from nonspecific to sepsis and definitive diagnosis is with imaging. In those with nonspecific lab and clinical findings, emphysematous cystitis can easily be overlooked and treated as uncomplicated cystitis. In women, diabetics, chronic UTI patients who present with uncomplicated cystitis with nonspecific symptoms and unrevealing lab work that does not improve with PO antibiotic therapy, imaging should be considered for emphysematous cystitis. EC is known to be an aggressive disease entity and early IV antibiotic therapy is necessary to avoid mortality or need for surgical intervention. 1. Thomas A.A., Lane, B.R., Thomas, A.Z., Remer, E.R, Campbell, S.C., Shokes, D.A “Emphysematous Cystitis: A review of 135 cases”. BJU International, 2007 100:17-20

Zachary Clements, MD

Persistent Hypoglycemia in a non-diabetic Female? Could it be Lupus?

Hypoglycemia is an uncommon clinical situation in patients not being treated with insulin for hyperglycemia. The diagnostic approach for the internist can be challenging given the rarity of the potential etiologies. The differential diagnosis can be narrowed by a detailed history and physical along with confirmatory lab testing showing endogenous hyperinsulinism during hypoglycemic episodes. When negative localizing imaging studies for insulinoma are obtained, autoimmune hypoglycemia including Type B insulin resistance syndrome associated with systemic lupus erythematosus (SLE) should be in the differential. A 55 year-old female non-diabetic female presented with a week history of falls, dizziness, weakness, and blurry vision. Past medical history included hepatitis C cirrhosis with a MELD score of 21. She had no alcohol use in the past 3 years or histiroy gastric bypass surgery. Her medications included tramadol, ambien, and omeprazole. Physical examination she was significant for a malar rash sparing the nasolabial folds. No stigmata of liver disease was noted. Spontaneous early morning hypoglycemia along with headache and diaphoresis was noted during days 1-4 of her hospitalization with blood sugars ranging from 32-39. Subsequent lab testing was consistent with endogenous hyperinsulinsim that showed high levels of insulin, proinsulin, and c-
peptide. Sulfonylurea, meglitinide and insulin antibody lab testing were negative. ACTH stimulation and thyroid function tests were unremarkable. Additional lab testing showed increased creatinine from baseline, severe thrombocytopenia, anemia, lymphopenia, and urinalysis showing wbc and rbc casts. Renal biopsy performed on HD # 4 showed stage II lupus nephritis. Subsequent lab testing showed positive ANA, DS-DNA antibody, and low complement levels. Additional history was significant for two prior miscarriages, Raynaud’s phenomenon, dry mouth/eyes, and photosensitive rash. A new diagnosis of SLE was made and she was started on plaquenil. Differential diagnosis for fasting endogenous hyperinsulinemic hypoglycemia at this point included insulinoma vs. autoimmune antibody to the insulin receptor (Type B insulin resistance syndrome) secondary to SLE. Localizing studies for insulinoma were negative including abdominal MRI, EUS, and octreotide scan (looking for ectopic pancreatic mass). An arterial calcium stimulation test was not performed. Her persistent hypoglycemia was thought to be secondary to Type B insulin resistance syndrome associated with SLE. She was prescribed a midnight snack which resolved her early morning hypoglycemia. A send out antibody to the insulin receptor to New Zealand was pending at time of discharge. This case illustrates the diagnostic approach to hypoglycemia in the non-diabetic patient and the importance of a complete history and physical. Type B insulin resistance syndrome is an extremely rare entity but one to consider when localizing studies for insulinoma are negative and an autoimmune condition such as SLE is present.

Steven Conlon, MD

Alkaline Encrusted Cystitis
Alkaline-encrusted cystitis is a severe chronic infection of the bladder caused by corynebacterium group D2 resulting in deposition of magnesium phosphate within the kidney. This disease can often go undiagnosed as cystitis without evidence of infection on urinalysis or typical cultures resulting in delayed diagnosis and poor patient outcomes. A 77 year old male with past medical history of enlarged prostate and atony of the bladder was seen at the urology clinic for hematuria, difficulty voiding, fatigue and malaise. A month prior the patient had undergone TURP for difficulty urinating, which resulted in temporary resolution of his urinary obstruction. Following surgery, he noted increasing straining with urination and had to resume use of a straight catheterization for urinary retention. Upon the development of hematuria with clots he became concerned and sought medical help. A bladder scan showed multiple large bladder stones. Following cystolitholapaxy his serum creatinine steadily rose to 2.3 from a base line of 1.3. A work up for AKI was started with a UA, BMP, urine culture, kidney ureter and bladder X-ray. The patient’s UA returned with a highly alkaline ph and KUB x-ray demonstrated calcification of tissue within the walls of the bladder and kidney. This radiographic feature is almost unique to alkaline encrusted cystitis and prompted administration of empiric vancomycin. The slow growing corynebacterium bacteria were cultured out a week later confirming the diagnosis. The patient’s creatinine stabilized, he was able to avoid dialysis and was discharged to home with IV vancomycocin. A high suspicion for alkaline encrusted cystitis must be maintained for
diagnosis of this unique infection. Being aware of the presence of alkaline urine, risk factors such as kidney transplant and foreign body insertion are imperative to making this diagnosis. The slow growing nature of corynebacterium group D2 makes the highly specific X-ray finding imperative to implementing proper antibiotic therapy.

**Blake Daley, MD**
**David Miranda MD,**
**Ankur Kalra MD,** and
**Daniel Pease MD.**

**Post-PCI Thrombocytopenia: A Cardiovascular Dilemma**

Thrombocytopenia resulting from the exposure of anti-platelet agents has been documented in patients undergoing percutaneous coronary intervention (PCI) for revascularization during acute coronary syndromes. However, the management strategy remains challenging for this infrequent yet potentially life-threatening complication following coronary revascularization. Case: A 63-year-old male presented to the emergency department following a witnessed out-of-hospital cardiac arrest. Prior to ED arrival, the patient had received multiple defibrillation shocks for ventricular fibrillation (v-fib) without achieving a perfusing rhythm or return of spontaneous circulation (ROSC). Physical examination on arrival was remarkable for no carotid or femoral pulses and no respiratory effort. Laboratory data revealed a venous pH of 7.06, lactate of 2.6 mmol/L, troponin I of .192 ng/mL, hemoglobin of 14.1 g/dL, and platelet count of 228,000/mm3. Initial 12-lead electrocardiogram demonstrated ST-segment-elevation in anterior and precordial leads V1-V5, following ROSC. The patient was sent for coronary arteriography which revealed a culprit lesion in the mid-left anterior descending coronary artery. PCI was performed with placement of a drug-eluting stent at this site. A glycoprotein IIb/IIIa inhibitor, abciximab, was added in addition to dual anti-platelet therapy with aspirin and clopidogrel. The patient had also received a loading-dose of intravenous unfractionated heparin as part of upstream therapy. Subsequent laboratory examination revealed profound thrombocytopenia from a platelet count of 228,000/mm3 to 9,000/mm3, with physical findings of bleeding from the oral mucosa and epistaxis. A decision was made to stop abciximab infusion, and a hematology consultation was obtained. Platelets and fresh frozen plasma were transfused, with the understanding of the attendant risk of occluding the freshly-inserted stent. The patient’s platelet count continued to rise steadily following these interventions, without significant bleeding events. A peripheral smear did not demonstrate evidence of disseminated intravascular coagulation or pseudothrombocytopenia. The patient made a full recovery and was discharged with a normal platelet count nine days after presenting in cardiac arrest. Discussion: Post-PCI thrombocytopenia represents an infrequent but clinically challenging and dangerous complication of anti-platelet intravenous glycoprotein IIb/IIIa administration, such as abciximab. The clinician must be aware of its rapid ability to produce severe thrombocytopenia; this is in contrast to type II heparin-induced thrombocytopenia, which may take several days to develop. Major events such as intracranial bleeding and spontaneous cardiac tamponade have been shown to increase with patients with thrombocytopenia receiving abciximab. Hence, platelet vigilance following PCI is of extreme importance for all physicians involved in the patient’s care. In the event of significant thrombocytopenia following
PCI, expert consultation with cardiology and hematology prior to discontinuation of antiplatelet therapy or administration of any blood products is absolutely necessary to balance the risk of stent thrombosis versus life-threatening bleeding in this high risk situation.

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<th>Lisa Daniels, MD</th>
<th><strong>Bovine endocarditis and the cattle rancher</strong></th>
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<td>Phillip R. Heaton, Ph.D., Shivani N. Desai M.D., Robin Patel, M.D., Larry M. Baddour, M.D.</td>
<td>An 88 year old male cattle rancher with a history of aortic valve replacement with a bovine prosthetic valve presented with fever, chills and dyspnea after removal of an infected toe with cellulitis. Fever, decreased oxygen saturation, elevated JVP, prominent V waves, bibasilar crackles, displaced PMI, diastolic murmur at left lower sternal boarder with a rumble and loud P2 were noted on physical examination. Chest radiograph demonstrated an enlarged cardiac silhouette, pulmonary venous hypertension and new onset bilateral pleural effusions. Transesophageal echocardiogram demonstrated a small mobile echo dense structure is noted in the anterior aortic root near the sinotubular junction as well as a pseudoaneurysm of the posterior aortic root. There was also an opening both above and below the valve prosthesis and thickening of the posterior aortic wall above the pseudoaneurysm resulting in severe aortic periprosthetic regurgitation. Blood cultures from an outlying medical center grew a fastidious anaerobic, gram positive, catalase negative cocci identified as Helcococcus kunzii. Ceftriaxone was initiated with resolution of fever, chills and leukocytosis. He continued to have dyspnea with supplemental oxygen requirement and therefore proceeded to surgery. The aortic annulus and bioprosthetic valve were cultured and remained negative for growth after five days. Pathology demonstrated active endocarditis with gram positive cocci. He completed a six week course of ceftriaxone. Helcococcus kunzii is a Gram-positive catalase negative cocci thought to simply colonize the skin, especially that of the lower extremities. H. kunzii is also a rare cause of endocarditis in animals, and interestingly the related Helcococcus ovis accounts for approximately one-third of bovine endocarditis cases. Given the patient’s work as a cattle rancher, he may be been predisposed to lower extremity colonization with H. kunzii. One could speculate that this group of organisms could have adhesins that permit attachment to the endocardial surface and have resulted in his subsequent endocarditis. Putting together a cattle rancher and bovine prosthetic valve, highlights the unusual risk factors in this case of H. kunzii bovine prosthetic valve endocarditis.</td>
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<th>Mehdi Dastrange, MD</th>
<th><strong>A Safari to Forget: a 64 year old female with East African Sleeping Sickness</strong></th>
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<td>Human African Trypanosomiasis is a common disease in regions of Western and Sub-Saharan Africa caused by Trypanosoma brucei; a unicellular protozoan infection transmitted to humans by an infected Tsetse fly. If left untreated, it is almost always fatal. This is a 64 year old female with past medical history of hyperlipidemia and hyperthyroidism who presented to clinic for evaluation of fever. Her social history was notable for recent travel to Zimbabwe (9/17-10/4), where she participated in a hunting safari and was exposed to multiple insect bites. She presented to clinic on 10/8/12 with a sore throat, fever, and myalgias. Clinic vitals and physical exam were unremarkable.</td>
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Notable labs included CBC, ESR, UA, and Influenza antigen A+B which were unremarkable, and CRP of 5.3. The next day she presented to the ED for evaluation of fever. She complained of non-productive cough, nausea, vomiting, and diffuse myalgias. Vitals showed T 103F, BP 119/60, P 85, R 20, SpO2 95%. Physical exam was notable for 3 cm raised area of erythema above her left ankle. Notable labs included WBC 3.6 (31% bands), Platelets 120, Na 131, CO2 19, AST 47, UA: 2+ protein, otherwise normal CBC, BMP, LFTs, CXR, EKG. A peripheral blood smear showed findings consistent with Trypanosoma brucei. Infectious disease was consulted and felt presentation was consistent with East African Sleeping Sickness. The CDC was contacted and recommended initiation of suramin for treatment. She received supportive care along with continuation of malarone for malaria prophylaxis. On hospital day 1 the patient was given a test dose of suramin (100 mg) followed by 900 mg infusion over six hours. Shortly thereafter the patient’s clinic status rapidly declined. The patient was transferred to the ICU where she was intubated due to respiratory failure. She developed supraventricular tachycardia requiring bolus infusion of amiodarone and DC cardioversion with return to sinus rhythm. Subsequent laboratory findings were consistent with DIC and septic shock. By hospital day 4, the patient developed multi system organ failure and had received a total of 18 units of platelets, 3 units of FFP, 6 units PRBC’s, and 70 liters of intravenous fluid (25 kilogram weight gain). The patient developed ARDS, shock liver, rhabdomyolysis, and dry gangrene of fingers and toes. She required amputation of the right hand, left fingers, and both legs (BKA). She completed an additional 10 days of pentamidine and was discharged to LTAC on hospital day 56. This case illustrates the potential for rapid clinical deterioration of East African Sleeping Sickness. Early recognition (travel history, insect bite), diagnosis (peripheral blood smear, LP), and treatment (sumarin, pentamidine) is key to reducing morbidity and mortality.
arrived on the ICU floor, she had severely labile blood pressure and had lockjaw with inability to control her secretions. She was emergently intubated and was initiated on a versed drip with propofol boluses for sedation and to control spasms. To help control autonomic instability, she was started on magnesium sulfate and norepinephrine. Wound debridement was also done and patient received a tetanus booster for active immunization. Despite aggressive supportive cares and toxin control, she had a prolonged hospital course with ongoing severe spasms as attempts to wean sedation were made. Patient was transitioned to comfort cares and passed away shortly thereafter. This case illuminates the need to have a broad differential diagnosis. Although tetanus is a rare condition in the United States, with only a few hundred cases reported over the past several years as compared to nearly one million cases reported worldwide per year, it cannot be totally excluded. Of the cases here, the largest risk of mortality was seen in the 65 year old and above age group. Even when full measures are taken in an ICU setting, mortality rates are above 30 percent. The increased risk in mortality may be due to over 70% of elderly individuals having lower than protective levels of antitetanus antibody. This case emphasizes the need for up to date vaccinations, especially in the elderly population, in hopes of preventing presentations like this one in the future.

Joshua Dorn, MD

A difficult and recurrent case of Idiopathic Angioedema

Angioedema is a potentially life threatening condition which involves pronounced swelling of the deep dermis of submucosal tissues as a result of vascular leakage. Common causes of angioedema include hereditary or acquired C1 inhibitor deficiency or dysfunction, ACE inhibitor mediated, allergic or other trigger, and idiopathic. Patients with idiopathic angioedema represent a particularly challenging population both in accepting lack of etiology and finding effective management. Case Description: A 79 y/o female with a history of breast cancer, type II diabetes mellitus, coronary artery disease s/p CABG, pulmonary hypertension, myocardial infarction and hypertension presented with angioedema for the first time at age 76. She proceeded to have 12 admissions and Emergency Department visits for angioedema over a course of three years. She required intubation for airway protection one time. Initially she was thought to have ACEi induced angioedema as she had been on lisinopril for two years prior to the first episode. This medication was discontinued but episodes continued to recur. Allergic causes were also thought to be possible however no consistent trigger was identified. Aspirin, statin, lisinopril and shellfish (positive skin test) were added to allergy list in the medical record as these were thought to possibly be associated with specific episodes. Despite removing these possible triggers, she continued to have episodes of angioedema. C1, C3, C4, C1q complement, C1 esterase inhibitor and functional assay levels were checked multiple times and did not indicate that a complement, immune complex mediated, acquired or hereditary cause was likely. She did not have evidence of lymphoproliferative disorder which can be associated with acquired angioedema. No diagnosis was able to be determined in her case, thus
no specific treatment was successfully employed in spite of best efforts. Treatment included glucocorticoid therapy and antihistamines during acute episodes which she was somewhat responsive to. Eventually, these same treatments were used chronically and may have slightly decreased the number of episodes, but did not prevent them altogether. Discussion: Angioedema is best diagnosed with a thorough history and physical, which can then direct further testing. There are common causes including ACEi, allergic, and hereditary and acquired C1 esterase deficiency. These diagnoses should be tested for as the history dictates. Unfortunately for both physician and patient, these etiologies are often ruled out without one is left without a definitive answer. This patient had what is classified as idiopathic non-histaminergic angioedema, an especially difficult diagnosis as there are no known effective therapies. In a challenging case like this, it is difficult yet important to transfer focus from continuous, likely non-beneficial workup, to management of acute attacks and safety.

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<th>Daniel Dudenkov, MD</th>
<th>Opacification on chest X-ray following right internal jugular central line placement: What is the diagnosis?</th>
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| John Park, MD       | Chest X-ray is frequently used after central venous line insertion to confirm proper placement and to diagnose post-procedure complications such as vascular or lung injury. However, interpretation of post-procedure chest X-rays can be challenging, especially in very sick patients with respiratory failure. Mr. H is a 65 year-old male with a complex past medical history who was admitted to the intensive care unit for management of septic shock and acute hypoxemic respiratory failure. He was intubated and sedated prior to arrival. Due to refractory hypotension requiring vasopressor support, a decision was made to place a right internal jugular central line. Prior to central line placement, chest X-ray showed an appropriately positioned endotracheal tube and mild-moderate pulmonary edema and bilateral pleural effusions. Due to the patient’s large body habitus, the central line insertion was difficult and required two attempts. The procedure was ultrasound-guided, and venous cannulation was confirmed by transduction. A post-procedure chest X-ray revealed a new, large opacification in the right upper chest. In the setting of a new central line, the findings were interpreted as secondary to vascular injury, and further evaluation with CT was recommended. However, on closer inspection of the radiograph, there was rightward tracheal deviation and mediastinal shift, which is inconsistent with a right hemothorax. Furthermore, there was an abrupt cutoff of the right mainstem bronchus. A decision was made to perform bronchoscopy which resulted in the removal of a large mucous plug from the right mainstem bronchus. Subsequent chest X-ray demonstrated resolution of the opacification and mediastinal shift. This case illustrates that a temporal association between a procedure and a worrisome radiographic finding does not indicate causality. Although it was important to consider trauma from the central line placement, careful inspection of the chest X-ray revealed a better explanation for the new findings, which led to appropriate management. In order to advance high value care that improves quality and reduces cost, it is prudent to avoid developing diagnostic “tunnel-vision” and to maintain a broad
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<th>Colt Edin, MD</th>
<th>A Case of Biopsy-Proven Giant-Cell Arteritis in Setting of Normal ESR</th>
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<td>Peter Lund, MD</td>
<td>Giant-cell arteritis is an autoimmune inflammatory condition of the large and medium arteries. It is most common in people over 70 years of age, in women and in persons of northern European ancestry. One potential complication is vision loss; this occurs in approximately 10-15% of patients with this condition (1). Classic symptoms include vision changes, headache and other new head pains including jaw claudication. It is commonly taught that an elevated erythrocyte sedimentation rate (ESR) is a hallmark of this disease. However, this case illustrates that this cannot be considered a universal truth. An 82 year old woman with past medical history notable for COPD and hypothyroidism presented for evaluation of one month of new diplopia and soft palate and tongue pain with eating. She was not on corticosteroids or other immunosuppressive therapy. There was no headache or tenderness over the temporal artery. ESR was 16 (normal &lt;31 mm/hour). MRI/MRA of the head and neck was normal for age. Neurology was consulted and found weakness of the right superior rectus and lateral rectus muscles. Given these findings, a CT of the orbits was obtained and revealed only inflammatory changes in the bilateral ethmoid sinuses. She discharged to home with recommended outpatient ophthalmology follow-up. Three days after discharge she presented to the emergency department with gradual vision loss since time of discharge. She was started on prednisone. Ophthalmologic evaluation revealed ischemic optic neuropathy. Soon bilateral temporal artery biopsies were obtained and found to be consistent with giant-cell arteritis. Unfortunately, vision never returned to her right eye. Her clinical course was quite complicated, including hospitalizations for marked hypovolemia secondary to severe thrush, hemolytic anemia attributed to dapsone used for PCP prophylaxis, and for pneumonia secondary to Nocardi and Aspergillus complicated with brain abscesses. However, she recovered and, after rehabilitation she lives independently in her own home. This case demonstrates that giant-cell arteritis (and its unfortunate complications) can be present with a normal ESR. In a recent study of 177 patients with biopsy-confirmed giant-cell arteritis, sensitivity of elevated ESR obtained prior to biopsy was 84%. If the clinical scenario is a strong fit, a normal ESR should not, on its own, preclude the use of steroids or of further evaluation for the possibility of giant-cell arteritis. (1) Weyand, C. M. and Goronzy, J. J. Giant-Cell Arteritis and Polymyalgia Rheumatica. The New England Journal of Medicine. 2012; 371: 50-57. (2) Kermani, T. A. et. al. Utility of Erythrocyte Sedimentation Rate and C-reactive Protein for the diagnosis of Giant Cell Arteritis. Semin Arthritis Rheum. 2012; 41: 866-871.</td>
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<th>Ashley Egan, MD</th>
<th>A Recurrent Broken Heart</th>
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<td>Bradley Anderson, MD; Arya Mohabbat, MD</td>
<td>Stress-induced cardiomyopathy, also referred to as Broken Heart Syndrome, is a relatively rare condition affecting approximately 1-2% of patients presenting with acute coronary syndrome. It is almost exclusively seen in postmenopausal women with documented low recurrence rates. A 91-year-old Cambodian woman with a medical history significant for cholangitis with subsequent ampulla of Vater</td>
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sphincterotomy and cholecystectomy presented to the emergency
department with generalized weakness, abdominal pain, and fever. A
preliminary diagnosis of cholangitis was made and she was initiated on
antibiotics. An endoscopic retrograde cholangiopancreatography
(ERCP) revealed choledocholithiasis and focal non-obstructing stenosis
of the right main hepatic duct. She underwent successful stone
removal and dilation of the stenosis without procedural complication.
Over the following day, her abdominal pain and hyperbilirubinemia
persisted. Physical examination revealed a new cardiac murmur;
transthoracic echocardiogram demonstrated an ejection fraction of
74% without appreciable regional wall abnormalities. Continuing
symptoms prompted repeat ERCP with stenting of the right hepatic
duct stenosis. Initially, the patient demonstrated clinical improvement
but the following day she developed chest pain and shortness of
breath. An electrocardiogram showed ST changes and serum troponin
was mildly elevated raising concern for possible ischemia. Repeat
transthoracic echocardiogram, just two days after the first
echocardiogram, demonstrated left ventricular enlargement with an
ejection fraction of 36% and new regional wall motion abnormalities.
The patient was transferred to the intensive care unit for further care.
Severe coronary artery atherosclerosis was noted on angiography, but
coronary perfusion was judged to be TIMI grade III indicating full
perfusion; this led to the diagnosis of stress-induced cardiomyopathy.
Interestingly, upon further chart review, the patient developed stress-
induced cardiomyopathy approximately six years prior following
previous ERCP. At that time, her left ventricular ejection fraction
decreased to 35% but subsequently improved to 65% within one
month. Unfortunately, during her current hospital stay, the patient
died secondary to cardiogenic and septic shock. This case highlights the
importance of further evaluation of suspected acute coronary
syndrome to delineate between myocardial infarction and other
possible diagnoses. Up to 10% of patients with a history of stress-
induced cardiomyopathy can experience a recurrence, though this
generally occurs within the ensuing four years. Furthermore, the
identification of Broken Heart Syndrome is crucial as the treatment can
typically differ from standard care for myocardial ischemia since the
condition is thought to be a result of catecholamine excess. Ultimately,
treatment of the underlying cause is key to managing this transient
disorder.

Derek Eklund, MD

Symptomatic Jaundice in a Young Adult with Infectious
Mononucleosis
Determining the etiology for a patient with new onset jaundice usually
requires an extensive evaluation. Here a 21 year old male presents with
acute cholestatic hepatitis as an atypical feature of Epstein-Barr virus
(EBV) infectious mononucleosis. This case illustrates how valuable, yet
inexpensive, a thorough history and exam can be in reaching a
diagnosis early and cost-effectively. Case Description: A 21 year old
male presented with one week of nausea, malaise, arthralgias, and
fever. He also noted yellowing skin and dark brown urine. Importantly,
one month prior he was at a cabin in Wisconsin and he had a new
sexual partner. He was noted to have scleral icterus, jaundice, cervical
adenopathy, and diffuse abdominal tenderness. Initial lab work showed a WBC of 20k, with no differential. A peripheral smear showed an absolute lymphocytosis with numerous reactive and atypical lymphocytes. Liver enzymes were all elevated on admission and peaked with ALP 696, ALT 250, AST 184, total bilirubin 7.8(mg/dL) and direct bilirubin 6.3. Abdominal ultrasound showed decreased liver echogenicity consistent with acute hepatitis and splenomegaly. Extensive evaluation to determine the etiology of his mixed hepatocellular and cholestatic liver injury was undertaken and he had negative infectious studies for hepatitis A/B/C, HSV I&II, HIV, CMV, Lyme, Ehrlichia, Anaplasma, and TB. Serologic studies for autoimmune hepatitis, celiac disease, PBC, PSC, and alpha 1 antitrypsin deficiency were all negative. Wilson’s disease and hemochromatosis were ruled out. The diagnosis was found when EBV IgG, IgM, and PCR resulted positive. A monospot confirmed the diagnosis. The patient symptomatically improved after 4 days and discharged home with mild improvement in liver enzymes. Discussion: EBV is known to frequently cause a small elevation in liver transaminases, however a significant elevation in ALP and bilirubin causing clinical jaundice is much more rare. Recent case reports and a retrospective review would suggest jaundice secondary to EBV as seen here may be more common than previously thought. Generally the liver injury is self limited without significant morbidity and mortality. However, given the rarity previously attributed to EBV cholestatic hepatitis, an extensive search for alternative etiologies and a prolonged hospitalization may occur. Given this patient’s symptoms of fevers, malaise, and recent new sexual partner could this case have been solved with just a CBC with differential, peripheral smear, abdominal ultrasound, and monospot test? Of course in this patient with a new sexual partner one month prior, acute HIV infection would need to be ruled out. Careful review of the patient’s history may lead to a more rapid and cost-effective diagnosis of a historically rare presentation of EBV cholestatic hepatitis.

Your 10:30 Appointment: A Case of Cardiac Tamponade in Clinic

Cardiac tamponade is defined as a pericardial effusion that is large enough to compromise cardiac output. It is a highly mortal condition that is fairly commonplace in the intensive care unit. While treatment is fairly straightforward when it is detected, it is not often thought of as a cause of dyspnea in the outpatient setting. A 51 year-old female presented to clinic with a chief complaint of shortness of breath progressive over a month. Her past medical history included hypertension, chronic shoulder pain, and cholecystectomy 2 months prior to presentation. One month prior to presentation, she had been experiencing worsening shortness of breath, occasional palpitations, in addition to a nonproductive cough. She had a 10 lb weight loss since her surgery. Remainder of review of systems was negative. On physical examination, her pulse was regular and tachycardic (120 bpm), no murmurs, rubs, or gallops were appreciated, although the heart sounds were distant. Jugular venous distension was not appreciated. She was tachypneic, but the lungs were clear to auscultation bilaterally. The abdomen was nondistended, and her surgical incisions had healed. An electrocardiogram was ordered. Point-of-care ultrasound was
performed in clinic. Examination of the lungs revealed some scattered B-lines, indicative of interstitial edema. No pleural effusions were present. Examination of the heart revealed a large, pericardial effusion. There was collapse of the right ventricle in diastole. The left ventricle was hyperdynamic. Assessment of the IVC showed a 2.5 cm vessel without respiratory collapse. The combination of findings was suggestive of cardiac tamponade, and the pt was urgently admitted to the inpatient service. Once admitted, a formal paradoxical pulse of 30 mmHg was recorded. Cardiology was consulted, and a formal transthoracic echocardiogram confirmed the findings in clinic. A pericardiocentesis was performed with removal of 770 cc of hemorrhagic fluid. The patient noted swift relief of her shortness of breath. A pigtail catheter was placed after the procedure and remained through hospital day #2. She recovered without complication. Extensive work-up for etiology of the effusion was unrevealing. This case highlights multiple interesting topics, chiefly cardiac tamponade and the utility of point-of-care ultrasound. Cardiac tamponade rarely presents in an ambulatory setting, and it is easy to see how the diagnosis could be missed without the use of bedside ultrasound. As access to bedside ultrasound in both the inpatient and outpatient setting becomes more common, conditions like cardiac tamponade will be diagnosed more quickly and accurately. It is not often that cardiac tamponade walks through the clinic door, but bedside ultrasound makes it less likely to walk out undiagnosed.

Jarrett Failing, MD
Bradley Anderson, M.D.
and Thomas Poterucha, M.D.

Walk-in, wheel-out: a case of delayed diagnosis
An 87-year-old man with history of Parkinson’s disease, mesenteric lymphadenopathy of unclear etiology, and atraumatic L2 compression fracture 9 months prior to presentation was admitted to the general medicine service following a nine month history of progressive fatigue/weakness and 12 kg weight-loss. He reported prior to the onset of symptoms, he had been physically active and frequently golfed without difficulty. On presentation to the hospital, he now required a walker to ambulate even short distances. Aside from the general weakness and weight loss, he also endorsed a several month history of anterior abdominal pain located inferior to the bilateral costal margins which patient attributed to a prior muscle strain. On physical exam, the patient’s proximal leg strength was 4/5 bilaterally without additional neurologic deficit and his abdominal pain was reproduced with sitting up in bed, otherwise his exam was unremarkable. Labs showed AKI (Cr 1.9), anemia (Hgb 10.5), and thrombocytopenia (Plt 134). Given concern for an underlying malignancy, subsequent flow cytometry, SPEP, bone marrow biopsy, and PET scan were performed and showed two primary malignancies: low grade B cell lymphoma and multiple myeloma with widespread adenopathy, but no evidence of other metastases. Both the patient’s fatigue and weakness were attributed to these findings. Similarly, the abdominal pain was thought to be due to the retroperitoneal adenopathy shown on PET imaging. Over the ensuing hospital course, the patient’s abdominal pain progressively increased. On hospital day 8, he developed increasing lower extremity weakness and was unable to lift his legs even against gravity. A MRI spine demonstrated an epidural tumor at T7-T9 with cord compression, likely
the source of the patient’s worsening abdominal pain and leg weakness. He subsequently received high dose steroids and 5 radiation treatments but ultimately developed T7 paraplegia. He was discharged to a SNF on comfort cares. This case illustrates several points such as the cognitive error of premature closure, as well as the rapid and devastating nature of spinal cord compression in cancer patients. 15% of multiple myeloma and 14% of lymphoma patients will develop cord compression. Epidural cord compression can be the initial presenting manifestation in both of the patient’s underlying cancers. The delay to diagnosis seen in this case is unfortunately not uncommon, with an average delay from symptom onset to treatment of 14 days - with only 1/3rd of patients still able to ambulate by start of treatment. Once paraplegia occurs, only 5% will regain the ability to walk.

Steven Feng, MD

Pseudo-Meigs or Ovarian Hyperstimulation Syndrome? Ascites, Hydrothorax, and Cervical Mass in a 34 year old Female

Ovarian hyperstimulation syndrome (OHS) and Pseudo-Meigs are rare conditions with presentations ranging from mild abdominal bloating to severe symptoms such as ascites and hydrothorax. This case provides an unusual diagnostic dilemma highlighting the overlapping pathophysiology of these two conditions. Case Description A 34 y/o female presented to the ED complaining primarily of back pain and abdominal distension for 5 months. A chest x-ray showed a near complete opacification of right lung, and a follow up CT abd/pelvis showed a large amount of ascites and a 5.5cm cervical mass. Interestingly, the patient did not have any respiratory or hemodynamic compromise, suggesting that her hydrothorax was chronic in duration. A diagnostic thoracentesis revealed hemorrhagic pleural fluid negative for malignant cells or infectious etiology. The patient’s past medical history was significant for infertility and myomatous uterus, which was chronic for over 5 years. She was treated with clomiphene citrate for infertility for seven months, stopping treatment about two months prior to presenting to the ED. The patient is now three months post-hospitalization, first undergoing a therapeutic thoracentesis and more recently a paracentesis which showed hemorrhagic fluid but negative cytology. Despite discontinuing clomiphene citrate two months prior to hospitalization, she is having recurrent ascites. No malignancy has been identified. She is currently presumed to have a resolving OHS or a Pseudo-Meigs syndrome, perhaps due to her fibroids, and is currently scheduled to undergo a fibroidectomy. Discussion Ovarian hyperstimulation syndrome (OHS) and Pseudo-Meigs are rare conditions where either overstimulation of ovaries or an occult gynecological tumor creates a unique clinical syndrome that ranges from mild abdominal bloating to severe symptoms such as ascites and hydrothorax. Severe OHS has been noted to occur in less than 1% of treatment cycles involving hCG and more rarely, clomiphene citrate. Pseudo-Meigs has been described primarily in case studies as a variant to Meigs Syndrome. Interestingly, the pathophysiology behind the presentation of ascites and hydrothorax in these two conditions are similar: the clinical syndrome appears to be triggered by increased capillary permeability secondary to the release of vasoactive factors such as VEGF. Evaluation of the ascitic and pleuritic fluid, therefore, is
usually nondiagnostic (unless cancer is the etiology). In fact, the clinical syndrome of ascites and hydrothorax in a young healthy woman has been noted in a number of gynecological abnormalities ranging from ovarian tumors, fibroids, cervical tumors, OHS, and various cancers. Diagnosis of these conditions relies on the positive identification of an abnormal growth (most likely a gynecologic tumor or OHS) and resolution following treatment.

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<th>Justin Fiala, MD</th>
<th>Pashtoon Kasi, MBBS, J. Fernando Quevedo, MD</th>
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<td><em>“His Sugars Keep Dropping, Doc:” An Atypical Case of Recurrent Hypoglycemia</em></td>
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| A 64 year old male with history of hypertension and hyperlipidemia, without past malignancy or endocrinopathy, presents for evaluation of loss of consciousness while driving. Case: On presentation, the patient endorsed confusion, tremulousness and diaphoresis, without chest pain, palpitations, dyspnea, or abdominal pain. Review of systems was remarkable for blurred vision and night sweats, which had been occurring with increasing frequency for two weeks. Notably, his symptoms improved with meals. He denied new medications or changes to his current regimen. Family history was remarkable for insulin-dependent diabetes in his mother. On exam, the patient appeared diaphoretic, but was afebrile with normal heart rate and blood pressure. Initial confusion improved upon administration of D50 and no focal deficits were present on neurologic exam. Careful skin examination revealed no evidence of hypodermic injections, and heart, lung, and abdominal exams were unremarkable. Initial investigation was remarkable for a point-of-care glucose of 33 mg/dL, which improved to 55 mg/dL following oral glucose administration. Hemoglobin A1c was 4.4%, with elevated serum insulin at 62.0 μIU/mL (normal 2.6-24.9 μIU/mL) and C-peptide at 11.9 ng/mL (normal 1.1-4.4 ng/mL). Serum sulfonylurea screen and insulin antibodies were negative. The patient required continuous dextrose infusion due to persistently low glucose, with severe hypoglycemia and loss of consciousness after inadvertent discontinuation of the infusion during a scan. CT abdomen was negative for pancreatic mass, but showed multiple lesions throughout the liver. FNA biopsy of one of the lesions showed a grade 3/3, well-differentiated neuroendocrine tumor with positive immunohistochemical staining for insulin, confirming the diagnosis of malignant insulinoma. Somatostatin therapy was started and serial hepatic artery embolizations were performed to decrease tumor burden. The patient showed no clinical improvement on everolimus, but has done well since switching to capecitabine/temozolomide combination therapy, with resolution of hypoglycemic episodes and improvement on interval PET imaging. Discussion: Insulinomas are rare, and more common etiologies for hypoglycemia should be explored before pursuing active workup. Inappropriate exogenous insulin or sulfonylurea use is by far the most common reason for recurrent hypoglycemia, and is suggested by disproportionately low/normal C-protein levels or positive sulfonylurea screen. Of confirmed insulinomas, 80-90% are due to a single pancreatic mass, making this patient’s case of metastases with unknown primary an atypical presentation. Treatment with a somatostatin analog is effective in focal and metastatic disease, while...
surgical resection is preferred for solitary masses. In this patient’s case, depot octreotide and hepatic artery embolization were pursued due to metastasis to the liver. Everolimus therapy was added initially, but yielded minimal results, and was switched to capecitabine and temozolomide, on which the patient has had a dramatic response and a near resolution of his hypoglycemic episodes.

**Abby Gardner, MD**

**Primary Amenorrhoea and Complications of a Late Diagnosis of Turner Syndrome**

Abby Gardner, MD PGY-2 HCMC

Introduction: Primary amenorrhoea and secondary amenorrhoea have a similar initial workup. After ruling out a current pregnancy, a gynecologic exam or a pelvic ultrasound should be performed. An ultrasound can specifically address whether or not the uterus and ovaries are present, and rule out an anatomical defect of the outflow tract. Hormone testing can also be done including prolactin, TSH, FSH, and LH. Finally, karyotype testing and or an MRI may be considered depending on the results of the initial testing. This case illustrates a diagnosis of Turner’s syndrome through a workup for primary amenorrhoea, and the complications that result from late recognition and treatment of the disorder.

Case Description: A 28 yo F presented with primary amenorrhoea. The patient gave a history of never having had her menses, never having developed breast buds, having short stature compared to her other family members, and also complained of hearing problems. Her workup included a negative pregnancy test and an ultrasound that did not identify ovaries or a uterus. Further imaging with MRI revealed a very small unicornurate uterus approximately 1.2 x 4 x 0.9 cm, with no ovaries. Hormonal studies showed a TSH of 1.2, TPO ab > 1000, LH of 19.6, and FSH of 63.4 (post menopausal range). Cytogenetic testing revealed a karyotype of 45, X. Once the diagnosis of Turner syndrome was established a baseline echo, renal ultrasound, audiology, and DEXA scan were performed. A TTE showed normal cardiac function with no evidence of aneurysm. Renal ultrasound showed normal kidneys. DEXA scan revealed a Z score of -4.1 at the lumbar spine indicating osteoporosis, and -3.2 at the R total femur and -2.7 at the R femoral neck indicating osteopenia. Audiology exam showed moderate to severe mixed hearing loss on the L ear and moderate to profound hearing loss on the R ear.

Discussion: While diagnosis of Turner Syndrome is rare in the Adult clinic setting, it should be included in the differential diagnosis of amenorrhoea, and all patients who lack a uterus on imaging should undergo karyotype testing so appropriate medical evaluation is not further delayed. The importance of early intervention in Turner Syndrome is shown here. Short stature, lack of secondary sex characteristics, and significant bone disease resulted from delayed recognition and treatment. All women with Turners Syndrome who present to the adult clinic should undergo a comprehensive medical evaluation for not only problems specifically associated with TS, but also screening for osteoporosis, HTN, dyslipidemia, thyroid disease and diabetes.

**Rachel Gordon, MD**

**A rare cause of central diabetes insipidus**

Central Diabetes Insipidus (DI) has long been known to be a cause of hypernatremia in patients. It occurs when the body produces a lower
amount of antidiuretic hormone (ADH), which is produced in the hypothalamus and then stored and released from the pituitary gland. This reduced level of ADH is most often caused by damage to the hypothalamus or pituitary gland due to surgery, infection, inflammation, tumor, or injury to the brain. A 41 year old morbidly obese male was admitted to the hospital with hypercapnic respiratory failure due to obesity hypoventilation syndrome requiring BiPAP support. He quickly developed an acute kidney injury and complicating hypernatremia. This was first thought to be due to a pre-renal mechanism and the patient was hydrated resulted in improvement of kidney function, however sodium levels remained elevated. His serum sodium was 153 with a urine osmolality of 85 suggesting diabetes insipidus, and so he was given 4mcg of DDAVP intravenously with only a modest rise in urine osmolality to 153. At this time, it was unsure if this represented renal response, disputing a nephrogenic DI diagnosis, and so a serum ADH was sent and returned very low at <0.5 indicating central DI. At that time he was started on DDAVP nasal solution with eventual improvement in serum. His poor initial response to DDAVP was thought to be due to a partial nephrogenic DI secondary to his kidney injury. A full pituitary work-up was sent revealing an elevated prolactin at 30, normal TSH, low T4, testosterone, lutropin, HGH, FSH, Cortisol, and IGF-1 representing partial pituitary insufficiency most notably with central DI, growth hormone deficiency, and gonadotropin deficiency. He underwent a non-contrast CT scan of the head to evaluate his central DI which revealed significant lateral and 3rd ventricle hydrocephalus with aqueductal stenosis. Neurosurgery was consulted and with a stable neurologic exam and ophthalmology exam revealing no papilledema this was thought to be a chronic process with no need for acute intervention. Unfortunately, this 41 year old male’s morbid obesity did not allow for him to undergo an MRI to further examine this as he was over the weight limit for all the MRI scanners in the area. He refused any neurosurgical intervention for the hydrocephalus. At the time of discharge his sodium was stable in the 140’s off of any IV hydration with DDAVP administration and he was set up with neurosurgery and endocrinology follow-up. This case demonstrates the need for continued work-up for other causes common conditions such as hypernatremia when the laboratory testing, history, and physical does not reveal an etiology clearly. It is important to continue to investigate for causes of this pathology of basic testing does not clearly delineate the pathology.

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<th>Misoor Goueli, MD</th>
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<td><strong>Clinical Vignette</strong></td>
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A 50-year-old African American male with a past medical history of paranoid schizophrenia, resistant hypertension, type 2 diabetes mellitus, and a recent stroke presented to primary care clinic to establish care with his new provider and for follow up of his recent hospitalization for hypertensive emergency. At this time the patient was being treated with five anti-hypertensive medications, near or at maximal dosage. Furthermore the patient was requiring over 120 mEq of potassium in order to maintain normal potassium levels. Upon chart review, the patient was found to have long standing resistant hypertension and profound hypokalemia. Chart review also revealed
that hyperaldosteronism was previously suspected and the patient had aldosterone-renin ratios obtained that were highly suggestive of this diagnose checked over 5 years prior to this visit. These results were never mentioned in previous provider’s notes. Accordingly, the new provider undertook an expedited workup for hyperaldosteronism which revealed bilateral adrenal hypertrophy likely responsible for patients presentation. The patient was started on a low dose aldosterone antagonist and responded quite favorably. Today the patient is no longer on potassium replacement and his blood pressure with well controlled with only two antihypertensive medications. This case represents the importance of ownership of patient care and the difficulties faced when care is transitioned between providers, especially in patients with mental illness. This patient suffered significant morbidity during the prior 5 years, including several hospitalizations related to both his schizophrenia and his hypertension. It can be incredibly taxing to address the medical needs of certain populations, such as the psychotic, mentally challenged, and demented. It is critical to keep in mind that these are the populations who often are incapable of looking after their own medical needs. For this reason we must give a voice to these voiceless individuals.

Benjamin Griffin, MD
William Ward

*Early Satiety from an Unusual Cause*

Early Satiety from an Unusual Cause

Benjamin R. Griffin1, William Ward1 1Department of Internal Medicine, Mayo Clinic

Autosomal Dominant Polycystic Kidney Disease (ADPKD) is a relatively common disorder causing extensive cysts and enlarged kidneys that is often benign and clinically silent, though multiple associated complications including cerebral aneurysms and hepatic cysts are known to occur. A 33 year old with a past medical history of ADPKD presents for a post-ED evaluation following a motor vehicle accident in which she sustained mild injuries. Incidentally, she notes several months of early satiety with a sensation of shifting abdominal contents shortly after eating. She denies weight loss. A CT scan of the abdomen reveals markedly enlarged liver and kidneys that have been replaced by multiple cysts, consistent with advanced changes of autosomal dominant polycystic disease. The stomach is noted to be compressed between the liver and the left kidney (see image), resulting in the patient’s sensation of shifting abdominal contents as the stomach is forced upwards in the abdomen when filled. The patient is initially offered conservative management consisting of smaller, more frequent meals, which is currently effective in managing her symptoms. Cyst decompression and partial hepatic resection may be considered if her symptoms continue to progress. This case illustrates a complication of ADPKD in which the mass effect of the cystic organs causes compression related gastric symptoms. The most commonly seen extra-renal manifestations of ADPKD are cerebral aneurysms, hepatic and pancreatic cysts sometimes resulting in impaired function, and cardiac valvular abnormalities.

Elizabeth Gulleen, MD

*An Unusual Case of Bilateral Sensorineural Hearing Loss*

Sensorineural hearing loss is considered a medical emergency requiring prompt evaluation and treatment. While the etiology of such hearing loss is often not elucidated, cryptococcal meningitis has been known to present with vestibulocochlear defects. Here, we discuss a case of an
HIV-negative woman who presented with bilateral sensorineural hearing loss caused by cryptococcal meningitis. Case Description: A 55-year-old woman with a history of type 2 diabetes was admitted to the hospital with a 5-week history of worsening vertigo and bilateral sensorineural hearing loss. The patient had previously been seen in clinic for headaches and vertigo, diagnosed with benign paroxysmal positional vertigo, and managed conservatively with physical therapy and meclizine. On the day of admission, the patient again presented to clinic, this time noting profound bilateral hearing loss, increasing confusion, and severe gait instability. Emergent audiologic evaluation demonstrated moderate to profound bilateral sensorineural hearing loss, so she was admitted to the hospital for expedited work-up. Upon admission, the patient was afebrile and appeared mildly confused. Neurologic exam was remarkable only for bilateral hearing loss and positive Romberg sign. Laboratory evaluation included normal inflammatory markers and negative aspirin level. Subsequent MRI of the head showed abnormal enhancement of the leptomeninges including bilateral enhancement of the internal auditory canals and eighth cranial nerves. Lumbar puncture was performed, and cerebrospinal fluid (CSF) showed white blood cell count of 107 (87% lymphocytes), protein of 404, and glucose<20. CSF cytology as well as PCR for HSV and VZV were negative. Serologic studies for Lyme antibody, syphilis, HIV, and ANA were also negative. Ultimately, CSF cultures grew Cryptococcus neoformans. Consequently, she was started on Flucytosine and Amphotericin B with improvement in her hearing, balance, and mental status. Discussion: Cryptococcus is a common cause of meningitis in HIV-positive patients, but is an unusual pathogen in those who are HIV-negative. Review of the literature reveals that any immunocompromised state (i.e. diabetes, malignancy, prolonged steroid use) increases the risk of developing cryptococcal meningitis. Furthermore, up to 30% of HIV-negative patients have no known risk factors. While neurologic symptoms such as headache, confusion, and meningismus are common, hearing loss is relatively unusual. Our case demonstrates the importance of considering cryptococcus in the evaluation of unexplained meningitis.

Gil Harmon, MD  
Mansfield, Aaron MD

Peripheral eosinophilia as a novel paraneoplastic process and potential tumor marker in metastatic inflammatory myofibroblastic tumor.

Inflammatory myofibroblastic tumor (IMT) is a rare form of sarcoma that can arise in nearly any part of the body. It is a spindle cell neoplasm that typically does not metastasize, though frequently recurs locally. Herein, we describe the case of metastatic IMT with the paraneoplastic phenomenon of peripheral eosinophilia. Case description: A 32-year-old gentlemen presented for second opinion of therapeutic options for treatment-refractory metastatic IMT. His course began two years prior to our consultation, when he noted chest pain and shortness of breath. Imaging revealed what was felt to be a left lower lobe pneumonia and left-sided pleural effusion. He was treated with antibiotics without improvement. Subsequent imaging revealed interval growth of the left lower lobe lesion and a biopsy was performed which demonstrated lung parenchyma with an eosinophilic
infiltrate. Peripheral eosinophilia was also noted at that time. He was treated with steroids for eosinophilic pneumonia and was then lost to followup. He re-presented one year following his initial presentation with worsening left-sided chest pain and an enlarged right thigh. Imaging revealed growth of the lesion within the left lung as well as a mass within the right thigh. Biopsy of the thigh mass revealed IMT. Testing for expression of anaplastic lymphoma kinase (ALK) by immunohistochemistry was strongly positive. He was treated with an ALK inhibitor (crizotinib) with an initial response for almost 12 month’s duration, followed by progression of disease before our first contact with him. At the time of our assessment, he had an Eastern Cooperative Oncology Group performance status of 3. He presented in a wheelchair, secondary to dyspnea and right thigh pain. His left-sided breath sounds were difficult to auscultate. Positron emission tomography/computed tomography (PET/CT) imaging demonstrated a hypermetabolic mass replacing nearly the entire left hemithorax, and fluorodeoxyglucose-avid lesions of the right gluteal region and right thigh, as well as generalized bone marrow activity. Leukocytosis was noted at 25.0x10^9/L (normal range 3.5-10.5x10^9/L) with peripheral eosinophilia of 3.66x10^9/L (normal range 0.05-0.50x10^9/L) Therapy was initiated with a more potent ALK inhibitor (ceritinib) with almost immediate, significant symptomatic improvement and tumor response noted on PET imaging after 8 weeks of therapy. Specifically, he had dramatic shrinkage of the lung, gluteal, and thigh masses. His generalized bone marrow activity resolved. His leukocytosis improved to 12.5x10^9/L and peripheral eosinophilia decreased to 0.75x10^9/L.

Discussion: This case is not only remarkable for the near complete remission obtained with ceritinib after failure of crizotinib, but also for the peripheral eosinophilia and the increased bone marrow metabolic activity that eventually normalized with successful treatment. This observation suggests that peripheral eosinophilia may represent a novel paraneoplastic syndrome associated with metastatic inflammatory myofibroblastic tumors and may be used as a biomarker for response.

Obsa Hassan, MD
Dr. Anya Jamrozy

A rare cause of neurologic disorder associated with elevated anti-thyroid antibodies
Hashimoto’s encephalopathy is a rare and controversial syndrome associated with Hashimoto’s thyroiditis. It is believed to be an immune-mediated disorder that is associated with elevated antithyroid antibody titers. It is most often characterized by acute or subacute mental status changes, seizures, and myoclonus. An 84-year-old Caucasian male with hypertension, diabetes, hypothyroidism, and depression presented to the hospital after being found wandering in his neighbor’s house dressed only in his socks. His family reported recent intermittent confusion and left sided weakness. He was noted to be aphasic, restless, and hypertensive on presentation. Brain MRI/MR angiogram was negative for acute stroke. Initial video EEG monitoring revealed nonspecific temporal abnormality, raising the possibility of focal seizure disorder. Levetiracetam and empiric acyclovir were initiated. Initial CSF results were unrevealing with normal glucose, normal protein and absence of leukocytes. Lab tests revealed no clue to etiology including
unremarkable urine toxicology screen, ammonia, EtOH level, UA, metabolic panel, CBC, lactate, troponin, and paraneoplastic panel. TSH was slightly elevated but free T4 was normal. The patient’s mental status waxed and waned throughout the hospitalization. Repeat MRI and repeat EEG tests were unrevealing. Later, very high CSF thyroperoxidase antibody level at 323.9 (normal < 34) returned and a diagnosis of Hashimoto’s encephalitis was proposed. The patient received high IV dose steroids for several days in the hospital with gradual improvement in his mentation and he was sent home on prednisone 50 mg daily with a taper over several weeks. Subsequently, the patient’s encephalopathy recurred but his symptoms improved when the steroid dose was increased. After several relapses associated with attempted steroid taper, the patient is currently being maintained on mycophenolate. In summary, Hashimoto’s encephalopathy is an uncommon neurologic syndrome associated with elevated anti-thyroid antibodies levels and should be considered in the differential of unexplained mental status changes. The presence of serum antithyroid antibody titers and exclusion of other causes of neurologic symptoms support the diagnosis. Corticosteroid treatment results in improvement in the majority of cases, leading some authors to suggest that steroid response be used as a criterion for diagnosis. Long-term immunosuppressive treatment should be considered in cases of relapsing symptoms.

Blake Heinz, MD

Calcific uremic arteriolopathy and warfarin use.
Calcific uremic arteriolopathy is a poorly understood, uncommon condition characterized by calcification of small and medium sized blood vessels leading to ischemia, necrosis, cutaneous ulcers and eschar formation. The condition is typically seen in patients who are on hemodialysis with alterations related to hyperparathyroidism, active vitamin D administration and hyperphosphatemia. The condition can also be precipitated by those treated with warfarin. The drug is commonly prescribed due to development of DVT’s related to intimal changes inherently found in the disease process. Case discussion: A 44 y/o male with a history of recent necrotizing fasciitis with below the knee amputation. The patient was re-admitted due to necrosis and dry gangrene of several digits, soft tissues of his leg and glans penis. On readmission he was found to have a complicated urinary tract infection due to chronic indwelling Foley catheter. Relevant aspects of the patient’s history included type II diabetes, bilateral provoked DVT’s, chronic diastolic heart failure and pulmonary hypertension, essential hypertension and chronic kidney disease as well as a history of Hodgkin’s lymphoma. Current medications included Coumadin, Neurontin, proscar, atorvastatin and ciprofloxacin. He had several painful ulcerations of his legs which were covered in eschar located at his hands and groin. He developed acute on chronic kidney injury and a metabolic acidosis requiring initiation of hemodialysis. Lab workup revealed a BUN in the 40’s and a creatinine of 2.58 with an unknown baseline. He had elevated alkaline phosphate of >3,000 and an elevated GGT. Previous workup for liver autoimmune disease, Wilson’s disease and hemochromatosis was negative. A liver biopsy showed congestive hepatopathy with bile duct proliferation. ANA and complement were
normal with a mildly positive anti-cardiolipin Ab/beta-2 glycoprotein and lupus anti-coagulant. He had negative studies for hepatitis B, C and a normal ANCA. Cryoglobulin was negative. A calcium phosphate product was 33. A PTH was 68. A tissue biopsy collected proximal to eschar formed on the right medial thigh which showed subcutaneous small sized vessels with calcifications suggestive of calciphylaxis. There was no evidence of vasculitis or embolic disease and no evidence of cholesterol microemboli. Warfarin was discontinued and he started sodium thiosulfate. Discussion: The patient developed a rare complication which is uncommonly seen in those who are not already on hemodialysis for a lengthy period of time. The patient’s kidney and parathyroid function were abnormal and he was also on warfarin, a possible potentiating agent. The patient also had liver disease of unclear etiology. This case raised unique issues that challenged routine cares as any skin disruption carried a high risk of ulcer formation. Calciphylaxis can be a terminal disease process whereby patients typically pass away from infections and sepsis.

Moira Hilscher, MD
Jasmine R. Marcelin, M.D., Mark J. Enzler, M.D.

**Man’s not so best friend: Erysipelothrix rhusiopathiae infection following animal exposure**

A 91 year old man was brought to the Emergency Department with a fever to 103°F. He had a history of severe aortic stenosis for which he had undergone bovine TAVR with known peri-prosthetic regurgitation and left total knee arthroplasty. He had been hospitalized one month prior to this admission with severe right knee pain and swelling. Right knee synovial fluid analysis during that hospitalization revealed positively birefringent crystals consistent with pseudogout and a negative Gram’s stain. Intra-articular steroids were administered, and he was discharged without recurrence of knee pain. He worked as a farmer and described contact with pigs and cattle and a recent dog bite. He went on a fishing trip three months earlier but denied handling any fish. He endorsed a recent episode of chills but otherwise felt well. Physical examination revealed a grade 2/6 systolic ejection murmur consistent with aortic stenosis and a grade 2/6 murmur of aortic regurgitation that were unchanged from prior examinations. His joints were diffusely non-tender with normal range of motion and no evidence of joint effusions. Laboratory evaluation revealed a mild leukocytosis. Blood cultures later grew Erysipelothrix rhusiopathiae in two out of two sets. He subsequently underwent a transesophageal echocardiography which revealed known moderate periprosthetic aortic valve regurgitation without evidence of cardiac vegetations. Treatment was initiated with a continuous infusion of penicillin G.

On further review of his history and medical record, it was noted that the right knee synovial fluid cultures obtained one month earlier grew two colonies of E. rhusiopathiae following his discharge. This had not been treated and the right knee pain had resolved without antibacterial therapy. E. rhusiopathiae is a ubiquitous, facultative, anaerobic Gram positive bacillus. This organism is a common animal pathogen that colonizes many species including pigs and fish. Erysipelothrix infection in humans is generally related to occupational animal exposures. Erysipleoid is the most common form of human disease and manifests as an acute painful cutaneous infection which
commonly involves the hands and fingers. The generalized cutaneous form of *E. rhusiopathiae* infection involves similar lesions that may spread to remote areas of the body. Fever and arthralgias are more common with this form of the disease. The most serious manifestation of *E. rhusiopathiae* infection is bloodstream infection, leading to infective endocarditis (IE). A majority of the reported cases of *E. rhusiopathiae* IE have involved native heart valves and have led to significant valvular destruction. The mortality rate of *E. rhusiopathiae* IE appears to be higher than that of other etiologies. Penicillin G is the treatment of choice for all forms of *E. rhusiopathiae* infections. This case highlights a serious form of a rare infection with unique risk factors and potentially devastating consequences.

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<th>Hans Huang, MD</th>
<th>Asymptomatic multiple myeloma presenting as a nodular hepatic lesion</th>
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<td>Fateh Bazerbachi, Hector Mesa, Pankaj Gupta</td>
<td>Multiple myeloma (MM) represents a malignant proliferation of plasma cells from a single clone, characterized by plasma cell infiltration of bone marrow and overproduction of immunoglobin or light chains. Initial presentation as an asymptomatic extramedullary lesion and more specifically as a nodular hepatic lesion is exceedingly rare. Case Presentation: An asymptomatic 64-year-old male was found to have an incidental right hepatic lobe nodule on abdominal ultrasound performed prior to bariatric surgery. The lesion was barely visible on contrast enhanced CT scan. A follow up US-guided biopsy revealed a mature B-cell neoplasm with plasmacytic differentiation. Core biopsy sections showed a nodular plasma cell infiltration that expressed cytoplasmic kappa light chains. Subsequently, positron emission tomography (PET) demonstrated the hypermetabolic hepatic mass more clearly and identified destructive bony lesions in the clavicle, manubrium, right third rib, pelvis and sacrum. Biopsy of clavicular lesion revealed sheets of plasma cells that carried the t(11;14) cytogenetic abnormality. Labs at this time were significant for progressive anemia (11.7 g/dL), hypercalcemia (10.3 mg/dL), preserved renal function (Cr 0.7 mg/dL), increased beta 2 microglobulin (3 mg/L), negative serum and urine electrophoresis, and normal quantitative immunoglobulins. Of note, serum free kappa light chains were increased (1,030 mg/L). The International Staging System (ISS) prognostic stage was I. Chemotherapy was started with cyclophosphamide, bortezomib and dexamethasone (CyBorD regimen), which induced a response as demonstrated by reduction in kappa light chains and improvement in bone and soft tissue lesions on PET. Discussion: This case illustrates a rare presentation of multiple myeloma as a nodular hepatic lesion. Nevertheless, extramedullary plasmacytoma should be included in the differential diagnosis of indistinct hepatic lesions visualized on CT scan, particularly when there is no clinical or radiological evidence of primary malignancies that frequently metastasize to the liver. Confirmation by liver biopsy is advisable. PET scanning is a highly sensitive modality for identifying plasmacytomas, and is especially helpful for identifying occult bony lesions in cases with uncommon presentations like this one.</td>
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<th>Dana Irrer, MD</th>
<th>Return of the left lobe. Late presentation of a congenital heart.</th>
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| 51 y M married salesman former smoker, HTN, DLD, hypothyroidism, | }
FHx early MI. No prior cardiac Hx. Witnessed Syncopal episodes at home. Lost consciousness while sitting up in chair, spontaneously resolved in seconds. Afib with RVR in ED a/w chest pain and palpitations. During evaluation, went into Vtach/vfib. Multiple shocks, intubated, amiodarone. Proceeded to have several more vfib/vtach arrests with defibrillation. EKG c/w anterior STEMI. Transferred to tertiary care facility cath lab on Lucas device. 3 more vfib/vtach arrests in ambulance (45 miles away). Blood pressure 66/26, heart rate 92 upon presentation to cath lab CAD: STEMI DES x 2 LAD (100% occlusion) + (unrepaired 80% tandem RCA lesions). LVAD placement, cooling protocol, metabolic encephalopathy, right sided weakness. Post arrest, noted by nursing staff to be hypoxic when positioned in lateral decubitus position. Resolved with repositioning. Echo initially remarkable for possible cotriatrium. CT angiogram found to have partial anomalous pulmonary venous return of left lung to explain positional findings. Additionally underwent successful ablation for afib Contrast nephropathy and cardiorenal failure (peak cr 2.06). 1 month hospital stay. EF returned to 22%. Cardiogenic shock, encephalopathy since resolved. Since discharged home with no complaints, NSR, 6 METS, returned to work, walks 4 miles 4x/wk. awaiting repair of congenital anomalous. Learning objectives: · Understanding of cardiac physiology as it relates to clinical exam findings · Effective use of cardiac diagnostic studies or imaging · Broad differential and late presentation of childhood diseases

Annie Jacobsen, MD

Crack Lung Presenting As Acute Hypoxic Respiratory Failure

Inhalation of (crack) cocaine causes a variety of pulmonary complications and can present a diagnostic challenge when there is no collateral history of illicit drug use. Case description: A 38-year-old female presented with acute onset tachypnea, hemoptysis, hypoxia and fever. She had a history of hypertension, GERD, and tobacco dependence, but was otherwise healthy. She denied illicit drug use. She did not remember a specific instance of acid regurgitation with aspiration. Her chest x-ray in the Emergency Department showed diffuse bilateral infiltrates, suggesting alveolar hemorrhage or Pneumocystis jiroveci infection. Given the acute onset, the initial concern was for a pulmonary embolism, though the patient did not have history of PE or deep vein thrombosis, did not use oral contraceptives, and had not recently undergone surgery or been immobilized. A cardiac ultrasound in the ED showed no evidence of right ventricular dilatation or strain. EKG showed sinus tachycardia and diffuse ST-segment depression. D-dimer and troponins were mildly elevated. Complete blood count showed leukocytosis with neutrophilia. The patient was given IV fluids and high flow oxygen and her oxygen saturation and respiratory rate improved. She was admitted in stable condition for continued monitoring and diagnostic workup. Her HIV test was negative, so Pneumocystis jiroveci pneumonia was ruled out. She was treated empirically for community acquired pneumonia with azithromycin and ceftriaxone. The following day, the patient continued to require supplementary oxygen via nasal cannula, but her fever and leukocytosis were resolved. The primary team ordered a follow up chest x-ray which showed vast improvement.
in the previously seen infiltrates. This rapid evolution on imaging was not consistent with the working diagnosis of community acquired pneumonia, so a chest CT was obtained to definitively rule out PE. This showed severe diffuse ground glass opacities, consistent with severe infection or ARDS. The patient was questioned again about illicit drug use, but she again denied any history. She did agree to a urine drug screen, which came back positive for cocaine metabolites. Discussion: This case illustrates the challenge of diagnosing crack cocaine-induced pulmonary syndrome in a patient who denies illicit drug use. This syndrome can masquerade as pulmonary embolism, asthma exacerbation, Pneumocystis jiroveci pneumonia, ARDS, or pneumothorax. The worldwide incidence of crack lung is rising and this diagnosis should be considered in the appropriate setting in any patient presenting with tachypnea, hypoxemia, fever, and diffuse bilateral pulmonary infiltrates.

Mohammad-Ali Jazayeri, MD
David Miranda, MD; Yader Sandoval, MD

Acute Left Ventricular Dysfunction in the Setting of Chest Pain: The Emerging Role of Immediate Bedside Ultrasound to Triage Patients with Chest Pain

Stress cardiomyopathy (SCM) is a clinical entity in which patients may often present with signs and symptoms mimicking acute myocardial infarction including chest pain, dyspnea, ST-segment elevation, myocardial necrosis and left ventricular dysfunction. Classically there is a history of a preceding acute physiologic or emotional stressor. This case illustrates the challenge in discerning acute coronary syndromes (ACS) from SCM, particularly in patients presenting with chest pain and new electrocardiographic (ECG) changes. Case presentation: A 49-year-old male presented to the emergency department with mid-sternal chest pain associated with dizziness. Physical examination revealed an emotionally labile patient with a blood pressure of 97/58 mmHg, heart rate of 70 beats per minute, respiratory rate of 9 breaths per minute and oxygen saturation of 100% on room air. No abnormalities were identified on cardiopulmonary examination. Initial ECG demonstrated new peaked T-waves in the anterior leads. His initial cardiac troponin I measurement was above the 99th percentile upper reference limit. Bedside cardiac ultrasound demonstrated a large apical wall motion abnormality with sparing of the left ventricular (LV) basal segments. In the setting of new-onset chest pain with ECG changes and the presence of a large wall motion abnormality, concern for ACS was raised, and he was consequently loaded with clopidogrel and administered an unfractionated heparin bolus. Subsequently he underwent urgent cardiac catheterization that demonstrated no obstructive coronary artery disease. Follow-up echocardiogram one week after the index presentation showed an improvement in LV function with some ongoing residual apical dyskinesis. Discussion: Clinicians are frequently faced with the challenge of distinguishing whether a patient presenting with chest pain has ACS or not. This distinction becomes even more challenging among patients with chest pain that have new ECG changes and/or wall motion abnormalities on echocardiography. SCM is a condition characterized by transient LV dysfunction in the absence of significant coronary artery disease that can be seen in approximately 2% of patients presenting with suspected
ACS. It is typically triggered by an acute medical illness or by intense emotional or physical stress, and patients who survive the acute episode typically recover normal LV function in one to four weeks. This case emphasizes the value of a detailed clinical history detecting an emotional trigger, as well as the usefulness of bedside ultrasonography in contemporary clinical practice, in addition to the ECG. Such an evaluation can be readily performed in a few minutes and can aid significantly in triaging patients presenting with chest pain.

Mithulan Jegapragasan, MD  
Prashant Sharma

**The Root of the Problem: A Case of an Infected Pacemaker**

Infection of cardiovascular implantable electronic devices can have potentially devastating sequelae. While the complications are infrequent, there are known risk factors that can make infection more likely and should alert the care provider of a high-risk patient.  

**CASE PRESENTATION:** An 86-year-old male with history of ischemic cardiomyopathy status post coronary artery bypass graft, mechanical aortic valve replacement for prior aortic stenosis presented 3 months after implantation of a cardiac resynchronization therapy pacemaker with a five-day history of fevers and malaise. Patient also had device hematoma two weeks after the surgery, which was being conservatively managed. The patient reported an associated generalized weakness and poor appetite. He was seen by his primary care physician for these symptoms and basic laboratory tests including blood cultures were drawn which, a day later grew Staphylococcus epidermis. He was advised to present to the emergency department. His further evaluation included a transesophageal echocardiogram (TEE), which revealed an aortic valve prosthetic vegetation, 1 cm x 0.5 cm attached to the right leaflet. He was started on appropriate parenteral antibiotics for infective endocarditis and was planned to have pacemaker explantation given concern for spread of disease. On hospital day 3, the patient developed chest pain and shortness of breath. EKG was unchanged from his baseline and serial troponins were unremarkable. A transthoracic echocardiogram (TTE) demonstrated aortic valve regurgitation, the known aortic valve endocarditis and a previously unseen aortic root abscess. It was believed that the prosthetic aortic valve obscured the view of the abscess on TEE. Cardiovascular surgery was consulted and given the high risk for operation, particularly given his previous heart surgeries, the patient elected to pursue palliative care. His pacemaker was explanted and the pocket tissue was cultured which grew out Staphylococcus epidermidis. A wound-vac was used to cover the device pocket and he was given parenteral antibiotics for six weeks duration.  

**DISCUSSION:** Clinicians should be vigilant for pacemaker infection, especially in patients who have known risk factors including revision surgery and post-operative hematoma. Furthermore, appropriate imaging modalities should be used to aide in the diagnosis of device related infective endocarditis with the inclusion of both transthoracic echocardiogram and transesophageal echocardiogram to evaluate the valves and perivalvular structures.

Magdalena Kappelman, MD  
Michael Aylward, MD

**Atrial septal defect, biventricular failure, and the limits of care for an undocumented Mexican immigrant**

A patient presented with new onset heart failure attributable to a large,
unrestricted atrial septal defect as well as possible left ventricular non-compaction syndrome. Unfortunately, due to his immigration status, he was not a candidate for heart transplant and the patient returned to Mexico. This case reflects both the drive to find a diagnosis, but the frustrating, helpless conclusion to caring for people in the United States who are undocumented. The patient was a 29 year old, previously healthy man who presented to an outpatient clinic with several months of progressive right upper quadrant abdominal pain and dyspnea on exertion. He had immigrated to the United States from Mexico three years prior to his initial presentation. He had no prior medical or surgical history. He took no medications and had no dietary restrictions. He drank moderate amounts of alcohol in social settings, but otherwise had never smoked or used illicit substances. He had been working as a dishwasher in a local restaurant for the last three years. He had no significant family medical history. Physical exam was significant for elevated jugular venous distension, irregularly irregular heart rhythm, increased abdominal distension, mild pedal edema, and palmar hyperemia. Electrocardiogram revealed atrial fibrillation with right bundle branch block. Trypanosoma IgG and IgM levels were both negative. Thyroid stimulating hormone was normal. He had an elevated brain natriuretic peptide (2010 PG/mL) and mild thrombocytopenia. Echocardiogram revealed an unrestricted atrial septal defect, dilated right atrium, mild pulmonary hypertension, findings consistent with left ventricular non-compaction syndrome, and biventricular failure with an ejection fraction of 30 percent. He was placed on diuretics and underwent open repair of his atrial septal defect with implantable cardioverter-defibrillator placement. Immediately post-operatively, his symptoms of dyspnea and abdominal pain improved. Unfortunately, about 30 days after surgery, his dyspnea and abdominal pain recurred. He was found to have persistent biventricular failure, and a cardiac transplant work-up was initiated. Given his immigration status he was deemed not a candidate for cardiac transplant, so the patient elected to return to his country of origin to seek treatment. Discussion: This case illustrates the diagnosis and subsequent management of heart failure in a patient with an unrestricted atrial septal defect and biventricular failure due to suspected non-compaction syndrome. Physicians are compelled to diagnose and treat patients; however, the undocumented immigrant population presents a unique challenge in the United States due to the limitations imposed on their care by the health care system. In this case, the patient ultimately could not undergo definitive testing and treatment for his heart failure due to his immigration status.

Renal failure and nephromegaly manifesting from progressive CLL

Learning Objectives 1.Recognize the differential diagnosis for renal failure in the CLL population, always exclude obstruction 2.Know the common processes resulting in nephromegaly 3.Understand CLL renal invasion is common, but not frequently associated with renal failure. A 74-year-old woman with a history of CLL under observation presented to the outpatient clinic with three months of progressive functional decline. Examination revealed an ill appearing patient with normal vital signs, and stable axillary adenopathy. Laboratory evaluation showed a
A white blood cell count of 30 k/µL with an absolute lymphocyte count of 24 k/µL (increased from 8 k/µL three months prior). Other laboratory studies revealed a creatinine of 5.6 (increased from 1.4 three months prior), BUN of 98, bicarbonate of 19, and a potassium of 4.6. She was admitted to the hospital for further evaluation. A CT abdomen showed no evidence of hydronephrosis, but did reveal a 50% increase in kidney size compared to a previous study from 5 years prior. A urinalysis showed 10 RBC/hpf of which >25% were dysmorphic and a predicted 24 hour protein of 2.5 grams. Despite intravenous hydration she remained oliguric without improvement in her serum creatinine. Given suspicion for a glomerular process she underwent a renal biopsy and was started on empiric steroids. The biopsy revealed diffuse infiltration of the interstitial parenchyma by neoplastic small lymphoid cells without evidence of vasculitis. Electron microscopy revealed preserved podocyte foot processes and no thickening or focal deposition along the basement membrane. The patient improved with steroids and initiated immunochemotherapy appropriate for her renal function under the guise of her hematologist for progressive CLL. Following three cycles her creatinine has stabilized at 1.7. Discussion

The differential diagnosis of renal failure in the CLL patient population is broad encompassing a higher frequency of extrarenal obstruction due to pelvic lymphadenopathy as well as intrinsic causes including membranous nephropathy, minimal change disease (higher in T cell CLL), type 1 cryoglobulinemia, and less commonly leukemic infiltration of the renal parenchyma. This case illustrates the importance of incorporating careful review of imaging studies into the clinical context of a patient’s presentation. Bilateral nephromegaly in an adult can be seen in polycystic kidney disease, distal obstruction, early diabetes mellitus, sarcoidosis, rare hereditary disorders such as Von Hippel-Lindau and nephroblastomatosis, as well as infiltrative disorders such as IgG4 disease or lymphoma/leukemias. Renal infiltration in CLL is highly prevalent in autopsy studies (60-90%), but uncommonly associated with renal dysfunction. Immunochemotherapy such as anti-CD20 agents and non-renally eliminated drugs such as chlorambucil have anti-leukemic efficacy and can reverse renal dysfunction when attributed to CLL parenchymal infiltration.

<table>
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<th>Faraz Nasim Kazmi, MD</th>
<th>Arrhythmogenic Syncope: Predating Infiltration in Infiltrative Cardiomyopathy</th>
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<td>Adil A., Kalra A., Almquist AK.</td>
<td>A 56-year-old man presented with an episode of presyncope. He had sustained ventricular tachycardia in the hospital, requiring direct current cardioversion to normal sinus rhythm, and initiation of amiodarone. A 12-lead electrocardiogram, surface echocardiogram, and cardiac magnetic resonance imaging (MRI) did not demonstrate evidence for structural heart diseases. Electrophysiological testing did not induce ventricular tachycardia. The patient was discharged on amiodarone, and remained asymptomatic until 4 years later when he endorsed identical presyncopeal symptoms with palpitations, lasting as long as 2 hours. Telemetry monitoring demonstrated salvos of non-sustained ventricular tachycardia. Repeat surface echocardiogram demonstrated marked left ventricular hypertrophy. Cardiac MRI with gadolinium demonstrated diffuse late gadolinium hyperenhancement.</td>
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Endomyocardial biopsy confirmed a diagnosis of transthyretin amyloidosis. An implantable cardioverter-defibrillator was placed for secondary prevention of sudden cardiac death.

**Loren Khoury, MD**

76 year old female whom suffered a right leg abrasion while gardening in her yard. Six days afterwards she presented to her primary care clinic for the wound. At that time she was given some wound care instructions and a tetanus booster. Last tetanus vaccination was seven years prior. The following day the patient presented again to primary care with a complaint of dysphagia and neck stiffness for which she was prescribed some muscle relaxants. Symptoms worsened throughout the day and the patient presented to the emergency room. During presentation to the emergency room she was found to have a stick neck (head tilted in the sniffer position), diaphoresis, hypertension, urinary retention, and clenched teeth. Highest on the differential diagnosis was generalized tetanus. Initial treatment in the emergency room included intravenous metronidazole, valium, intravenous valium, and 500 units of tetanus antitoxin. The recommended dose of antitoxin is 5000 units, however this was not readily available at the hospital. A request was made for further antitoxin from surrounding hospitals. The patient’s symptoms continued to worsen and included muscle rigidity (neck/upper back, lower and upper extremities), worsening lock jaw, hypertension, and inability to handle her oral secretions. At this antitoxin arrived from surrounding hospitals and a total of 3000 units were administered (a fraction was administered into the wound). The patient was urgently intubated and transferred to the intensive care unit. There she underwent surgical debridement of the right leg wound. She was continued on intravenous metronidazole. Sedation initially included fentanyl and propofol. The patient also received baclofen to minimize muscle spasms. However she began to have evidence of rhabdomyolysis with an increase creatinine kinase and renal failure. At this point a midazolam drip was initiated to decrease muscle spasms. Creatinine kinase trended downwards and her renal failure was stable. However, the patient’s ICU stay was complicated by aspiration pneumonia, autonomic instability and continued muscle spasms. A decision was made to pursue placement of a gastric feeding tube and tracheostomy given prolonged and slow recovery. However the patient’s family decided that comfort care would be appropriate given the lack of significant clinical improvement of the patient’s illness. On day thirty three of the patient’s intensive care stay she passed of systemic tetanus.

**Sarah Kiel, MD**

**Jonathan Sellman, MD**

**Clinical Vignette**

**Finalist- Residents**

**The Real Air Bud: The Importance of Canines in Diagnosing Blastomycosis**

Blastomycosis is a fungal infection transmitted by the inhalation of spores that can lead to severe disseminated infection in immunocompetent individuals if not identified and treated appropriately. It is endemic to the south central, south eastern and Midwest United States and Ontario, Manitoba. The diagnosis may be missed by the unsuspecting clinician. A 53 year old previously healthy Caucasian man presented to Urgent Care with a pruritic maculopapular rash on his forearms and chest, nasal congestion and a productive
cough with brown phlegm that began four days after returning home from his cabin in the woods with his dog in northern Minnesota where he had been installing a new dock. Chest X-ray showed bilateral patchy airspace opacities and left lower lobe consolidation with significant leukocytosis. He was diagnosed with community acquired pneumonia along with contact dermatitis from poison ivy and prescribed Levofoxacin. His symptoms failed to resolve and on follow up visit two days later Azithromycin and Prednisone were prescribed. Subsequently, his symptoms progressed in the outpatient setting and reevaluation led to hospital admission with severe sepsis and hypoxic respiratory failure. Chest X-Ray and CT scan of the lungs showed progression of consolidation bilaterally with numerous nodules and hilar lymphadenopathy. After hospitalization, additional history was obtained revealing that three dogs owned by the patient’s family had been diagnosed with canine Blastomycosis. Shortly after admission, the patient’s respiratory status worsened leading to intubation. He was empirically started on liposomal Amphotericin B. Urinary Blastomyces antigen and Histoplasma antigen were positive. Bronchoalveolar lavage revealed broad based budding yeast on stain confirming the diagnosis of acute Blastomycosis. Four days after hospital admission, one of the dogs was euthanized due to severity of disease. Six days after his admission, the patient’s service dog was diagnosed and hospitalized for Blastomycosis as well. Epidemiologically, canines serve as a useful sentinel tool suggesting the diagnosis of Blastomycosis in patients presenting with community acquired pneumonia. In a patient presenting with a severe or progressing pneumonia despite appropriate antibiotic therapy, an epidemiologic history of a family dog with concurrent respiratory symptoms or with a previous diagnosis of canine blastomycosis should prompt clinicians in endemic areas to obtain a fungal sputum culture and smear in order to quickly diagnose blastomycosis.

Kristina Krohn, MD

**Not Your Father’s Angina: A 70-year-old’s birth defect.**

For 2 years Mr. P reported chest pressure when hiking, hunting or chopping wood. It resolved with rest. One day he had sudden intense chest pain and pressure at rest that radiated to his jaw and left arm. He became pale and sweaty. While his wife called 911, he tried to relax and the pain slowly resolved. He never smoked and had no personal or family history of atherosclerotic disease or diabetes. His hypertension was controlled by lisinopril and hydrochlorothiazide. In the hospital troponins were negative x3 and an EKG showed no changes. Because his story was concerning, he underwent an angiogram. No atherosclerotic disease was found, but he had an anomalous right coronary artery. A computer tomography angiogram verified the anomalous right coronary artery passed between the aorta and the pulmonary artery. Discussion: Literature suggests that anomalous coronary arteries occur in <0.1% to >5% of people. An anomalous right coronary artery from the left sinus, like Mr. P’s, may have an incidence up to 0.92%. Overall anomalous coronary arteries are associated with an increased risk of sudden death, but that risk depends on the exact anatomy with many variants posing no risk at all. A report from the American Armed Forces of Pathology found 33% (21 out of 64) of
sudden cardiac deaths during intense military activity were due to left anomalous coronary arteries. No deaths were caused by anomalous right coronary arteries. While children and young adults may present with sudden death, older individuals are more likely to present with syncope, angina pectoris, dizziness, or palpitations. These symptoms are likely to appear or increase when an individual develops hypertension. The prevailing thought is that symptoms occur due to compression of the artery. Arteries that run for a distance inside the wall of the aorta may become compressed when pressure increases in the aorta, such as when hypertension worsens. The incidence of sudden death in older adults with anomalous right coronary arteries has not been clarified. Unfortunately, it is unclear which anomalous arteries can safely be watched and which require surgical intervention. Mr. P and his family, and many physicians are currently deciding whether or not he should undergo a bypass. References: Angelini, Paolo. Congenital Heart Disease for the Adult CardiologistCoronary Artery Anomalies: An Entity in Search of an Identity. Circulation. 2007;115:1296-1305, Eckart RE, Scoville SL, Campbell CL, Shry EA, Stajduhar KC, Potter RN, Pearse LA, Virmani R. Sudden death in young adults: a 25-year review of autopsies in military recruits. Ann Intern Med. 2004; 141: 829–834.

Alan Kubey, MD

The Case of the Super Sedative – Modeling Medication Plasma Levels to Improve Care

Somnolence is a common symptom in the critically ill. Determining whether its etiology is benign or sinister often proves difficult. A 22-year-old male with congenital heart disease was transferred to the cardiac critical care unit for worsening acute on chronic systolic heart failure, acute on chronic liver failure, and acute renal failure. On admission he was alert and oriented with a Richmond Agitation Sedation Scale (RASS) of 0. He soon required intubation for hypoxemic respiratory failure; immediately prior to sedation, RASS was +1. On HD 2 ammonia level was with-in-normal-limits, RASS was -4. For mechanical ventilation sedation he received at total of 3,526 mcg of fentanyl and 42.24 mg of lorazepam over 34 hours. On HD 3, he was extubated and noted to be somnolent despite nearly 24 hours off sedation; RASS was -2. With continued somnolence without focal neurologic findings into the evening of HD 3, further lab or imaging workup was deferred in favor of Excel-based modeling of plasma levels of fentanyl and lorazepam – using dosing amount, route, and timing and pharmacokinetic data to account for the patient’s hepatic and renal impairment. The analysis suggested that the patient had nearly cleared the fentanyl but had a plasma-level-equivalent of a 16 mg dose of lorazepam – more than 6 times higher than would be expected with neither hepatic nor renal impairment. The analysis suggested plasma levels would fall more than 80% over the next 2 to 4 days, presumably with cognitive improvement. On HD 4 the team considered head CT and LP to investigate continued somnolence, while noting that the somnolence “is felt secondary to benzodiazepine doses received previously.” For reassurance, a CT was pursued; it was negative. Ammonia level was rechecked and was with-in-normal. On HD 5 RASS was -1 and the patient was noted to “improve clinically,” and noted on
exam to be “awake and alert.” This case illustrates the potential for patient lab and clinical assessment data analysis to help guide clinical diagnosis and treatment. In this particular case, the added modeling knowledge helped to avoid additional invasive testing (the LP) and, with it, the inherent risks to the patient. Furthermore, an additional lab draw on the evening of HD 3 was avoided and CT imaging arguably could have been avoided. In hindsight, this analysis, if implemented earlier, could have prevented over-sedation in the first place. This case highlights the potential for clinical decision support systems to guide clinicians in improved patient care.

Kathleen Lane, MD

A Spongy Heart: Left Ventricular Noncompaction
Left ventricular noncompaction is a rare congenital cause of nonischemic cardiomyopathy. Its discovery in adults is important for guiding management of the patient and for screening of relatives. A 62 year old man with a history of nonischemic dilated cardiomyopathy and was admitted with dyspnea suspected to be secondary to either a COPD exacerbation or a heart failure exacerbation (reduced ejection fraction of 11%). He had presented to clinic with one month of worsening dyspnea, decreased exercise tolerance, and orthopnea. In clinic, he was orthostatic with a heart rate increasing from the 90s to the 160s. He was admitted to the Cardiology service for management of a heart failure exacerbation vs. COPD exacerbation. During his inpatient stay, he was treated with antibiotics, nebulizers, and diuretics, and an echocardiogram was performed. A previous echocardiogram had revealed nonischemic dilated cardiomyopathy, thought to the result of a high PVC burden, prior viral infection, or alcohol abuse. However, his most recent echocardiogram showed hypertrabeculation and LV thrombi. Given the constellation of clinical and echocardiogram findings, he was diagnosed with nonischemic dilated cardiomyopathy secondary to left ventricular noncompaction. Cardiac MRI was unable to be performed due to a previously placed ICD, therefore he was referred for genetic counseling. He was encouraged to discuss his diagnosis with his relatives, given the importance of screening and early intervention. His clinical condition was improved and he was discharged to home with close follow-up. The differential diagnosis for nonischemic dilated cardiomyopathy is broad, and recognition of genetic syndromes is valuable for not only the patient but also his or her relatives. Screening and appropriate management are important for improving the quality of life of these patients.

Colleen Lane, MD

The Strangled Heart: A Case of Restrictive Pericarditis
A 67 year-old male was admitted for treatment of osteomyelitis of his right wrist. During the review of systems, it was noted that he had a four-year history of progressive painless lower extremity edema and increasing abdominal distension, resulting in fluctuant weight gain of 20-40 pounds. His past medical history was significant for a recent diagnosis of alcoholic cirrhosis and a recurrent right-sided pleural effusion. The patient had a remote history of pericarditis 15 years ago and underwent cardiac catheterization four years earlier. Assessment: Physical exam was notable for markedly elevated jugular venous pressure. First and second heart sounds were soft and distant. A pericardial knock was present. The left lung base was dull. Abdomen
was distended with a positive fluid wave. Extremities had dense pitting edema to the thighs bilaterally. A CT from one week earlier was reviewed and revealed pericardial calcification and an ossifying pericardial hematoma. Due to the CT and his physical exam findings, a cardiac MR was obtained, which revealed dense pericardial thickening and a large intrapericardial hematoma causing significant compression of the right ventricle. Subsequently, an echocardiogram with respirometry was ordered and demonstrated intraventricular dependence, expiratory reversal of hepatic vein flow and restrictive mitral inflow. Diagnosis/Management: Due to the results of the echocardiogram, a diagnosis of constrictive pericarditis was made and his liver dysfunction was thought to be cardiogenic cirrhosis. The patient successfully underwent radical pericardectomy with improvement of his congestive heart failure symptoms. Pathology of his sample was negative for infection but significant fibrosis was noted. His prior history of pericarditis was thought to be the likely etiology. Constrictive pericarditis is a thickening or decreased elasticity of the pericardium resulting in decreased diastolic filling and is uncommon. However, it is an important diagnosis to consider due to the high curative rates accomplished with surgical intervention. The etiology of constrictive pericarditis is commonly idiopathic. Other causes include recurrent pericarditis, chest radiation and prior cardiac procedure. Etiology is important to consider as studies show it is an important prognostic indicator of surgical success. One study showed long term survival rates for idiopathic, surgical and radiation constrictive pericarditis as 88%, 66% and 27%, respectively. There are multiple non-invasive tests that can help to differentiate constrictive pericarditis from other restrictive cardiac disease. The diagnosis of constrictive pericarditis is often made by Doppler echocardiogram with respirometry. Invasive testing with right heart catheterization is used if echocardiogram is difficult to interpret. Radical pericardectomy is the only definitive management for constrictive pericarditis. Surgery improves symptoms in the majority of patients, except the subset of patients with radiation-induced disease. In recent years, studies demonstrate improved perioperative mortality rates and long term outcomes.

Elizabeth Levin, MD
Andres Wiernik, MD and Peter Schlesinger, MD

Methotrexate-Induced Lymphoproliferative Disorder
Patients with the diagnosis of rheumatoid arthritis (RA) are two to five and a half -times more likely to develop a lymphoproliferative disorder (LPD) than the general population. RA patients may be at higher risk due to hyperimmune state secondary to RA or it could be due to their immunosuppressed state secondary to Methotrexate (MTX). MTX is the first –line treatment for RA. Case Presentation: 68 year-old African American woman with a past medical history of rheumatoid arthritis and has been on immunosuppressive therapy for approximately ten years initially presents to her primary care doctor for dysphagia. On exam she had a large left tonsil and was referred to ENT for further evaluation. Patient underwent a tonsillectomy. The pathology of the left tonsil is consistent with iatrogenic immune deficiency associated lymphoproliferative disorder, polymorphous subtype, EBV positive. Specifically the pathologist reported "there were morphologic features
of polymorphous lymphoproliferative neoplasm, with clonal plasma cells and a spectrum of B lymphocytes with areas of more abundant large B cells at a higher mitotic rate. In the setting of immunosuppression, by methotrexate and infliximab, it is best classified as an iatrogenic immune deficiency associated lymphoproliferative disorder by the WHO 2008 classification. The patient also underwent a PET-CT, which revealed low-level metabolic uptake in the mild prominent left cervical lymph nodes, a neoplasm cannot be excluded. There was no other adenopathy seen in the scan. Also, she had diffuse esophageal uptake likely from esophagitis. The patient currently has halved her dose of MTX with the goal of complete cessation of MTX. She currently is still being followed by her oncologist, Dr. Wiernik, and rheumatologist, Dr. Schlesinger. More information including a follow-up PET-CT will be able to be reported at the ACP poster presentation. Discussion: Since MTX is the first line therapy for RA. It is important to be aware of the rare, but possible side effects of MTX. Specifically I will be discussing MTX-induced LPD. There have been over 100 reported cases of LPD due to MTX. Being EBV positive is a good prognostic indicator and treatment usually only requires MTX cessation. Patients who end up being diagnosed with Diffuse Large B-cell Lymphoma unfortunately have a poorer prognosis.

Tasha Lin, MD
Kevin Moder, Karna Sundsted

Pericardial Tamponade as a Rare but Significant Complication of Adult-onset Still’s Disease

Adult-onset Still’s disease is a rare, systemic inflammatory disorder that is often difficult to diagnose on presentation, as patients present with symptoms similar to infection, malignancy, and other connective tissue diseases. Inflammatory disorders can often cause pericarditis with pericardial effusions, but rarely result in tamponade. Here we describe a case of a patient who developed pericardial tamponade secondary to adult-onset Still’s disease. A 52 year-old woman with no significant past medical history presented with a three-week history of daily high-grade fevers, profuse night sweats, severe diffuse arthralgias and myalgias, and evanescent rash. Evaluation was significant for leukocytosis of 21.8 x 10^9/L with neutrophilic predominance, markedly elevated inflammatory markers with C-reactive protein of 304.9 mg/L, erythrocyte sedimentation rate of 97 mm/hr and ferritin of 14890 mcg/L, elevated muscle enzymes, and bilateral pleural effusions on chest radiograph. Empiric broad-spectrum antibiotics did not result in any improvement. She underwent an extensive workup that was negative for infection, rheumatologic disease, and malignancy. This included, but was not limited to, blood cultures, multiple infectious studies, extractable nuclear antigens, diagnostic thoracentesis, positron emission tomography scan, colonoscopy, flow cytometry of peripheral blood and bone marrow biopsy. On hospital day 19, she developed sudden-onset hypotension, tachycardia, and dyspnea with a new oxygen requirement. Chest radiograph demonstrated a pericardial effusion. Urgent bedside echocardiogram was obtained, revealing a large circumferential pericardial effusion with swinging of the heart and evidence of tamponade. She underwent pericardiocentesis with immediate improvement in her symptoms and without complication. Analysis of the pericardial fluid revealed an inflammatory exudate.
Ultimately, the diagnosis of adult-onset Still’s disease was made, as she met three major Yamaguchi criteria with fever, arthralgias, and leukocytosis and one minor criteria with negative anti-nuclear antibody and rheumatoid factor, after exclusion of infection, malignancy or other inflammatory disorder. She was initiated on prednisone therapy with subsequent improvement in symptoms and was discharged with close follow-up. This case describes a rare but significant and life-threatening complication of adult-onset Still’s disease, which represents a diagnostic challenge given its multi-system involvement and non-specific symptoms. Delayed diagnosis is unfortunately common, and this case highlights the importance of considering this diagnosis to allow for prompt initiation of treatment and prevention of significant complications.

Melissa Lyle, MD  
Fernando C. Fervenza M.D., Ph.D.

### An Unusual Case of Hyponatremia

The antiarrhythmic amiodarone has many well-known side effects, including pulmonary fibrosis and thyroid dysfunction. Hyponatremia secondary to an amiodarone-induced syndrome of inappropriate antidiuretic hormone secretion (SIADH) is a lesser known, but potentially fatal, side effect.  

**Case Description:** A 67 year old male with a past medical history of hypertension, type 2 diabetes mellitus, and recently diagnosed esophageal adenocarcinoma, status post neoadjuvant chemoradiotherapy, presented to the hospital for intrathoracic total gastrectomy. On postoperative day two, he developed atrial fibrillation with rapid ventricular rate. Intravenous diltiazem resulted in hemodynamic instability, and was discontinued. Following unsuccessful electric cardioversion, intravenous amiodarone was initiated with a loading dose of 150 mg and maintenance infusion dosing. Intravenous therapy was then converted to oral amiodarone 400 mg every eight hours, resulting in a return of sinus rhythm. On the day of amiodarone initiation, the patient’s sodium was noted to be 140 mmol/L. Serum sodium level was 130 mmol/L two weeks later, and reached a nadir of 106 mmol/L on day 16 of his hospitalization. The patient began to experience gait instability, increasing confusion, and intermittent hallucinations. He was subsequently transferred to the intensive care unit for symptomatic hyponatremia. Physical exam revealed normal vital signs and normal cardiovascular and pulmonary exams. Lower extremities were edematous (2+) bilaterally which had progressed over the hospitalization. Neurologic exam revealed no focal deficits. Laboratory evaluation demonstrated a serum sodium of 106 mmol/L, potassium of 3.6 mmol/L, creatinine of 0.4 mg/dL, and blood urea nitrogen of 6 mg/dL. Serum osmolality was noted to be 225 mOsm/kg, and urine osmolality was 481 mOsm/kg. Urinalysis and urine electrolytes revealed a fractional excretion of sodium value that was greater than 1% and a urine sodium of 188 mmol/L. Amiodarone was discontinued, and hypertonic 3% saline and fluid restriction were initiated for treatment of SIADH. Serum sodium increased to 114 mmol/L over 24 hours and 119 mmol/L after 48 hours, but then plateaued. Tolvaptan was started due to persistent hyponatremia, and the patient received a total of five doses of 15 mg tolvaptan with improvement in serum sodium levels noted. Outpatient follow-up illustrated a serum sodium of 136 mmol/L 28 days after amiodarone.
discontinuation. Discussion: Severe hyponatremia with a serum sodium level of less than 120 mmol/L is often associated with neurologic dysfunction and can precipitate seizure activity. Hyponatremia due to syndrome of inappropriate antidiuretic hormone secretion (SIADH) secondary to amiodarone use is a rare but potentially lethal consequence of amiodarone. Discontinuation of amiodarone, hypertonic saline infusion, and fluid restriction are useful to improve hyponatremia. Tolvaptan, a vasopressin antagonist, can be used to treat symptomatic hypervolemic or euvolemic hyponatremia secondary to SIADH. Caution must be taken to avoid rapid correction of serum sodium.

Jacob Lyons, MD

Missing Potassium: Renal Tubular Acidosis in Inhaled Toluene Exposure

RTA is a rare but previously documented complication associated with toluene inhalation. Toluene exposure is often accomplished through the inhalation (huffing) of metallic aerosol (spray) paint, sought after by its users for its rapid onset and relative ease of procurement. Risks of exposure include CNS toxicity leading to seizure, respiratory depression, long term neurocognitive impairment, cardiac arrhythmia and renal failure. Case Description: A 39 year old female with past medical history of hypertension, type II diabetes and alcohol dependence was found down at a homeless tent camp and transported to the emergency department. On arrival she was minimally responsive, but seemed to indicate she had several days of recent vomiting. Vital signs on arrival were notable for blood pressures consistently in the 60s/30s with a respiratory rate of 30 and a temperature of 34.4 deg F. Heart rate was 82. Her exam was significant for minimal responsiveness without focal neurological deficit and cool extremities. Initial laboratory values showed an arterial pH of 6.92, creatinine of 8.7 mg/dL (from a baseline of 0.5), CO2 of 6 mEq/L, and white blood cell count of 20.7 k/cmm. Blood ethanol, toxic alcohols and urine drug screen were negative. TTE revealed a dilated right atria with minimal contractility of right ventricle. She was admitted to the MICU and urgently intubated for impending respiratory failure. She was started on norepinephrine and vasopressin for blood pressure support and continuous renal replacement therapy for correction of acidosis. Correction of the pH unmasked profound hypokalemia, requiring aggressive replacement. Her MICU course was significant for rapid improvement in her cardiac function, normalization of white blood cell count, normalization of mental status leading to extubation, as well as the above mentioned aggressive potassium replacement. She was transferred to the general medicine ward and discharged two days later with complete recovery of mental status, vital signs and laboratory values. It was not until day 4 of her hospitalization that a family member reported she had chronically been using metallic aerosol paint as a mechanism for intoxication. Discussion: RTA with associated hypokalemia is a rare but potentially fatal complication of toluene exposure. The metabolic derangements seen in this patient seem to have precipitated a transient right heart failure, but have been documented elsewhere to cause arrhythmia and arrest. Increased community and clinician awareness of the prevalence and dangers of paint huffing and toluene
exposure will lead to increased preventative and community resources, as well as recognition of the constellation of symptoms and laboratory findings, leading to more rapid treatment and prevention of neurologic and cardiac consequences.

**Kathleen Mahan, MD**  
Ali Jazayeri, MD and Robert Shapiro, MD  

**When You Just Can’t Wait - A Case of a "Benign" Cancer**  
Desmoid tumors, also known as aggressive fibromatosis, or sarcoma of low grade malignancy, are rare, soft tissue malignancies which arise from fascial or musculo-aponeurotic structures. They are considered benign neoplasms because they do not metastasize. This classification should not delay treatment of these tumors, which is often surgical resection, as the consequences of their rapid growth can prove to be fatal. A 71-year-old male presented to the emergency department with left-sided, non-anginal arm and chest pain which had been present for several months. His medical history was significant for end-stage renal disease on hemodialysis in addition to a 30 pack-year smoking history. Imaging of the chest revealed a left-sided extrapleural mass which was not present 2 months prior on roentgenogram. Computed tomography of the chest showed a 6.5 x 5.6 x 7.4 cm left apical soft tissue mass which abutted the descending aorta and left subclavian artery, and caused mild rightward deviation of the trachea. The patient elected to have the mass biopsied as an outpatient, which became further delayed due to dialysis access complications, new left upper extremity deep venous thrombosis, and initiation of warfarin therapy. As a result, fine needle aspiration of the mass was performed approximately three and a half months after its initial discovery. At this point, only a small portion of the left lung remained aerated and a significant pleural effusion on the same side developed. The official diagnosis of fibromatosis was established after a repeat biopsy. The patient repeatedly deferred immediate intervention and ultimately chose to adopt comfort cares due to progressive respiratory failure and his other multiple comorbidities. Approximately six months after identification of the mass, repeat imaging revealed an increase in the size of the mass to 18 x 12 x 20 cm with significant mass effect on the mediastinal structures and accompanying pleural effusion of at least 1.7 liters. The left lung was completely collapsed with obstruction of the left upper lobe and basilar bronchi. The patient ultimately died in his home from progressive airway obstruction and hypoxic respiratory failure.

**Neil Majithia, MD**  
Nicholas Crews, MD; Neena Natt, MD  

**Clinical Vignette**  
**Finalist- Residents**  

**When It's Not Just the Sniffles: A Case of Unilateral Rhinorrhea**  
Rhinorrhea is a common complaint evaluated in the primary care clinic, frequently seen in the setting of allergic or infectious syndromes. Sometimes, nasal discharge can be a sign of structural abnormalities, including disruption of the dura and skull base, which is a well-recognized complication of head trauma and pituitary surgery. In rare cases, cerebrospinal fluid (CSF) rhinorrhea can develop spontaneously in the setting of pituitary adenomas, and is most commonly associated with prolactinomas. Case Description: A 24--year--old gentleman with a history of obstructive sleep apnea and seasonal allergic rhinitis was referred to Allergy clinic in December for unilateral rhinorrhea persistent over a four month period. The patient had experienced his typical seasonal allergy symptoms, including pruritus of his eyes and nose, sneezing, bilateral nasal congestion, and rhinitis. Following
symptomatic treatment, all of his symptoms had resolved except a persistent unilateral rhinorrhea from the left naris. He had no history of facial trauma or surgery and specifically denied inhalational drug use. CT and MR imaging revealed a destructive central skull base mass measuring 6.5 x 5.6 x 4.4 cm that completely effaced the sella turcica with extension into the posterior nasopharynx, left maxillary sinus, and both cavernous sinuses. CT cisternogram scan confirmed the presence of CSF leak with multiple tracts of contrast passing through the skull base tumor and pooling in the maxillary sinuses bilaterally. Tissue obtained by endoscopic left nasopharyngeal biopsy was found to stain strongly positive for prolactin with histopathological features consistent with atypical pituitary prolactinoma. At the time of diagnosis, his prolactin level was elevated at 539 ng/mL. Management included transsphenoidal partial tumor resection and right-sided nasoseptal flap to correct the CSF leak. Post-operatively, he was started on cabergoline with evidence of slight reduction in residual tumor size. No recurrence of rhinorrhea was noted at seven-month follow-up. Discussion: Prolactinoma-associated CSF rhinorrhea is most commonly observed following initiation of dopamine-agonist therapy, resulting in tumor involution and development of fistula formation through the dura and skull base; however, it can rarely be the presenting symptom of an untreated pituitary prolactinoma. Asymmetrical rhinorrhea should prompt consideration of structural etiologies, particularly when treatment-resistant and associated with concerning symptoms such as diplopia and facial numbness, especially in the V2 distribution. In the office, CSF rhinorrhea can often be reproduced by having the patient lean forward and perform the Valsalva maneuver. If clinical suspicion is high, nasal discharge can be tested for beta-2 transferrin, which is a highly specific CSF marker. CT and MR imaging are both typically necessary for thorough radiologic evaluation of bony anatomy disruption and soft tissue involvement of a skull base mass.
| Kevin Manocha, MD  
| Amir Lerman, M.D. | **Second-Hit CAMI**  
| | Cocaine induced angina is well described in the literature. Cocaine associated angina usually occurs shortly after use of cocaine and usually only causes infarction .7-6% of the time. Here, we describe a case of delayed Cocaine Associated STEMI in a patient with mild coronary atherosclerosis. Case Description Our patient is a 48 year old Black male with past medical history of well controlled Type 2 Diabetes Mellitus (Hgb A1C=6.0 mg/dL) and Hypertension, who first presented with severe chest pain. He used cocaine twice in the last week, most recently the evening (22:30) prior to admission. He began experiencing abrupt onset retrosternal pressure the morning before admission soon after waking up. This pain was nonradiating and associated with only nausea & vomiting. Evaluation in an outside facility, per report, showed “ST flattening” on EKG and a negative troponin x1. Because of ongoing concern for ACS, however, the patient was started on IV Heparin and Nitroglycerin infusions and transferred to the Mayo Clinic for further care. At St Mary’s Hospital, EKG showed only mild baseline ST elevation only in V2 seen on previous EKGs. A Computed Tomography Angiogram was negative. Three sets of troponins were also negative and thus the Heparin and Nitroglycerin infusions were discontinued. Day #2 The patient awoke chest pain free and was being prepared for endothelial dysfunction testing. Unfortunately, suddenly that afternoon, the patient began having retrosternal, nonradiating chest pain associated with nausea and feeling of impending doom. At this time, Nitroglycerin provided no relief. Ativan however, helped considerably. EKG showed up to 7mm ST elevations in leads I-III, V1, V4-V5 and aVF. The STEMI pager was activated and the patient was taken to the Cath Lab. Coronary angiogram showed mild coronary atherosclerosis but was otherwise unremarkable. Follow up troponins were elevated with a peak of .67 ng/mL. The patient was subsequently discharged on aspirin, diltiazem and isosorbide mononitrate the following day. Discussion Cocaine induced MI (CAMI) is thought to be because of increase myocardial demand secondary to Alpha and Beta adrenergic activation, coronary thrombus or coronary vasospasm. Given his unremarkable angiogram however, coronary vasospasm was thought to be the underlying mechanism of infarction. Another interesting point is the delayed onset of his CAMI. One study showed that when precise information was available, 88% patients with CAMI used cocaine within 24 hours and 48% had used it within 4 hours. Another study showed that with >2/3 of patients noted to have cocaine induced MIs had used cocaine within 3 hours. Our patient had his CAMI about 36 hours after use and is probably due to cocaine metabolites causing a second hit phenomenon. |
| Kathleen Marshall, MD  
| Andrew Greenlund, MD | **Osteophytes causing big headaches**  
| | Spontaneous intracranial hypotension is an underrecognized cause of headaches. With a careful history, exam, and neuroimaging the diagnosis can be made and can prevent devastating effects of intracranial hypotension. A 64 year-old male presented to the hospital for intractable headaches of 3 weeks duration. The headache started when he bent down to pick up his grandson. It was positional in nature and was unresponsive to pain-relievers, but improved with a supine |
position. Basic lab evaluation including CBC, electrolytes, and inflammatory markers were unrevealing. Lumbar puncture was unremarkable. A head MRI showed intracranial hypotension with dural enhancement and a sagging brainstem. MRI spine showed diffuse extradural fluid collection consistent with a CSF leak. He needed a dynamic CT myelogram to identify the site of the leak, but he was on Plavix due to extensive cardiac history. The Plavix was held, but shortly thereafter he developed new neurological deficits including intranuclear ophthalmoplegia and a sixth nerve palsy. Emergent head MRI showed hypointensity in the midline midbrain consistent with stretching secondary to worsening intracranial hypotension. An emergent dynamic CT myelogram revealed a CSF leak at T1-T2 with a notable small spiculated ventral osteophyte thought to be the cause of the leak. This led to a CT-guided epidural blood patch after which he had marked improvement of his headache and resolution of his neurological deficits. Headaches are a common problem with a vast differential. A careful history and exam can often lead to the diagnosis. In our case, the classic orthostatic headache led to neuroimaging that confirmed the diagnosis of spontaneous intracranial hypotension. The clinical presentation and neuroimaging can be quite varied in those with spontaneous CSF leak, thus it is important to be aware of this clinical entity. This diagnosis should be considered in anyone with an orthostatic nature to their headache and those with cranial nerve deficits. Patients with underlying connective tissue diseases are at increased risk for spontaneous leaks. MRI has revolutionized the ability to diagnose these headaches and myelography is needed to identify the precise location of the leak. Treatment strategies include conservative management, epidural blood patches, surgical CSF leak repair, and percutaneous placement of fibrin sealant. In summary, spontaneous intracranial hypotension is often underdiagnosed and can be a devastating condition if not discovered and addressed appropriately.

Amanda McCambridge, MD
S Shinde, MBBS; N Gangat, MBBS

Hepatitis A Hiding a Hematologic Malignancy

A previously healthy 19 year old man presented with a one week history of abdominal discomfort, constipation, nausea, and anorexia. Laboratory analysis revealed hyperbilirubinemia, elevated liver transaminases and positive Hepatitis A IgM. HIV, Monospot, Hepatitis B and C testing were negative. CT abdomen demonstrated marked hepatosplenomegaly, with diffuse lymphadenopathy, and no evidence of gallstones. He was admitted, received supportive care, and discharged the next day. One week later he was readmitted to the liver transplant service for fulminant hepatic failure with thrombocytopenia, hyperkalemia, and worsened hepatosplenomegaly. Interventions: Abdominal ultrasound demonstrated massive hepatosplenomegaly, and diffuse thickening of the gallbladder wall without evidence of ductal dilation or venous obstruction. Extensive workup for the etiology of liver failure was negative, with the exception of a now positive Hepatitis A IgG, with negative IgM and negative Hepatitis A RNA. Leukemia/lymphoma phenotype was negative. He developed fulminant hepatic failure, and an iliac lymph node biopsy was performed to assess for malignancy. Preliminary pathology was read as reactive. He underwent orthotopic liver transplant with the
presumption that the hepatic failure was secondary to Hepatitis A, during which his spleen ruptured, necessitating splenectomy. Pathology from the spleen revealed histiocytic sarcoma. PET scan demonstrated extensive nodal involvement and marrow infiltration. Biopsy of the bone marrow and the new liver also confirmed histiocytic infiltration, suggestive of Stage IV disease. Chemotherapy was promptly initiated. Discussion: Histiocytic sarcoma (HS) is an exceedingly rare non-Langerhans histiocytosis of unknown etiology, most commonly in adults. It has been reported both as an isolated disease and in concert with other hematologic neoplasms, most notably ALL and Follicular Lymphoma. The pathogenesis remains unidentified, though a few studies have proposed common chromosomal translocations. No characteristic organ system involvement has been identified, and all are susceptible. Presentation of this disease is dependent on the organ involvement and the extent of the disease. Diagnosis requires pathologic evaluation, and must be distinguished from other histiocytic/dendritic disorders via staining patterns. The ideal treatment regimen of HS is unknown due to the rarity of the disease, but most patients with extensive disease require aggressive chemotherapy. Prognosis is poor. The case stresses the necessity of differential diagnoses, while increasing the awareness of a rare yet lethal disease. Fulminant liver failure is a known, albeit rare complication of Hepatitis A. In our case the diagnosis of hepatitis A was questionable given the negative hepatitis A RNA testing. In retrospect, the fulminant liver failure was felt to be due to liver infiltration by malignant histiocytic sarcoma.

| Isaac Meier, MD |
| Vaibhav R. Vaidya, M.B.B.S., John T. Ratelle, M.D. |

May-Thurner Syndrome: The Anatomy of a DVT

May-Thurner syndrome (MTS) is defined as extrinsic venous compression by the arterial system against a bony structure. Most commonly, this leads to a hemodynamically significant compression of the left common iliac vein between the right common iliac artery anteriorly and lumbar vertebral body posteriorly. MTS is an underappreciated etiology of deep venous thrombosis (DVT), and requires a high index of clinical suspicion. A 37-year-old woman was presented to the emergency department for acute left lower extremity swelling and pain. Her medical history was significant for IgA nephropathy with non-nephrotic range proteinuria, and she was found to be a heterozygous carrier of prothrombin G20210A gene mutation. On examination, the patient was tachycardic with significant tenderness, swelling and livedo reticularis of the entire left leg. An ultrasound revealed a DVT extending from the left external iliac vein all the way through the calf. The left common iliac could not be visualized on ultrasound, but CT venogram showed extrinsic left common iliac vein compression by the right common iliac artery, consistent with MTS. She underwent successful catheter-directed thrombolysis/thrombectomy, but venous calcifications precluded initial stent placement. Her symptoms initially improved, but 2 days later, she developed worsening leg pain and swelling. She was found to have a recurrent DVT, and underwent repeat thrombolysis/thrombectomy with stenting of the common and external iliac veins. Repeat venography 5 days later showed complete patency. She was treated
with heparin and ultimately transitioned to Rivaroxaban. She was
dismissed from the hospital without further incident with a plan for
reevaluation after 3 months of anticoagulation to determine long-term
plan. This case highlights a well understood anatomical relationship
that often goes unrecognized as a source of venous disease. The
incidence of MTS in acute DVT has been estimated to be between 2-5%,
however it is likely underreported, and some degree of iliac vein
compression may be present in up to two-thirds of asymptomatic
individuals. While venous ultrasound is the initial test of choice when
suspecting DVT, the common iliac vein may not be able to be visualized
in significant number of patients. CT and MR venography offer greater
diagnostic yield and, more recently, intravascular ultrasound has been
described as an important adjunct in the management of MTS.
Procuring this diagnosis is crucial for guiding treatment because many
of these DVTs are reported to be recurrent or poorly responsive to
anticoagulation therapy alone. Intravascular stenting, with catheter
directed thrombolysis/thrombectomy if clot is present, is becoming the
treatment of choice, and may offer long-term venous patency rates of
>90%.

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<th>Aimee Merino, MD</th>
<th>Diffuse large B cell lymphoma presenting as transverse myelitis</th>
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| Diffuse large B cell lymphoma is the most common type of Non-
| Hodgkin’s lymphoma, comprising approximately 25% of cases. The
| diverse manifestations of this disease and frequent extranodal
| involvement of diverse tissues create a diagnostic challenge. A 64 year
| old man presented to the emergency department after four days of leg
| weakness and difficulty urinating. On exam he was found to have
| sensory deficits bilaterally. At that time he had an MRI of the spinal
| cord that showed edema at T10 to T12 and a lumbar puncture that was
| negative for infectious agents but had a high protein. He was believed
| to have transverse myelitis and was started on high dose steroids. His
| weakness improved initially but worsened again when the steroids
| were tapered. A brain MRI at that time showed lesions in the brainstem
| consistent with demyelination and it was thought that his symptoms
| were due to multiple sclerosis. Steroid therapy was reinitiated and
| interferon beta-1a was started. Despite therapy he continued to have
| bilateral leg weakness, paresthesia, worsening urinary retention, and
| constipation. An EMG was performed on both legs and showed diffuse
| axonal sensorimotor polyneuropathy. His steroid dose was increased
| and he eventually regained enough strength in his legs to walk using a
| walker. Approximately three months after his initial presentation, he
| continued to have urinary retention, constipation, and paresthesia in
| addition to some residual leg weakness. A repeat EMG showed diffuse,
| bilateral sensorimotor polyneuropathy with primarily axonal
| involvement; he was diagnosed with Guillain-Barre syndrome. He was
| treated with IgG, plasmapheresis, and high-dose steroids. After physical
| therapy he was able to finally return home with self-catheterization and
| assistive devices. A month after returning home, he returned to the
| emergency department with an acute return of weakness to the point
| of being unable to transfer from his wheelchair. He was thought to have
| an autoinflammatory demyelinating disease and was started on
| mycophenolate. Contemporaneously there was a precipitous rise in his

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liver function tests with no known etiology. A liver biopsy was performed, 6 months after initial presentation, showing diffuse large B cell lymphoma. His neurologic symptoms were determined to be due to neurolymphomatosis from direct invasion of peripheral nerves and possible lymphoma in the CNS. He was treated with rituximab and dexamethasone until his liver function improved and will soon receive R-CHOP. This case illustrates the protean presentation of lymphoma and the importance of maintaining a broad differential in patients with unusual symptoms. Although the neurologic symptoms seen in this patient are rare, it is important to remember that lymphoma can arise in almost any tissue and does not always present with typical lymphadenopathy. Recognition of this disease is vital in instituting proper treatment and avoiding unnecessary treatment modalities.

Istiaq Mian, MD

**Adrenal Abscess in an Immunocompromised Patient caused by Nocardia farcinia**

Nocardia is a filamentous gram-positive aerobe found in soil that can cause pulmonary infection or be introduced into the body via trauma. It can additionally cause brain abscess in immunocompromised patients. Few cases though have been reported of adrenal abscess caused by nocardia and this case illustrates a rare finding in an immunocompromised patient. Case 63 yom with ESRD s/p DDKT in 2010, T2DM, PAD s/p RLE BKA, DVT/PE w/ IVC filter in place, is admitted June 2014 in the context of FTT with a right-sided adrenal mass. He recently underwent cholecystectomy in February 2014 and CT-abdomen detected an adrenoma thought to be a hematoma secondary to supratherapeutic INR at the time. His immunosuppression is maintained by prednisone 7.5 mg daily and mycophenolate 2500mg daily. He reports intermittent fevers and fatigue with hospitalizations in the past year without any identifiable cause. Repeat CT revealed an expanding adrenoma with new RLQ abscess. Patient underwent diagnostic and therapeutic JP drain placement with subsequent drainage. Initial cultures revealed lack of acid-fast bacteria, consistent with likely actinomyces infection. He was treated with penicillin until DNA sequencing revealed Nocardia farcinia infection. Antibiotic therapy was then switched to amikacin and TMP-sulfa. CT-abdomen two months later showed resolving abscesses. Discussion Infections caused by Nocardia farcinia is an uncommon finding and presents with a variety of clinical manifestations. Due to nonspecific symptoms, radiologic findings resembling tumor and long culture time, this diagnosis may be missed. Additionally, adrenal abscess is a rare finding as nocardia tends to favor the pulmonary and CNS systems. Nocardia should be included in the differential of intra-abdominal infection in immunocompromised patients.

Libby Miller, MD

**ANCA associated vasculitis in setting of cocaine use**

ANCA associated vasculitis can be primary ie Churg Strauss, granulomatosis with polyangitis, Microscopic polyangitis or secondary due to drug reaction, viral infection, autoimmune disease or rarely lymphoma. Often the exact etiology is not determined. Case Discussion: 66 y.o. male h/o limited exposure to healthcare system, PMHx of cocaine abuse but no known medical problems admitted with SOB and fatigue, found to be anemic with a Hgb of 5 s/p 2U PRBCs, with
profoundly elevated creatinine and apparent CKD of initial unknown etiology. Patient found to be ANCA+ (marked elevation in MPO-ANCA and PR3-ANCA) and FANA+ in setting of HCV viremia, as well as elevated serum light chains. Biopsy demonstrating pauci-immune GN w/ crescentic glomeruli indicating active disease. Although the exact etiology of the vasculitis is unclear, there was initial speculation that this patient’s vasculitis was related to levamisole-contaminated cocaine use. This patient was placed on rituximab and is now on dialysis.

Discussion: Vasculitis is a rare but well described complication of cocaine use. Patients may present with cutaneous vasculitis, nasal septal destruction, pauci-immune crescentic glomerulonephritis and a characteristic autoantibody profile that includes positive c-ANCA. The role of levamisole contaminated cocaine has been discussed on a limited basis; I will explore that further in my case presentation.

**Tom Miskavige, MD**

**Neurosis, Nephrosis and Sclerosis: Scleroderma Renal Crisis Presenting with Anxiety**

Scleroderma can range from limited cutaneous disease to life threatening diffuse visceral involvement. Renal involvement is common in patients with systemic scleroderma with the most serious manifestation being scleroderma renal crisis (SRC). Presentation 58-year-old female adopted from Greece with no prior past medical history presented to her PCP office with anxiety. Her BP was elevated at 210/116 and labs showed acute renal failure with a creatinine of 2.85. She was subsequently admitted to the hospital. On admission her review of systems revealed one year of worsening anxiety associated with shortness of breath and swelling of hand/ankles. Physical exam showed blue fingers suspicious for Raynaud’s, hypopigmentation over the upper chest, telangiectasia’s over the face, lungs with bilateral crackles, cardiac S4, retinal edema, flame hemorrhages, cotton wool spots, significant thickening of the skin of the arms, forearms and trunk, and ulcerations of her finger tips. Echo showed pericardial effusion with RA collapse but without tamponade. Rheumatology and Nephrology were consulted and started captopril at 6.25 mg q8hrs and prednisone 40 mg daily. ANA titer came back at 1:160 nucleolar pattern and >1:2560 homogeneous pattern. ACA (Anti-Centromere Antibody) was negative. SCL 70 was positive at 8.0 (normal <1.0). BP improved over the course of 10 days but creatinine remained elevated, so hemodialysis was initiated. She was discharged home on peritoneal dialysis. One year later she underwent LURTx (living unrelated renal transplantation). Today she is doing well.

Discussion Scleroderma renal crisis (SRC) is a potentially life-threatening complication. SRC is characterized by acute kidney injury with abrupt onset of moderate to marked hypertension; a normal urinalysis or a urine sediment with only mild proteinuria and few cells or casts; and/or signs of microangiopathic hemolytic anemia. Prior to the widespread use of ACE inhibitors, almost all patients with significant renal involvement died within one year. Survival in patients with SRC is markedly improved with ACE inhibitor therapy. One-year mortality is now 24 percent in patients treated with ACE inhibitors, compared with 85 percent in patients treated with other drugs. Use of captopril rather than other ACE inhibitors is encouraged because of extensive clinical experience.
and its short onset and duration of action, which permit rapid dose escalation. Steroids should be used with caution as they may precipitate hypertensive crisis. Despite treatment with ACE inhibitors, 50 percent of patients with SRC progress to end-stage renal disease (ESRD). However, among patients with SRC who require dialysis during the acute episode, a proportion recovers sufficient renal function to discontinue dialysis over a period of up to 18 months. For those who need continue dialysis there is a survival benefits with kidney transplantation among all patients with ESRD, rather than hemodialysis or peritoneal dialysis.

**Martha Montgomery, MD**  
Matthew Olson, Selcuk Adabag  

**Influenza with Transient Heart Block**  
In December a 39 year old male veteran with a history of anxiety, depression, intravenous methamphetamine abuse, and non-ischemic cardiomyopathy presented to the Emergency Department with generalized fatigue and chest pain. He reported 4 to 5 days of fevers and myalgias. His most recent use of intravenous methamphetamine was two weeks prior to admission. On examination he was febrile and anxious appearing but otherwise unremarkable. Electrocardiogram was notable for diffuse T-wave depression. Troponin was slightly elevated at 0.234. Coronary catheterization demonstrated normal coronary arteries. Following catheterization he was noted to have several episodes of heart block on telemetry lasting up to 8 seconds. Rapid influenza returned negative; however, a close contact was also admitted for similar symptoms and tested positive for influenza. Additional workup for alternative etiologies of transient heart block including electrolyte abnormalities, renal function, and transesophageal endoscopy for vegetations or valvular abnormalities was negative. The patient was treated with temporary pacemaker and oseltamivir. He improved clinically and pacemaker was removed on day 5 with no subsequent episodes of heart block. This case demonstrates a potentially fatal complication of a common illness. This complication has been reported in a handful of other case reports, the largest of which was a retrospective study in Japan during the 2009 H1N1 pandemic (1). The incidence of heart block during the pandemic was estimated to be as high as 12% among influenza patients. Based on cases reported in the literature, influenza related heart block appears to disproportionately affect younger individuals.  

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**Justin Moser, MD**  
Megan Krause, Eric Matteson  

**A Pain in the Chest and A Pain in the Joints: Uncontrolled Rheumatoid Arthritis with Pericarditis and Aortic Stenosis.**  
A 75 year old male with a past medical history of rheumatoid arthritis on prednisone (formerly on methotrexate and prednisone, however the patient discontinued the methotrexate due to efficacy and toxicity concerns), iron deficiency anemia secondary to GI bleeding from colonic AV malformations and hypertension presented to the Cardiology service for evaluation of aortic valve stenosis. He recently had multiple episodes of sharp, severe, left sided chest pain that was responsive to nitroglycerin along with symptoms of orthostasis and heart failure. Previous work up ruled out an acute coronary syndrome and pulmonary embolism. Echocardiogram showed an EF of 65% with signs of aortic stenosis and regurgitation and an aortic valve area of 1.2 cm2 and a
mean gradient of 16 mmHg. Cardiac examination revealed a 2/6
cyrtotic murmur at the right sternal border that radiated to the
carotids and a 2/6 diastolic murmur at the left sternal board. Carotid
upstrokes were normal bilaterally. Joint examination was significant for
synovitis in multiple joints and rheumatoid nodules bilaterally over the
elbows. The exertional dyspnea was attributed to aortic valve stenosis,
and aortic valve replacement was recommended. The patient then
underwent successful aortic valve replacement. At surgery, “very active
pericarditis” with multiple “dense scarred granulomatous-type
nodules” was noted within the pericardium. The aortic valve was
markedly thickened and woody, without signs of calcification. Histologic
examination of the of the valve and the pericardium revealed chronic
inflammation and the presence of rheumatoid nodules. It is estimated
that roughly 1.5 million people in the United States have rheumatoid
arthritis, which is a chronic, symmetric, destructive, inflammatory
arthritis. In addition to the joint disease, patients may also have
extraarticular manifestations of rheumatoid arthritis including anemia,
rheumatoid nodules, pleuropelcarditis, interstitial lung disease, Felty’s
syndrome, large granular lymphocytic leukemia, and rarely rheumatoid
vasculitis and AA amyloidosis. This case represents unusual
complications of rheumatoid arthritis with the development of
rheumatoid nodules in extraarticular tissues including the aortic valve
and pericardium. This chronic inflammation lead to the patient’s chest
pain and valvular disease. Additionally, there is a strong association
between aortic stenosis and bleeding from gastrointestinal AV
malformations which is thought to be due to the consumption of von
Willdenbrand’s factor secondary to turbulent flow through the aortic
valve, commonly referred to as Heyde’s syndrome. Therefore, it is
possible that this patient’s anemia and GI bleeds were also a
complication of his uncontrolled rheumatoid arthritis. Extraarticular
manifestations of rheumatoid arthritis occur in as many as 40% of
patients, and patients with them present often first to their primary
care provider or urgent care physicians. Therefore, it is important that
Internists are aware of and able to recognize these manifestations, and
take steps necessary to better manage the underlying disease.

Naeem Moulki, MD

Ring the bells, in Bell’s palsy.
Half of facial nerve palsies are not secondary to Bell’s palsy. Here we
will review the case of a patient who was initially thought to have Bell’s
palsy but ended up with a less common diagnosis. A 57 year old male,
with a past medical history of liver transplantation secondary to
Wilson’s disease, and currently on tacrolimus immunosuppression, was
admitted to the cardiology service for atrial fibrillation management.
On further evaluation, the patient reported a sudden onset of complete
left facial nerve palsy 45 days before this admission. He was treated
with acyclovir and oral steroid taper for 10 days without any
improvement. Afterwards, the patient was diagnosed with left
mastoiditis and treated with tympanostomy and IV antibiotics for one
month. When the patient was admitted for cardiac arrhythmia, he was
found to have complete left facial nerve palsy as well as many other
neurologic signs, including left hypoglossal nerve palsy, dysphagia with
decreased gag reflex (especially on the left), and hyperreflexia in the
four limbs. The patient had been having back pain with bony
tenderness in the thoracic and lumbar spines. MRI of head and spine
was performed, and it raised the possibility of left mastoid bone
osteomyelitis without ruling out the possibility of malignancy. It also
was positive for left transverse sinus vein thrombosis extending into the
left jugular bulb. Spine images showed multifocal lesions in the
vertebral body compatible with osteomyelitis versus metastatic
malignancy. Left mastoidectomy was performed, and the pathology
report showed invasive mucoepidermoid carcinoma involving bone,
with similar results for vertebral body biopsy from T10. The final
diagnosis was primary tumor originating from the minor salivary glands
with metastatic disease involving spine and lungs. Patient was given
palliative radiation for the spine then discharged to hospice where he
died after an episode of aspiration pneumonia. This case emphasizes
the importance of comprehensive neurologic exam to rule out other
cranial nerve palsies whenever faced with a patient with possible facial
nerve palsy. In the setting of multiple cranial nerve palsy, the label of
Bell’s Palsy no longer applies and warrants more aggressive diagnostic
evaluation.

Abby Murray, MD

Thyroid Storm
Thyroid storm is a rare, life-threatening condition which is characterized
by severe clinical manifestations of thyrotoxicosis. A 50 year old female
with a history of hypertension and depression presented with vague
right upper quadrant and epigastric abdominal pain. Over the next few
weeks, she developed fevers, progressive dyspnea, orthopnea,
paroxysmal nocturnal dyspnea and lower extremity edema. She
presented to the emergency room with concerns of worsened
abdominal pain and was found to be in atrial fibrillation with rapid
ventricular response, with heart rate in the 200s. Labwork revealed a
normal CBC and BMP, with moderate transaminitis in the 400s. An
abdominal CT showed small wedge enhancements in both kidneys,
thought to be renal infarcts from atrial fibrillation; her gallbladder and
liver appeared normal without evidence of obstruction. She quickly
progressed to cardiorespiratory collapse, was intubated and
vasopressors were started. Attempted cardioversion was unsuccessful.
STAT echocardiogram showed an ejection fraction of 40% without
significant valve disease. She was started on antibiotics for possible
cholangitis, but in work-up for her new onset atrial fibrillation, a TSH
was checked and returned as undetectable. Free T4 was elevated at
2.07. T3 was normal at 2.93. Based upon these clinical findings, she met
diagnostic criteria for thyroid storm. Antibiotics were discontinued, and
treatment was initiated for thyrotoxicosis – she was continued on beta
blocker therapy, propylthiouracil, hydrocortisone and iodine drops. A
thyroid ultrasound showed small nodules, all <1cm. Her thyroid
stimulating immunoglobulin (TSI) returned elevated, suggestive of
Grave’s Disease. She was critically ill and in the ICU for several weeks.
Her course was complicated by persistent atrial fibrillation requiring
amiodarone and subsequent cardioversion x 3, neuroleptic malignant
syndrome related to quetiapine, and severe critical illness myopathy
related to prolonged immobilization in the ICU and high dose steroids.
This case demonstrates the essential role for checking TSH in atrial
fibrillation, but also illustrates the initially vague presentation of thyrotoxicosis; Classic symptoms include tachycardia, hyperpyrexia, CNS dysfunction and GI symptoms. Recognition of thyrotoxicosis as quickly as possible is critical to instituting appropriate therapy to reduce the severity of illness.

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<tr>
<th>David Newton, MD</th>
<th>Autonomic Dysfunction in HIV/AIDS</th>
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<td>Anya Jamrozy MD</td>
<td>Prior to HAART, neurologic disorders were often the first manifestation of HIV-1 infection. Autonomic dysfunction in particular has been well-documented; in one case series involving untreated AIDS in patients in Africa, 97% were reported to have some degree of autonomic dysfunction-- ranging from asymptomatic to severe debilitating orthostatic hypotension. HIV autonomic dysfunction should be considered in the differential for patients with advanced HIV who present with hypotension. A 43-year-old male with no significant medical history presented with complaints of emesis, progressive weakness, dry cough, weight loss, and night sweats. Social history was notable for 30 new sexual partners in the past year. Exam revealed temperature of 102.3F, hypoxemia to 86%, significant non-focal weakness, and thrush. Laboratory evaluation was remarkable for absolute lymphopenia 0.2, and CT of the chest revealed a hazy opacity in the left upper lung. HIV was confirmed by Western blot. CD4 count was 34, and HIV viral load was 3,940,000. He tested positive for pneumocystis by PCR, Histoplasma antigen in serum and urine, as well as Mycobacterium avium complex on culture. Quantiferon Gold testing for TB was indeterminate, but PPD negative. Itraconazole was initiated for presumed disseminated histoplasmosis prior to initiating ART. He continued to experience worsening weakness with new-onset diarrhea. Orthostatic blood pressures were 141/80 in lying position dropping to 60/40 standing with symptoms of near-syncope. He had prolonged QTc 461ms. ACTH stimulation test was normal. He continued to experience severe orthostatic hypotension despite adequate fluid resuscitation so fludrocortisone was administered and titrated up in dose with minimal improvement. Additional therapies included midodrine and caffeine, liberalizing sodium intake, as well as physical measures of elevating the head of the bed 30 degrees and using support stockings. He continued to suffer from severe orthostatic hypotension until time of discharge eighteen days later, and this was thought secondary to autonomic failure due to HIV. Orthostatic blood pressure measurements were normal and viral load suppressed to 346 copies on follow up in clinic two weeks later. The etiology of autonomic failure due to HIV is not entirely understood, but is postulated to occur through viral invasion of sympathetic and sensory ganglia as well as neurotoxic factors produced by the HIV virus. HIV p24 core antigen and gp41 envelope proteins have been identified in macrophages within the ganglia, and gp120 envelope protein is thought to alter the glutamate pathway to induce cytokine production which is subsequently toxic to neurons. No relationship has been observed between CD4 count and level of autonomic dysfunction, although decreasing viral load counts appears to correlate with improved orthostatic hypotension in HIV patients. Treatment of orthostatic dysfunction in HIV/AIDS patients includes standard measures aimed at symptomatic relief including</td>
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Hannah Nordhes, MD  
Mark Lee

**Moans without Stones: A Case of Spontaneous Renal Artery Dissection**

Spontaneous renal artery dissection (SRAD) is a rare entity which has a prevalence of 0.036—0.05% of dissections in large angiographic studies. It is most commonly associated with underlying vascular or connective tissue disorders such as Fibromuscular Dysplasia, Marfan’s Syndrome, or Ehlers-Danlos. Other associations include malignant hypertension and severe physical exertion. Its clinical manifestations range from asymptomatic renal infarction to severe abdominal pain, nausea, headache, hematuria, and hypertension. We present a case of a previously healthy 41 year old male who presented to his local emergency department with five hours of constant right sided abdominal and flank pain with associated nausea. He was evaluated for presumed cholelithiasis and nephrolithiasis with unremarkable initial studies. He was dismissed with pain medication and instructions for outpatient abdominal ultrasound. The following morning his abdominal ultrasound was normal. He re-presented to the ED where a CT scan with IV contrast revealed a wedge shaped infarct of the right kidney. His pain continued to progress requiring transfer to another facility for further management. During transport to our facility he became hypertensive to 171/101 mmHg. His creatinine remained stable at 1.0 and he was initiated on Lisinopril 5 mg daily. CT Angiogram revealed a thrombosed dissection in a second order branch of the right renal artery. In the setting of the acute thrombosis, imaging could not rule out fibromuscular dysplasia. No surgical intervention was undertaken and after 24 hours he was transitioned from Heparin to Clopidogrel. His pain improved, his renal function remained stable, and his blood pressure was well controlled. His treatment consisted of Clopidogrel 75 mg daily for three months, and then Aspirin 325 mg daily for 1 year following his event. Due to concern for possible fibromuscular dysplasia as an underling etiology for renal artery dissection, a carotid artery ultrasound was performed and was normal. His CT Angiogram at 6 weeks showed interval improvement of the thrombus and infarction with only minimal renal scarring and partial recanalization of the artery. Although fibromuscular dysplasia statistically is the most likely cause of spontaneous renal artery dissection, all other visualized vessels in the abdomen appear unaffected. At the six week follow-up, his hypertension had completely resolved and no longer requires medical management. Although SRAD is considered extremely rare, one study reported 35 symptomatic cases over 20 years at a single institution. SRAD has a wide variety of clinical presentations. Asymptomatic, or mild, self-resolving SRAD may lead to an underestimate of this condition’s true prevalence. Prognosis is good with appropriate intervention, however early recognition remains key. In atypical cases of abdominal and flank pain, SRAD should be considered in the differential diagnosis.

Ioana Oltean, MD  
Anya Jamrozy MD

**A Case of Pulmonary Kaposi Sarcoma**

Kaposi sarcoma (KS) is a vascular tumor associated with human herpesvirus-8. It is most commonly associated with violaceous plaques and nodules on the skin. Visceral involvement is less common and can
be more challenging to diagnose and treat. A 32-year-old man was seen in a primary care clinic with multiple complaints including a perioral scaling rash, a white coating on the tongue and a twenty pound weight loss over the previous 6 months. Diagnoses of tinea barbae and thrush were made and terbinafine was started. Two months later he was seen in an Emergency Department with cough and persistent tongue symptoms. He was diagnosed with pneumonia and was prescribed a course of levofloxacin. Two weeks later he was seen in the ED again for syncope and intermittent pulmonary symptoms. Physical exam showed cervical adenopathy. HIV test was ordered and it was positive. EGD revealed diffuse esophageal candidiasis and he was started on treatment with fluconazole. His CD4 count was 25. A CT scan of the chest showed diffuse bilateral ground glass opacities suggestive of pneumocystis infection. He was started on HAART, prednisone, trimethoprim-sulfamethazole, and clarithromycin. One month later he returned to ID clinic, pulmonary symptoms had improved but he noticed skin changes. Exam was notable for 4 small purple lesions on his legs, thorax, and arm along with significant cervical and axillary adenopathy. He was diagnosed with cutaneous Kaposi’s sarcoma. One month later he presented to the ED with SOB. CT chest showed diffuse pulmonary nodules with septal thickening. Bronchoscopy and endobronchial biopsy confirmed diagnosis of KS. All other cultures and tests were negative. He was started on liposomal doxorubicin and was discharged in stable condition. Over the next six months he had three other hospital admissions for shortness of breath and fevers. During this period the patient had a lapse in HAART therapy for three weeks. Extensive testing including repeat BAL samples showed no other signs of infection. He was continued on treatment with doxorubicin but during the last hospitalization he had hypoxic respiratory failure requiring mechanical ventilation and treatment with ECMO. He had no signs of improvement and family made the decision to withdraw care. This case illustrates the potential severity of Kaposi’s sarcoma. Pulmonary KS can present with shortness of breath, cough, fever, or chest pain. Imaging findings include reticular opacities involving the parenchyma, nodular densities, or pleural effusions. Endobronchial KS lesions can be seen on bronchoscopy appearing as red or purple macules or papules. The main treatment for pulmonary KS is HAART. Indications for systemic chemotherapy include extensive skin involvement, IRIS, or symptomatic visceral involvement. First line systemic chemotherapy is liposomal doxorubicin and other options include vinblastine or paclitaxel.

Dan Partain, MD
Ruth Bates MD,
Christopher McCoy MD

Cracking the Case with a Chicken Coop… and a Biopsy
It is often said that 80% of diagnoses can be reached with only a good history and physical examination. In the age where front doors to emergency departments seem to be replaced with CT scanners, it is tempting to rely on labs and imaging rather than a detailed history and physical exam. In this case, a thorough history helped guide further testing and was instrumental in reaching the correct diagnosis. A 72 year old lady from Kansas with a past medical history of psoriatic arthritis presented to the emergency department for evaluation of redness, swelling, and pain of her bilateral forearms and hands. Her
Psoriatic arthritis was diagnosed four years ago, and had been well controlled on Prednisone 20 mg and Infliximab. Over the last 3 months, she reported progressive right hand pain, swelling, and erythema. Her primary rheumatologist increased the frequency of her Infliximab infusions from every 6 weeks to every 4 weeks without improvement of her symptoms. Over the past 2 weeks, she noted necrotic changes of the skin on her right thumb, which prompted her to seek medical care. On admission, she was tachycardic and tachypneic. Physical exam demonstrated necrosis of the skin over the right mid-thumb and severe dactylitis of the right second through fourth digits. Admission labs demonstrated a markedly elevate CRP (128.2 mg/L). Detailed history revealed that she lived on a farm with multiple chicken coops. Given her compromised immunity and exposure history, a fungal infection was suspected. Fungal serologies showed Histoplasma antibody at 1:32 dilution, with positive urine antigen screen. Skin biopsy demonstrated numerous histoplasma capsulatum yeasts. Treatment was initiated with Liposomal Amphotericin B and Itraconazole. Initial infusions were complicated by symptomatic hypertensive urgency requiring pre-treatment with Acetaminophen, Diphenhydramine, and Hydralazine. On the ninth day of infusions, she developed an acute surgical abdomen. CT scan revealed free air in the abdomen, and emergent surgical exploration showed three small bowel perforations requiring small bowel resection. The surgical pathology report showed numerous histoplasma capsulatum organisms at the sites of perforation. Postoperatively, she slowly improved while completing a 14 day course of Amphotericin B. She was discharged with plans to continue Itraconazole for 12 months. Compromised cellular immunity, particularly the use of anti-TNF-α agents, is a strong risk factor for systemic fungal infection. Early identification of disseminated fungal infection is crucial to prevent significant morbidity and mortality. Delays in diagnosis of disseminated histoplasmosis can increase mortality from 8% to 57%. The ultimate diagnosis in this case was reached after clues from a careful history prompted appropriate screening for fungal infection. This case illustrates how labs and imaging should be used to support the history and physical exam rather than replace it.

Sagar Patel, MD
Sherrnan Holtan,
Gregory Vercellotti

Failure of eculizumab to control fulminant thrombotic microangiopathy after allogeneic hematopoietic cell transplantation

Thrombotic microangiopathy (TMA) is a potentially life threatening complication of allogeneic hematopoietic cell transplantation (HCT) characterized by endothelial dysfunction, hemolysis, thrombocytopenia, thrombus formation, and varying degrees of end-organ damage. TMA ranges from asymptomatic laboratory anomalies to fulminant hemolysis, renal failure and other end-organ damage, and/or death. TMA can be attributed to a side effect of calcineurin and IL-2 inhibitors, develop sporadically in susceptible patients (elderly, pregnancy), or occur in the context of atypical hemolytic/uremic syndrome (aHUS). Atypical HUS is believed to be due to complement activation through the alternative pathway. Recently (May 2014), eculizumab, a monoclonal antibody to the complement C5, received regular from accelerated approval by the Food and Drug Administration for the treatment of aHUS; its other indication is for paroxysmal
nocturnal hemoglobinuria. There have been only a few hundred reported cases of TMA associated with HCT; a small subset of these cases used eculizumab in allogeneic HCT recipients. Here, we report our recent experience with its use in the post-allogeneic HCT setting.

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<th>Thoetchai Peeraphatdit, MD</th>
<th>Shortness of Breath: Recognition of Bizarre Electrocardiogram</th>
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<td>Niyada Naksuk, Krittanawong Chayakrit</td>
<td>Minnesota Dextrocardia has a unique electrocardiogram (ECG) pattern. Given its infrequency in newly diagnosed case during adulthood, the ECG pattern recognition is important. We present a case with an ECG mimicking dextrocardia (or pseudo-dextrocardia) and review a stepwise approach on how to differentiate normal sinus rhythm and lead misplacements. A 57-year-old man presented with long standing shortness of breath with minimal activity. He had no symptoms suggesting respiratory tract infection or heart failure. The physical examination disclosed normal vital signs. The cardiac PMI was non-palpable. S1 and S2 were present, but diminished. Cardiac murmur was absent. The respiratory auscultation was decreased with dullness on percussion on the right lower lung field. The rest of his examination was unrevealed. Twelve-lead ECG was obtained which demonstrated small and negative P wave in leads II and aVF, compatible with abnormal axis of the sinus node. There were relatively flat P waves evident on aVL. Normal biphasic P wave morphology was absent on V1. Axis of QRS complex was normal, but with poor R progression. The chest radiography revealed markedly elevated left hemi-diaphragm, resulting in right-sided displacement of the heart. This case demonstrates several abnormal ECG findings that mimic dextrocardia pattern. Firstly, it is important to recognize that the P wave herein represents abnormal sinus origin. In normal sinus rhythm, the P morphology is round and upright in I, II, and aVF. Secondly, abnormal axis of P wave would lead to differential diagnosis between lead misplacement and dextrocardia. Those two conditions are then differentiated by noticing R wave progression. In the incorrect lead positioning, negative QRS and T waves are present on limb leads whereas the ECG in typical dextrocardia often shows right axis deviation and reverse R wave progression, with the tallest R wave on V1 and a progressively decrease in QRS amplitude through the lateral precordial leads. Notably, QRS pattern in lead aVR is similar to that normal pattern of aVL. In this present case, hemi-diaphragmatic elevation from car accident 20 years prior was likely the etiology of pseudo-dextrocardia. Other etiologies including right post-pneumonectomy and left diaphragmatic hernia have been reported. In clinical practice, prompt recognition of the potential of pseudo-dextrocardia may be critical in an emergent situation. For instance, effective defibrillation and pacing is probably limited given heart disposition and one may consider adjusting position for paddles placement.</td>
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<th>Kelly Pennington, MD</th>
<th>Lupus There It Is: Atypical Presentation of Lupus in the Setting of Concomitant Plasmodium Infection</th>
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<td>Christine Tran, Ruth Bates, Prashant Sharma</td>
<td>Several case-series have shown that systemic infections can lead to earlier presentation or recognition of systemic lupus erythematosus (SLE). In these circumstances, patients can present with non-specific signs and symptoms, making diagnosis challenging. Here, we present a previously healthy patient whose first presentation of nephrotic</td>
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syndrome was in the setting of concomitant Plasmodium infection. Case Presentation: A previously healthy 18 year-old female presented to the emergency department with a two-month history of chronic nausea, dysphagia, and a 40-pound weight loss. Ten-weeks prior to admission, the patient had a month long visit to India; she did not receive immunizations or anti-parasite prophylaxis. While in India, she developed nightly fevers with nausea and vomiting and was symptomatically treated at a local hospital with unknown medications. Her fevers resolved; however, she remained chronically nauseated with episodic non-bloody, non-biliary emesis. Physical examination showed an afebrile African female with diffuse abdominal tenderness without rebound or splenomegaly. No edema, joint tenderness/erythema or skin rashes were appreciated. Other systemic examination was normal. Laboratory studies were positive for microcytic anemia, elevated creatinine with nephrotic range proteinuria, hematuria with dysmorphic red blood cells, and pyuria. Initial work-up for infectious, autoimmune, and malignant causes were negative except a weakly positive ANA, weak cold and warm agglutinins, and low C3/C4. Anti-dsDNA and anti-phospholipid antibodies were negative. Initial peripheral blood smears were non-revealing. On the third malaria smear, a few Plasmodium species were identified, however not enough to speciate accurately. Despite aggressive IV hydration, her creatinine remained elevated. A renal biopsy revealed crescentic and necrotizing lesions with focal mesangial hyper-cellularity. Immunofluorescence studies demonstrated global granular capillary loop reactivity and tubular basement membrane deposits with interstitial immunoglobulin deposits. These histologic findings were consistent with lupus nephritis. She was started on high dose parenteral steroid and transitioned to oral steroid for lupus nephritis. She was also treated with primaquine and Malarone (Atovaquone/proguanil) for possible Plasmodium vivax infection. At 1-week follow-up, her creatinine remained stable and her appetite had improved. Discussion: Our patient had no symptomology of SLE and had a non-specific antibody work-up; however, her renal biopsy was diagnostic for lupus nephritis. Great consideration was given to the possibility of tropical nephrotic syndrome secondary to Plasmodium infection; however, renal biopsy was not consistent with previously described histo-pathologic findings of malaria nephropathy. Our case illustrates that SLE can present in the setting of systemic infections demonstrating the importance of maintaining a broad differential diagnosis.

Loretta Pfannes, MD

Left Ventricular Assist Device: Unintentional Treatment of Hemochromatosis

A 58 year old gentleman with past medical history significant for bicuspid aortic valve status post aortic valve replacement with St. Jude prosthesis, atrial fibrillation status post ablation is diagnosed with hemochromatosis with compound heterozygosity with mutations in C282Y and H63D. He has been treated with phlebotomy approximately every 54 days since that time. Several years later he was diagnosed with non-ischemic dilated cardiomyopathy (EF 20%) and received an ICD. His heart failure progressed such that he had NYHA Class IV stage D, congestive heart failure and it was recommended that he undergo...
heart transplant work up. Due to his history of hemochromatosis he underwent a liver biopsy that showed mild portal inflammation, mild steatosis without evidence of fibrosis. Iron determination in the liver was reported to be 4436 micrograms/gram of dry weight, consistent with hemochromatosis. Heart biopsy revealed fibrous scarring and hypertrophy without evidence of hemosiderin deposits. He subsequently received a Heartmate II left ventricular assist device (LVAD) as a bridge to heart transplant. His pre-transplant hematology labs with phlebotomy two weeks prior: Ferritin 79, iron 132, iron saturation 33%, LD 713, iron binding capacity 398 and plasma hemoglobin < 15, hemoglobin 13.1, MCV 98 and platelets 177. Shortly following LVAD placement he required 3 phlebotomies in order to maintain ferritin < 50. Approximately 1.5 years after LVAD placement, without any additional phlebotomy, he presented to hematology clinic with pica symptoms. Labs revealed: Ferritin 19, iron 53, iron saturation 13%, iron binding capacity 425, LD 903, haptoglobin <6, hemoglobin 11.1 MCV 89, platelets 165 and urine hemosiderin stain: positive. The labs indicate a low-grade intravascular hemolysis resulting in daily iron loss via urine hemosiderin. Due to the patient’s low ferritin and pica symptoms he was started on iron supplementation and his ferritin normalized and his pica symptoms resolved. Hereditary hemochromatosis, an iron overload disorder resulting in excessive and dysregulated intestinal iron absorption, is frequently treated by phlebotomy therapy as a single 500ml unit of blood can contain 220-240mg of iron. In this case, the patient who was previously dependent on phlebotomy for treatment of his hemochromatosis no longer needed phlebotomy after LVAD placement. Instead, the LVAD induced chronic intravascular hemolysis resulted in deposition of iron in the renal tubules causing hemosiderinuria to such an extent that the patient developed iron deficiency anemia actually necessitating iron supplementation.

Parkpoom Phatharacharukul, MD
Jonathan Alpern, Benji K.Mathews

Pulmonary Nocardiosis: Uncommon but Fatal if Untreated

Pulmonary nocardiosis is an uncommon lung infection caused by gram-positive bacteria. It is a disease found predominantly in immunocompromised patients, often resulting in poor outcomes due to delay in diagnosis and treatment, significant patient comorbidities, and bacterial resistance which requires combinations of antibiotics for extended durations. An 85-year-old male with severe COPD on oxygen, Rheumatoid arthritis on methotrexate, low-dose prednisone, and hydroxychloroquine presented to the emergency department due to shortness of breath and productive cough. In the ED, the patient was afebrile and normotensive but with tachypnea and hypoxemia required supplemental oxygen. Physical examination was significant for increased work of breathing and poor air entry of both lungs with minimal crackles and wheezing. Laboratory work showed leukocytosis with neutrophil predominance, and elevated procalcitonin and lactate. CT chest with contrast was done due to the concern of pulmonary embolism which showed interstitial opacification consistent with infection and few small emboli in the right lower lobe as well as an incidental large subcarinal mass suspicious for malignancy. Patient was started on Ceftriaxone and Azithromycin for the treatment of
community-acquired pneumonia. Sputum gram stain revealed gram positive branching bacilli, AFB gram stain was negative. Subcutaneous enoxaparin was started for pulmonary embolism. Over the next few days of hospitalization, patient remained afebrile but without improvement in cough or breathing. Due to concern for Nocardia, patient was continued on a third generation cephalosporin and Azithromycin was continued. Due to respiratory instability, the team could not obtain a tissue diagnosis of the subcarinal mass by EUS. On day 7 of hospitalization, his respiratory status worsened with increased oxygen requirements and increased sputum production. He subsequently developed respiratory failure with no response to non-invasive ventilation and cardiac arrest. Sputum AFB culture returned 2 weeks later growing Nocardia otitidiscaviarum, resistant to ceftriaxone, cefipime and imipenem while susceptible to trimethoprim-sulfamethoxazole (TMP-SMX), linezolid and amikacin. Pulmonary nocardiosis is an uncommon disease found mostly in immunocompromised patients. However, because Nocardia is not a normal oral flora, gram-positive branching bacilli on sputum gram stain should prompt the initiation of empirical treatment while waiting for the culture result. With increasing resistance of Nocardia to TMP-SMX, patients with pulmonary nocardiosis should be treated with a combination of either TMP-SMX and imipenem or amikacin and imipenem for 3-4 weeks followed by oral TMP-SMX for 3 months in immunocompetent patients and 6 months for immunocompromised patients. High suspicion for nocardiosis in immunocompromised hosts with appropriate empirical treatment is essential to improve outcomes for this rare, but virulent opportunistic infection.

Vania Phuoc, MD
Axel Grothey MD, Jose Villasboas Bisneto MD, and Jeremy Larsen MD

Metastatic extramammary Paget’s disease with pancytopenia and disseminated intravascular coagulation responding to weekly paclitaxel: a case report

Metastatic Extramammary Paget’s Disease (EMPD) is a rare cancer that currently has no validated treatment. Regimens including FECOM (5-FU, epirubicin, carboplatin, vincristine, and mitomycin C), trastuzumab in HER-2 expressing disease, 5-FU/cisplatin, or single agent docetaxel have been used in different case reports with varying levels of efficacy. A 58 year-old gentleman with EMPD diffusely metastatic to bone with bone marrow invasion presented with worsening shortness of breath and was found to have significant pancytopenia and disseminated intravascular coagulation (DIC). He was started on low-dose heparin for the DIC and weekly paclitaxel. Initially requiring daily transfusions of platelets and packed red blood cells, his shortness of breath improved after two doses of paclitaxel, and he became transfusion-independent after only three doses of paclitaxel. Carcinoembryonic Antigen (CEA) levels have been shown to correlate with tumor progression and parallel disease course. This patient’s pre-paclitaxel CEA of 62.1 ng/mL was also observed to decrease to 20.6 ng/mL after three doses. With no current validated chemotherapy regimen, this case can help guide consideration of paclitaxel in future treatment of metastatic EMPD.

Yonatan Platt, MD

Hydralazine induced vasculitis

Hydralazine is a very common anti-hypertensive, often used to treat resistant hypertension and systolic heart failure. Hydralazine has long
been known to cause different immunologic phenomena, including drug induced lupus. However, it also can rarely cause more serious auto-immune diseases such as drug induced vasculitis. We present a 77 year old female who presented with a vasculitic rash and was found to have positive ANA and C-ANCA antibodies. She was on hydralazine at the time the rash erupted and had no prior history of auto-immune disease. During her admission her renal function declined; however, she did not require renal replacement therapy. Thankfully, she did not have any pulmonary findings with her vasculitis, although this is a possible complication. Hydralazine induced vasculitis is an important entity to be aware of, as the drug is ubiquitous and if often used in the treatment of heart failure. Drug induced vasculitis should be considered in patients taking hydralazine who develop vasculitic rashes, pulmonary or renal impairment.

Alexander Podboy, MD
Dr. Seth Sweetser

A Diarrheal Dilemma

Chronic diarrhea is an incredibly common ailment, estimated to affect approximately 3-5% of the US population. Although common, the differential diagnosis is vast with over 100 distinct clinical entities. Case Presentation: A 61 year old man presented to clinic with an 18-month history of diarrhea. Over this interval, the patient reported progressively worsening of his diarrheal symptoms to the point of experiencing up to 7 stools a day of varying volumes and consistency at the time of presentation. He endorsed some blood on the toilet paper following defecation but denied frank blood within or coating the stool. Additionally, he denied abdominal or anorectal pain, abdominal bloating, nausea, vomiting, fever, chills, or night sweats. The patient did endorse a 30 lb weight loss since symptom onset, intermittent nocturnal stooling and episodes of nocturnal fecal incontinence. The patient had tried both lactose and gluten free diets without symptomatic improvement. There were no changes in medications over this symptomatic interval. Physical examination, including rectal examination, was unremarkable. Abdominal examination revealed a soft, nondistended abdomen with no tenderness to palpation; bowel sounds were present and normoactive. No masses or hepatosplenomegaly were present. Cardiovascular examination revealed an irregularly irregular rhythm but was otherwise normal. Initial laboratory evaluations were within normal limits but 24 hr stool testing did reveal 50g of fecal fat. Serum immunoglobins and thyroid stimulating hormones were within normal limits. Celiac sprue testing with IgA, IgG, and tissue transglutaminase antibodies were negative. Serial ova and parasite, cryptosporidia and giardia antigen testing, stool cultures, fecal leukocytes and fecal calprotectin testing were negative. VIP, gastrin, calcitonin, chromogranin and a 24 hr urinary 5 HIAA were also negative. The patient underwent esophagogastroduodenoscopy and colonoscopy with biopsy. EGD and colonoscopy with ileal examination were grossly normal and random biopsies of the stomach, small intestine, and colon were taken. Ileal, colonic and 2nd part of the duodenum biopsies were positive for congophilic material around small submucosal blood vessels with apple-green birefringence. Liquid chromatography tandem mass spectroscopy detected a peptide profile consistent with transthyretin/prealbumin type amyloid Thr60A1a,
establishing the diagnosis of hereditary amyloidosis with GI involvement. The patient was subsequently started on diflunisal 500mg twice a day, Lomotil, and a low fat diet with improvement in his symptoms. Subsequent echocardiogram revealed probable cardiac amyloid infiltration and is presently undergoing subsequent evaluation for possible liver transplant. Discussion: This case illustrates a rare cause of diarrhea, the utility of endoscopic examination with biopsy, and the value of maintaining a high clinical index of suspicion for rarer causes of diarrhea.

Carina Preskill, MD
Dennis M. Manning, MD

Spontaneous bladder rupture resulting in urinary ascites: a case of pseudo-renal failure

Intraperitoneal bladder rupture resulting in urinary ascites is a rare cause of peritonitis. Through a process of reverse peritoneal dialysis, the urinary ascites results in serum electrolyte derangements suggestive of acute renal failure despite normal renal function, thereby further clouding the diagnostic picture. Case: A 45-year-old woman with a history of type 2 diabetes, chronic kidney disease stage 3, and medically complicated obesity presented to the ED with diffuse abdominal pain. One week earlier, while twisting to get out of her car, she felt a "pop" in her abdomen followed by sudden onset of sharp right lower quadrant pain. The pain then spread in a band-like distribution across her abdomen. After several days of continued pain, she presented to the ED. Her abdomen was found to be distended and diffusely tender. Creatinine was significantly elevated to 10.8 mg/dL (from a baseline of 1.6 mg/dL), BUN was 87 mg/dL, and potassium was 6.5 mmol/L. Hemodialysis was initiated. CT of the abdomen revealed ascites, and she underwent paracentesis with removal of 1.5 liters of straw-colored fluid. The serum-ascites albumin gradient was 1.7. Although this was consistent with portal hypertension, there was no clinical evidence of portal hypertension and no evidence of liver disease on CT or ultrasound. Due to suspicion for bladder rupture, the creatinine level of the peritoneal fluid was measured, and was found to be significantly elevated at 14.5 mg/dL (serum creatinine was 11.2 mg/dL). A CT cystogram revealed contrast extravasation from the bladder into the peritoneal cavity, consistent with spontaneous tear of the bladder dome. A urinary catheter was placed for conservative management and the patient's abdominal pain resolved. Over the course of the next two weeks, her creatinine returned to baseline. On further questioning, the patient reported a history of surgical bladder trauma during a hysterectomy several years prior. It is likely that this area of weakened bladder wall predisposed her to spontaneous bladder rupture. Discussion: Spontaneous bladder rupture is rare and can easily be missed. Most often there is an underlying pathology that weakens the bladder wall such as a history of surgery, radiation, or trauma to the region, although this may not be initially apparent. Bladder rupture should be considered in a patient who presents with abdominal pain, ascites of unknown etiology and elevated creatinine. If the peritoneal fluid creatinine level is greater than the serum creatinine, it is highly suggestive of uroperitoneum. The diagnostic test of choice, however, is a CT cystogram. Depending on the size of the tear, ruptures can be managed conservatively or surgically. If this condition is identified and...
| Kevin Quinn, MD | **A Rare Cause of Chronic Diarrhea**  
Sarcoidosis is a multisystem granulomatous disorder of unknown etiology that is characterized by the presence of noncaseating granulomas in involved organs. Although sarcoidosis has a wide range of organ system involvement, 90% of sarcoidosis patients have intrathoracic disease. Gastrointestinal (GI) involvement, however, is very rare. When it does occur, GI sarcoidosis typically presents along with systemic disease and only very rarely presents as an isolated finding. A 72-year-old Caucasian female with past medical history significant for rectal cancer presents to clinic for evaluation of chronic diarrhea and recent weight loss. Six years prior to presentation, she was diagnosed with rectal cancer requiring neoadjuvant chemoradiation followed by low anterior resection and adjuvant chemotherapy. Shortly after her resection, she had changes in her bowel habits consisting of loose stools and occasional incontinence. These symptoms gradually improved as her stools became more formed and less frequent. Ten months ago, the patient underwent a surveillance colonoscopy that was normal. Immediately following the colonoscopy, she began with frequent diarrhea that has persisted. At present, she complains of at least twelve loose, watery stools each day in addition to five or more nocturnal bowel movements. Incontinence and leakage are common. Occasionally, she notes small amounts of blood in her stool. Associated symptoms include decreased appetite and 20-pound weight loss since symptom onset. She takes Imodium daily with minimal relief of symptoms. Workup has been negative for Clostridium difficile, fecal leukocytes, ova and parasites, Shigella, and salmonella. Following this initial visit, diagnostic testing for the etiology of her chronic diarrhea included computed tomography (CT) enterography, esophagogastroduodenoscopy (EGD), and sigmoidoscopy. Interestingly, EGD revealed gastritis and atrophy of the duodenum while sigmoidoscopy showed petechiae in the sigmoid and descending colon. Biopsies were obtained from the EGD and sigmoidoscopy, demonstrating granulomatous gastritis, duodenitis, and colitis, consistent with sarcoidosis of the GI tract. Additional testing is currently underway, including pulmonary function tests, chest CT, fungal serologies, and tuberculosis testing, prior to the initiation of treatment with corticosteroids. As highlighted by this case, sarcoidosis of the GI tract, although rare, may present with a number of nonspecific GI symptoms, including diarrhea. Due to the variability in presentation, the diagnosis of GI sarcoidosis is very difficult. Diagnosis requires the presence of noncaseating granulomas in the GI tract. However, more common causes of granuloma formation must be excluded, including Crohn’s disease, tuberculosis, Whipple’s disease, and fungal infections. This distinction can be made by the presence of specific histopathological features associated with sarcoidosis, including Schaumann bodies, intramucosal rather than submucosal granulomas, and lack of staining for mycobacteria or fungi. Once diagnosed, GI sarcoidosis typically has good response to corticosteroid therapy. Alternative agents may include methotrexate, azathioprine, infliximab, and cyclosporine for refractory cases. |
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<td><strong>Atypical Chest Pain Worsened By Stress Testing</strong></td>
<td>Coronary vasospasm can cause symptoms and ECG findings concerning for acute myocardial ischemia and is an important consideration when treating intermittent and atypical chest pain. Case Presentation: A 52-year-old female with a history of coronary artery disease, hypertension, multiple pulmonary emboli now on chronic anticoagulation, generalized anxiety disorder and obesity presented from the Emergency Department with a chief complaint of chest pain. She suddenly developed sharp chest pain while sitting at home, and she continued to have intermittent chest pain over the next several hours. The pain was not associated with exacerbating or alleviating factors, did not radiate, and was not complicated by shortness of breath. She denied a recent history of travel, illness, or hospitalization. Her vital signs were within normal limits upon arrival. On initial physical examination she was noted to be an anxious obese female with clear breath sounds bilaterally on pulmonary exam. Cardiac auscultation revealed a regular rate and rhythm with no murmurs or gallops. Her ECG was unremarkable for acute ischemia, and serial troponins were negative. The only initial remarkable laboratory finding was an INR of 4.1, above her INR goal of 3.0-3.5. Her history, presentation, and laboratory findings were inconsistent with active cardiac ischemia, but given her known history of coronary artery disease she was sent for Sestamibi Stress Testing with Regadenoson to rule out myocardial ischemia. While undergoing the stress test, she developed chest pain, shortness of breath, syncope and involuntary defecation. She was also noted to have significant ST-Elevations on her ECG in leads II, III, and aVF. She was taken emergently to cardiac catheterization due to concern for an acute inferior ST elevation myocardial infarction. Coronary angiography demonstrated only mild epicardial coronary artery disease with no acute thrombus. She was noted to have rapid improvement in chest pain and shortness of breath, and her ECG quickly returned to baseline. Due to the transient nature of her symptoms and unremarkable cardiac catheterization, she was diagnosed with coronary artery vasospasm, which was thought to have caused her symptoms due to reversible ischemia. She was begun on a calcium-channel blocker and continued on nitrates in order to help alleviate symptoms of coronary vasospasm. She improved during her hospitalization and was discharged home with resolution of her chest pain. Discussion: Coronary vasospasm can present in a manner similar to that of a myocardial infarction, producing reversible ischemia and ECG changes concerning for acute ST elevation MI. Sestamibi Stress Testing with Regadenoson, as was done in this case, has been associated with coronary vasospasm that results in transient signs of myocardial ischemia, with normal cardiac catheterization and typical resolution of symptoms. The treatment focuses on preventing vasoconstriction, utilizing drugs such as calcium-channel blockers or nitrates.</td>
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<td><strong>Renal Cell Carcinoma with Metastasis to the Right Ventricle without Renal Vein or Inferior Vena Cava Tumor Thrombus</strong></td>
<td>Though it is well known that renal cell carcinoma may invade the renal vein and inferior vena cava, occurrence of right ventricular metastasis is rare, and literature is limited to case reports. Presentation: A 58 year</td>
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old male with a history of hypertension, as well as first degree family history of pulmonary embolus and deep vein thrombosis, presented to the emergency department with increasing dyspnea. An outside CT of the abdomen and pelvis was notable for an 11 centimeter mass on the upper pole of the left kidney, with no extension into the renal vein or inferior vena cava. Outside biopsy results demonstrated renal cell carcinoma nuclear grade 3-4 with extensive necrosis. Retroperitoneal lymphadenopathy was also observed on CT. Furthermore, an irregular right ventricular mass was noted. Subsequent dedicated cardiac MRI with gadolinium was performed, which demonstrated an isolated mass in the right ventricular apex and inferior portion of the mid-right ventricular cavity. Neither MRI nor transesophageal echocardiogram showed extension of the multilobulated mass into the inferior vena cava or right atrium. The right ventricle exhibited normal function. CT angiogram was performed to delineate mass from thrombus, and to assess for pulmonary thromboembolism. CT angiography showed the mass to be consistent with collection of mixed tumor thrombus and bland thrombus. Extremity ultrasounds revealed no further clot burden, increasing suspicion that the right ventricular mass was malignant. PET-CT confirmed numerous lymph node metastases and right ventricular thrombus. The patient was begun on Pazopanib. After four weeks, repeat cardiac MRI showed small increase in the size of the right ventricular mass with right ventricular ejection fraction of 29%. Given his failure to respond to Pazopanib, the decision was made to proceed with cytoreductive nephrectomy and retroperitoneal lymph node dissection. Prior to further chemotherapy, another cardiac MRI was performed. The right ventricular mass had progressed to occupy approximately 75% of the right ventricle. At this time, the patient began to experience rapidly accelerating symptoms including weakness, altered mentation, and loss of appetite. Right ventricular failure became apparent with peripheral edema progressing to anasarca, and he was placed on hospice care. Discussion: Renal cell carcinoma originates from the renal cortex and accounts for 80-85% of all primary renal malignancies. At presentation, 45% of patients demonstrate localized disease, 25% have locally invasive disease, and 30% of patients have metastatic disease. Invasion of the renal vein and inferior vena cava occurs in 2-10% of patients with a renal neoplasm. Of those with venous invasion, 2-16% will have tumor thrombus extending into the right atrium. Isolated right ventricular mass is rare, with literature limited to case reports. Distinguishing tumor thrombus from bland thrombus continues to be a challenge through current imaging techniques.

Etiology for hemoglobin of 2.4.
Severe macrocytic anemia, neutropenia, and leukopenia in the setting of bone marrow biopsy with small population of abnormal blasts, is concerning for myelodysplastic syndrome. However, ruling out other treatable causes is quintessential, which is seen in this case of copper deficiency secondary to zinc overuse. A 59 y/o male presents with SOB, severe fatigue, and 50lb weight loss over the past 6 months. He is found to have a Hgb of 2.4, MCV of 110, WBC of 2.0, ANC of .5, and lactate of 12. Patient's B12, RBC folate, and MMA was not obtained prior to
transfusion, but his peripheral smear showed hypochromic red cell indices. Patient’s bone marrow biopsy was abnormal with small population of blast, thus patient was diagnosed with Refractory cytopenias with multilineage dysplasia. Patient was given Neupogen and showed a depend response. His anemia was persistent. Patient was also noted to have low ceruloplasmin of unclear etiology given his normal liver function tests and no signs of hemolysis. Thus, serum copper level and serum zinc levels were obtained. Patient’s zinc was elevated at 257 and his copper was low at 7. Patient was told to discontinue his zinc supplementation and given MVI containing copper. His anemia and neutropenia resolved with vitamin replacement, which was most likely the etiology of his bicytopenia. Myelodysplastic syndrome clinically manifests as an anemia with fatigue, weakness, angina, and cognitive impairment. Diagnosis is made based on peripheral blood and bone marrow findings in the appropriate clinical context. Of note, it is important to rule out other etiologies for quantitative changes in blood and bone marrow elements. Evaluating for hypothyroidism, Parvo virus, B12 deficiency, folate deficiency, medications, liver disease, and alcohol use is important given the macrocytic anemia noted in this patient. It is also important to keep in mind copper deficiency, which can occur with excessive ingestion of zinc because it is competitively absorbed in the GI tract.

Zachary Rosol, MD

The Little Fistula that Did

A 76 year old african american male with a medical history significant for end-stage renal disease status post transplant with fistula in place from prior dialysis, coronary artery disease, and diastolic congestive heart failure is admitted with one month of a persistent cough and associated shortness of breath. His primary care physician had initiated treatment for a COPD exacerbation and questionable pneumonia 5 days prior. Exam was notable for clear lung fields, a 2/6 early systolic murmur over the lower left sternal border, and 1+ pitting edema in the lower extremities. A chest xray revealed mild pulmonary edema. He was treated for a CHF exacerbation but failed to improve with diuresis. An echocardiogram was obtained revealing an ejection fraction (EF) of 90% and elevated pulmonary artery (PA) pressures. An echo performed 4 years prior had a normal EF and PA pressures. A repeat echo was obtain before, during, and after compression of the patient’s AVF which demonstrated normalization of the EF and transient bradycardia indicating a hemodynamically significant fistula. As the incidence of patients with end stage renal disease increases, along with its associated co-morbidities, it is important to remind ourselves of the complications, both incidental and iatrogenic that may accompany them.

Darin Ruanpeng, MD

Silent appendicitis, when to reveal?

Incidental finding of acute appendicitis in asymptomatic person undergo abdominal CT scan for other reasons is extremely rare. In one report of 2000 appendicitis undergo appendectomy, not a single case was pain absent as an initial symptom. A 21 years old male originally from Bangladesh whose CT angiogram of abdomen and pelvis were performed for an evaluation of secondary cause of hypertension which has never been fully worked up. Result revealed widely patent bilateral
renal arteries, 2 small angiomyolipomas in the left kidney and incidentally found an uncomplicated acute appendicitis. He was totally asymptomatic with normal vitals and physical exams. Differential diagnoses of appendicitis include TB, fungus, protozoa, inflammatory bowel disease or malignancy. Given the result of asymptomatic appendicitis, options of treatment include colonoscopy with biopsy vs. appendectomy. The patient was also advised to go to the ED if he developed fever or abdominal pain. Eleven days later, colonoscopy with biopsy was done. Patient complained of mild abdominal discomfort without fever the day prior to the procedure. Colonoscopy revealed localized moderate inflammation in the cecum and appendiceal orifice. However, given history of recent transient abdominal discomfort, tachycardia and chills during the procedure, colonoscopic and CT findings, he was prescribed an antibiotic. The biopsy result showed active colitis with erosion so the patient was then referred to the surgeon. Fifteen days after CT finding, he was still pain free, without fever. He was scheduled for urgent laparoscopic appendectomy. Twenty one days after an initial CT finding, he was seen for preoperative evaluation. He reported intermittent right lower abdominal pain, without fever or other GI symptoms. Physical exam showed RLQ tenderness without sign of peritonitis. He subsequently had an appendectomy. Intraoperative findings showed large inflammatory mass involving cecum, appendix, and terminal ileum. Laparoscopic hand assisted ileocecectomy was performed. Pathology revealed acute and subacute appendicitis, periappendiceal abscess formation and with reactive hyperplasia of the lymph nodes. This case represents an extremely rare asymptomatic acute/subacute appendicitis diagnosed incidentally in the CT scan. Although asymptomatic patient would make clinician think of other causes of abnormal CT findings beyond acute process, acute appendicitis can present without typical symptoms. Patient education, close monitoring and prompt surgical intervention should be obtained once clinically worsen.
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<th>Jordan Schaefer, MD</th>
<th>Folliculin Failure: A Case of Birt-Hogg-Dube Syndrome</th>
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<td>Mary J. Kasten MD</td>
<td>Surgical nephrectomy is often indicated for a large renal mass. Internists are often asked to assist in the preoperative assessment of these patients. Presented here is a case of Birt-Hogg-Dube Syndrome diagnosed during a pre-anesthesia medical exam. Case Description: A 51 year old male was evaluated by his local doctor for fatigue. Cross-sectional imaging revealed a 10 cm right renal mass with associated retroperitoneal lymphadenopathy concerning for renal cancer. He was referred for a pre-anesthesia medical exam by his urologist. The patient denied any significant medical history. On further review, he had been seen by multiple dermatologists for papules over his face and neck. He was treated on multiple occasions unsuccessfully for a diagnosis of acne. No biopsy was performed. Additionally, he had a history of a spontaneous pneumothorax eight years prior to his presentation that required chest tube placement. His screening colonoscopy was notable for several adenomatous polyps. Physical exam revealed cutaneous lesions consistent with fibrofolliculomas over the nose and neck. A comprehensive exam was otherwise normal. No periungual fibromas, hypomelanotic macules, shagreen patches, or eye lesions were present. Labs were normal. Review of his outside imaging showed the 10 cm renal mass, fatty infiltration of the liver, and marked cystic lung disease with over 20 thin walled cysts from 1 cm to 3 cm in size. FCLN gene mutation testing was performed to support the clinical diagnosis of Birt-Hogg-Dube Syndrome and appropriate counselling was initiated for his family. Right nephrectomy showed grade 3 (of 4) renal cell carcinoma, metastatic to a retroperitoneal lymph node. His post-operative course was complicated by recurrent pneumothorax requiring pleurodesis. Birt-Hogg-Dube Syndrome was first described in the 1970’s and is a rare, autosomal dominant genodermatosis that has been described in over 400 families. It is estimated to variably affect 1 in 2,000,000 individuals, characterized by cutaneous findings, pulmonary cysts, spontaneous pneumothoraces, colon polyps, and an increased risk of renal tumors. In the early 2,000’s the condition was mapped to chromosome 17p11.2 and later the FLCN gene was identified, encoding a protein called folliculin. While the role of this gene is still being explored, it may function as a tumor suppressor. This condition is felt to be underdiagnosed as a result of the rarity and variable clinical phenotype. A careful medical history, family history, physical exam, and review of radiographic findings can indicate a need for further testing. The diagnosis carries implications for patient surveillance and for potentially affected family members.</td>
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<th>Brittney Schultz, MD</th>
<th>Granulomatous Disease in X-linked Agammaglobulinemia</th>
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<td>Angela Aakhus, MD;</td>
<td>Granulomatous disease is a known manifestation of common variable immunodeficiency (CVID) and its etiology in this disease is unknown. It is associated with particular immunological phenotypes and certain complications such as autoimmunity and lymphoid malignancy. Treatment can be elusive. This condition has not previously been reported before in association with X-linked agammaglobulinemia. A 32-year-old man with a history of X-linked agammaglobulinemia presented with a three-week history of an eruption on his face, trunk and arms, biopsied as granulomatous dermatitis. Concurrently, he was...</td>
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pancytopenic and bone marrow biopsy was significant for noncaseating granulomas. Consultation with rheumatology and infectious diseases was sought, with exclusion of underlying autoimmune or infectious processes including sarcoidosis. Both his pancytopenia and skin eruption responded to prednisone, but worsened with taper of the medication. His pancytopenia progressed to the point that absolute neutrophil count was 0.2 despite high dose prednisone. He was subsequently started on mycophenolate mofetil with improvement in his pancytopenia and is now being tapered off prednisone with maintenance in hematologic counts and clearance of skin eruption. We report a presentation of granulomatous disease involving the skin and bone marrow in a patient with X-linked agammaglobulinemia, incompletely responsive to prednisone. This condition has previously only been reported in association with CVID, which encompasses a broad category of immunologic phenotypes, and its etiology is unknown. This case may provide clues to its pathophysiology, as the specific phenotypes of CVID that are associated with granulomatous disease share immunologic similarities with X-linked agammaglobulinemia. Treatment of our patient was challenging, which matches what has been observed in CVID. This case provides additional evidence for the use of mycophenolate mofetil in these patients. It remains unknown if the complications seen in patients with CVID and granulomatous disease would be expected in this patient. We encourage providers to consider this diagnosis in patients with noncaseating granulomas in the setting of X-linked agammaglobulinemia and to consider mycophenolate mofetil in the setting of steroid incomplete responsiveness.

John Schwerkoske, MD
Demetrios T. Andrisani, MD

Right on Target
New inhibitors targeting molecular pathways are revolutionizing the field of medicine and have the potential to restore cellular function and reverse disease pathology.
A 79-year-old woman with a history of idiopathic myelofibrosis resistant to medical therapy presented with worsening shortness of breath, hypoxia, and progressive transfusion-dependent anemia. Echocardiographic results revealed severe pulmonary hypertension in the setting of a low probability VQ scan and negative CTA. Technetium sulfur scan failed to show pulmonary microvascular infiltration of hematopoietic tissue. However, due to clinical suspicion of myelofibrosis as an etiology of her symptoms, she was treated with low-level chest irradiation to which she had minimal response. The patient was trialed on inhaled prostacyclin followed by continuous intravenous flolan. The patient’s oxygen requirements continued to increase along with worsening pain, progressive lethargy and an overall decline in performance status. Hematology was consulted and recommended therapy with ruxolitinib, a Janus tyrosine kinase 1 and 2 (JAK1/2) inhibitor which, at the time, was in phase III trial for myelofibrosis. The patient rapidly improved and in three months, pulmonary pressures were normalized by echocardiographic measurement and the patient was taken off flolan infusion and resumed a near-normal quality of life. Myelofibrosis is a chronic myeloproliferative disorder that often harbors a genetic mutation to
the JAK2 protein. The disease affects multiple organ systems and in some cases leads to refractory pulmonary hypertension. Targeted therapy against JAK2 with ruxolitinib can significantly improve performance status and improve patient quality of life. The inhibition of targets identified to drive disease pathogenesis such as JAK2 holds therapeutic potential. Ruxolitinib, a new JAK2 inhibitor, is a significant breakthrough in the treatment of myelofibrosis.

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<th>Justin Segraves, MD</th>
<th>A Not so Malignant Cause of Ear Pain and Facial Nerve Palsy</th>
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<td>Dr. John T. Ratelle</td>
<td>A Not so Malignant Cause of Ear Pain and Facial Nerve Palsy Justin M. Segraves, MD, and John T. Ratelle, MD, Department of Medicine, Mayo Clinic, Rochester, MN. Malignant otitis externa (MOE) is an uncommon, but feared complication of diabetes mellitus (DM), and is associated with significant morbidity and mortality. Patients typically present with otalgia and otorrhea, and can develop cranial nerve (CN) deficits. Prompt recognition and treatment of MOE is imperative, but clinicians should always consider alternative diagnoses. Ramsay Hunt syndrome (zoster oticus) is one such condition that can similarly present with otalgia and cranial nerve deficits. A 52 year old male presented to the emergency department with four days of left ear pain, otorrhea, and a facial rash, as well as two days of left facial weakness and dysarthria. Past medical history was significant for uncontrolled type II DM. Physical examination revealed a painful, swollen left ear with erythematous pustules along the V3 distribution. Neurologic exam was consistent with left CN VII palsy. A presumptive diagnosis of MOE was made, so ENT was consulted and systemic antimicrobials were initiated. CT of the head revealed thickening of the left external auditory canal and tympanic membrane, but no extension into the skull or other soft tissues. Swab of the ear grew Staphylococcus aureus, and swab of the rash was positive for varicella zoster virus (VZV). Final diagnosis was consistent with acute otitis externa and concomitant Ramsay Hunt syndrome. The patient was treated with oral ciprofloxacin and Ciprodex otic drops for his AOE, and valacyclovir with high-dose prednisone taper for Ramsay Hunt syndrome. At follow up he had improvement of his otalgia and otorrhea, but had some persistence of facial nerve palsy. MOE is differentiated from AOE by the severity and extension of infection. MOE frequently leads to osteomyelitis of the skull, and this can cause CN deficits in nearly half of patients. As opposed to AOE, which typically responds to topical antimicrobials, MOE requires systemic antimicrobials and surgical debridement, which is why a prompt and accurate diagnosis is imperative. Ramsay Hunt syndrome is caused by reactivation of VZV in the geniculate ganglion and should be considered on the differential diagnosis for otalgia and facial nerve palsy. These two symptoms, along with a vesicular rash, make up a classic triad, although the rash can initially be absent in up to a third of cases. Prompt diagnosis and treatment of Ramsay Hunt syndrome is also critically important, as delays in therapy are associated with poorer outcomes. In one study, seventy five percent of patients treated with acyclovir and corticosteroids within 3 days of symptom onset have complete recovery, compared with only 30% of those treated after 7 days.</td>
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An 83 yo male with history of sialadenitis, prostate CA status-post radiation therapy, and melenoma status-post resection presenting with 2 days of drenching night sweats and SOB. He reported generalized fatigue and some decrease in appetite for the last week. Pt denied any other symptoms, including fever, cough, sore throat, rhinorhea, nausea, vomiting, abdominal pain, diarrhea, constipation, and dysuria. The patient was afebrile, tachycardic, tachypnic, and hypoxic. He had a leukocytosis to 19. Chest x-ray showed a right lower lobe opacity. With signs and symptoms of infection, SOB, and infiltrate on chest x-ray, pt was admitted for PNA and initially treated with broad-spectrum IV antibiotics. Despite treatment, pt remained tachycardic with persistent leukocytosis (increased to 22), requiring supplemental oxygen. He was also noted to have mildly elevated liver enzymes. Sputum culture grew pan-sensitive E. coli, with no growth from blood or urine cultures. The patient felt well, overall, with good appetite and no fevers or sweats. Differential diagnosis was broadened, including TB, viral illness, pulmonary metastasis or malignancy, empyema, previously undiagnosed heart failure, and PE. A CTA Chest was obtained to rule out PE and better evaluate the pulmonary infiltrate seen on x-ray. Imaging showed a large hepatic abscess, extending into the right pleural space. Source control took nearly a week, requiring multiple drains. With fluid removal and antibiotics, pt improved. This case demonstrates the ease of anchoring on a diagnosis. In this gentleman with SOB and infiltrate on chest x-ray, pneumonia was presumed. When broadening our diagnosis, extra-pulmonary pathology still wasn’t strongly considered. Even the finding of elevated liver enzymes was initially tied into systemic or local response to a pulmonary process. Anchoring bias is especially difficult to avoid when faced with a uncommon presentation of a less common disease. With elderly males at greatest risk for hepatic abscess, it is still only present in 3.3 per 100,000 people. Hepatic abscess was not largely considered in a patient with no fever, abdominal pain, difficulty eating, history of biliary disease, or recent intraabdominal infection, despite the fact that right lower lobe extension is a known complication of this disease process. Following diagnosis, there were still many challenges with trying to remove the fluid collection. Pyogenic hepatic abscesses often present diagnostic and therapeutic challenges, as seen in the case.

Korosh Sharain, MD  
Cyril Varghese, Clement Michet

But, the ANCA is positive!
A 62-year-old man with a history of type 2 diabetes presented to his local emergency department with a worsening hemorrhagic bullous rash over his distal extremities. He also described an unintentional 40-pound weight loss and fatigue over the prior 6 months. He denied any shortness of breath, nausea, abdominal pain, or fevers. He was noted to have a new anemia to 10.3 g/dL, leukocytosis to 15.9x10(9)/L, and thrombocytopenia to 27x10(9)/L. His creatinine was elevated to 10.7 mg/dL from a baseline of 0.7 mg/dL. He was admitted for hemodialysis. Further workup demonstrated a positive C-ANCA and PR3 antibody with a negative P-ANCA and MPO antibody. His presentation was concerning for vasculitis, therefore, he was given one gram of IV methylprednisolone for 3 days. Unfortunately, his anemia and thrombocytopenia worsened and his rash continued to spread.
proximally. He was then transferred to our facility for further management. Upon transfer, his blood cultures from the outside hospital became positive for gram positive coccı in chains and he was started on broad spectrum antibiotics. A subsequent TEE demonstrated multiple large aortic and mitral valve vegetations and a mitral valve abscess. He was treated with IV ceftriaxone and required aortic and mitral valve replacements for Streptococcus mitis endocarditis. He was discharged 30 days after admission in stable condition. This case highlights the importance of understanding the differential diagnosis of ANCA positivity. Antineutrophil cytoplasmic antibodies are important markers for small vessel vasculitides; however, infective endocarditis can exhibit ANCA positivity and mimic vasculitis, presenting a diagnostic and treatment challenge. Small case series demonstrate that ANCA-positive infective endocarditis organ sequelae are limited to the kidneys and skin in contrast to ANCA vasculitides which can involve other organs such as the lungs or peripheral nerves. Additionally, almost all cases of ANCA-positive endocarditis are PR3 positive but MPO negative. Also, ANCA-positive infective endocarditis has higher morbidity and mortality compared to endocarditis without a positive ANCA, possibly due to delayed identification and therefore inappropriate treatment. Therefore, when vasculitis is considered, infection must be ruled out since immunosuppression could lead to dire consequences in an infected patient.

Solmaz Shayan-Kim, MD
Vinay Gupta, Peter Lund

Hodgkin Lymphoma Presenting with Myopathy

A 37 year old man presented to the emergency department with 6 month history of proximal muscle weakness, with additional associated symptoms of weight loss, night sweats, and more recently, swelling of the right side of his neck. CT of the chest, abdomen, pelvis and neck were done demonstrating diffuse lymphadenopathy, suspicious for lymphoma. An excisional supraclavicular lymph node biopsy and bone marrow biopsy of the iliac crest bilaterally were done. Results of pathology revealed classic Hodgkin Lymphoma. A CT PET study was done and findings were consistent with advanced lymphoma, including extensive hypermetabolic lymphadenopathy, pulmonary nodules and skeletal lesions. Laboratory studies revealed LD 644 IU/L, CBC with normal WBC, platelet count and mild anemia. Surprisingly CK 2274 IU/L. With respect to muscle weakness, EMG study demonstrated myopathy of the proximal lower limbs and right upper limb, with no significant abnormalities in nerve conduction. ANA was positive, speckled, 1:160, however, Anti Jo-1 was negative. A muscle biopsy was done and results are pending. Paraneoplastic antibody panel was negative. Patient was started on therapy with R-CHOP, as well as allopurinol prophylactically for tumor lysis syndrome. Hodgkin Lymphoma accounts for approximately 10% of lymphomas, and 0.6% of all cancers diagnosed in the developed world annually. Myopathy is not an established finding or paraneoplastic syndrome in Hodgkin Lymphoma. However, there are case reports with myopathy in Hodgkin Lymphoma. This case was unusual in that the patient had serendipitous myopathy in the setting of advance Stage IVB Hodgkin Lymphoma. Muscle weakness predated patient’s other symptoms and may very well have been a harbinger of underlying malignancy. In absence of
obvious neurological etiology for muscle weakness, an underlying malignancy such as lymphoproliferative disorder should be considered in the differential diagnosis.

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<th>Henry Shih, MD</th>
<th>A Clot on the Wrong Side of IVC Filter</th>
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<td>Learning Objectives 1. Recognize IVC filter as a cause of venous thromboembolism 2. Review anticoagulation strategy for patients with lupus anticoagulant. A 35-year-old woman was evaluated in the emergency department for epigastric abdominal pain after colonoscopy. Her medical history was notable for antiphospholipid syndrome with lupus anticoagulant, factor V Leiden heterozygosity, recurrent pulmonary embolism (PE), Greenfield inferior vena cava (IVC) filter placement for failed warfarin anticoagulation and pulmonary hypertension secondary to chronic PE. She was on daily enoxaparin, which was held for 24 hours prior to the screening colonoscopy. Computed tomography (CT) of the abdomen revealed a 10 cm thrombus attached to the apex of her vena caval filter extending superiorly. There was no evidence of bowel ischemia or new pulmonary embolism. She had no new cardiopulmonary symptoms. She was put on bed rest and anticoagulated with heparin upon admission to the hospital. Serum heparin concentration measurement was used for heparin titration. Due to the risk of developing massive PE, she underwent an AngioVac thrombectomy which successfully retrieved the IVC clot. She recovered well post-operatively. Her anticoagulation regimen was subsequently switched to fondaparinux, as enoxaparin failed to prevent the development of the large and life threatening thrombus. Repeat CT imaging 2 months after the thrombectomy showed no evidence of new thrombus development. Discussion: For patients with recurrent PE despite adequate anticoagulation, IVC filter placement can theoretically reduce the chance of subsequent PE by capturing embolism from the lower extremities. However, there are no good data supporting this treatment strategy and some would argue that switching to another anticoagulant or increasing the intensity of anticoagulation would be more effective strategies to prevent recurrent thrombosis. While clot development inferior to the IVC filter is considered to be a success of filter function, it is essential to note that the filter itself is thrombogenic. The mechanism is thought to be due to turbulence related blood flow stagnation and vessel wall shear stress change around the filter. Our patient unfortunately had a large thrombus on the atrial side of IVC filter carrying a high risk for massive PE and necessitating mechanical thrombectomy. Possible reasons for thrombosis in our patient include either failure of anticoagulation with enoxaparin, or a lack of anticoagulation for a brief period (~12 hours) prior to the colonoscopy, in the setting of a thrombogenic stimulus – the IVC filter, in addition to the existing hypercoagulable state. Fondaparinux was chosen ultimately for long-term anticoagulation for presumed failure of both warfarin and enoxaparin. Interruption of anticoagulation, even for a brief period, should be avoided in patients with a hypercoagulability disorder and an IVC filter.</td>
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| Rena Singleton, MD | Cotton Fever: Should the approach to management of the febrile patient with history of intravenous drug abuse be changed? Differential diagnosis in a febrile patient with history of intravenous |
drug abuse (IVDA) is broad and challenging. Antibiotic initiation is usually prompt, often with hospital admission. Should antibiotic therapy be discontinued if symptoms resolve in under 24 hours and there is no evidence for infection? Case Description: A 21-year-old female with no PMH is brought to the Emergency Department after waking with subjective fever and a "racing heart." She denies any other symptoms. Social history reveals active IVDA with injection of white powder heroin seven hours ago. Detailed injection history is collected: she reports she draws up heroin through a cotton filter. On physical exam, she is febrile to 102.9°F, BP 86/52, HR 165bpm, O2 sat 98% on room air. She appears anxious, and scabbed needle tracks are present on the left forearm. Exam is otherwise normal. WBC 2.2, lactate 4.3, procalcitonin >60. Pregnancy and HIV testing are negative, LFTs, BMP, Hgb, UA, TSH are normal. EKG shows sinus tachycardia, chest xray and bedside TTE are unremarkable. One liter of normal saline is given and hypotension and tachycardia resolve. Vancomycin and Zosyn are started and she is admitted. All signs and symptoms resolve within 12 hours, blood cultures remain without growth. Lactate normalized and vitals stabilized after initial IV fluid administration. Infectious Disease is consulted and diagnose patient with Cotton Fever, and antibiotic therapy is discontinued. Discussion: Cotton Fever is an acute-onset, self-limited febrile syndrome first reported in 1975; it is seen in individuals with IVDA who utilize cotton as a filter for an injected drug. Up to 26% of febrile illness presentations in patients with IVDA may be due to Cotton Fever. Heroin solution is often drawn up through a filter like cotton for injection. Used cotton fibers may be later heated in an attempt to draw out absorbed heroin. Cotton Fever presentation can be dramatic with varied symptoms that resolve within 12 to 24 hours. Transient lab abnormalities are reported. Two mechanisms are proposed. One is cotton itself is a pyrogen. An endotoxin-mediated reaction is also suspected (cotton plants are heavily colonized with Gram negative rods). Inhalation of purified endotoxin complex and of cotton plant extracts have similar effects to those seen in Cotton Fever; heating can further enhance endotoxin effects. Conclusion: Patients with IVDA history present a high-risk group for infection, and Cotton Fever should be a diagnosis of exclusion. The diminishing effectiveness of antimicrobial therapy is ever visible, underscoring the importance of antimicrobial stewardship. It has been suggested that patients like the one described here be admitted to an observation unit, with recommendation of prompt cessation of antibiotics if symptoms resolve within 12 to 24 hours and no objective evidence for infection is found.

Linnea Smith, MD

An Unexpected Cause of Gastrointestinal Symptoms After Initiation of HAART for HIV

A 43 year old female with HIV/AIDS (CD4 count 35 cells/mm3) presented with one week of crampy abdominal pain and four days of melena. She was found to be anemic with hemoglobin 8.3 g/dl, down from 9.5 g/dl two months prior. She had recently restarted HAART medications one month prior to onset of symptoms, after being without treatment for the previous five years. One month prior, her CD4 count was 35 cells/mm3 and HIV viral load was 296,878 copies/ml.
In addition to HAART, she was started on Azithromycin, TMP/SMX, and Acyclovir for Opportunistic Infection (OI) prophylaxis. The patient underwent Upper GI endoscopy, which showed normal esophagus and stomach, but proximal duodenum with patchy whitish mucosa with diffuse flattening of villi. Biopsies were obtained. She then underwent colonoscopy, which found sessile polyps and granular mucosa in the distal transverse colon, all of which were biopsied. Pathology results from duodenum, transverse colon mucosa, and polyps showed mucosal expansion by foamy macrophages laden with numerous acid-fast mycobacteria on AFB stain, consistent with Mycobacterium Avium Intracellulare. The patient was started on Clarithromycin, Ethambutol, and Rifabutin, with plan for prolonged course of at least one year. Her HAART medications were continued. This case illustrates the importance of considering MAC infection of the gastrointestinal tract, along with other OIs in HIV-infected patients with low CD4 cell counts and GI symptoms or bleeding. Diagnosis may require upper endoscopy and/or colonoscopy with multiple biopsies. Microscopically, the tissue is filled with distended histiocytes packed with acid-fast organisms. The macrophages are unable to lyse or digest the bacilli because of the CD4 T-cell immunodeficiency of HIV/AIDS. Disseminated MAC appears to result from primary acquisition of the pathogen, in contrast to tuberculosis in AIDS which results from reactivation of previously contained infection. The patients at highest risk of disseminated MAC are those who have CD4 counts <50 cells/mm³, with infections rare with CD4 >100 cells/mm³. In patients receiving HAART, the risk of developing MAC (and other OIs) is highest during the initial months of therapy, with low CD4 counts being the best predictor. Since the introduction of HAART, MAC infections of the GI tract are rare except in patients who progress to advanced HIV/AIDS. First-line treatment for MAC consists of Clarithromycin and Ethambutol, with many clinicians adding Rifabutin for associated decreased resistance and improved survival. Amikacin or Streptomycin may be added for patients at high risk of death from MAC. Although the optimal duration of therapy remains unclear, IDSA guidelines suggest at least 12 months of therapy and six months of immune reconstitution with HAART.

**Clayton Spiceland, MD**
Anjali Bhagra MBBS, Associate Professor of Medicine, Department of Internal Medicine, Mayo Clinic

**A Startling Consequence of a Common Disease**
Benign prostatic hyperplasia (BPH) is a common problem that affects the quality of life of over 14 million men in the United States alone. By age 50, over one third of men have symptoms of BPH and by age 85, 90% of men are affected. The large number of affected men, ease of access to diagnostic tests, and the availability of pharmacologic therapy make BPH an appropriate condition for primary care diagnosis and management. A previously healthy 61-year-old man presented to the emergency department after an episode of gross hematuria. Physical exam was significant for suprapubic distension and tenderness to palpation over the lower abdomen. Laboratory data showed a stable hemoglobin and elevated creatinine. Computed tomography revealed a markedly distended bladder extending to the level of the mid-abdomen measuring 17 cm x 15 cm x 11 cm. The bladder wall was noted to have a trabeculated contour with several wall diverticula. Severe bilateral hydronephrosis and ureterectasis were also present. A
urinary catheter was placed and returned over two liters of dark red urine and clots. The patient reported significant relief after bladder drainage. Follow-up cystoscopy showed severe bladder trabeculation appearing to be reactive secondary to chronic asymptomatic bladder outlet obstruction. The patient was discharged with an indwelling Foley catheter in place and transitioned to intermittent catheterization. This case illustrates a startling consequence of a common disease which is commonly treated by Internal Medicine and other primary care physicians. Chronic bladder outlet obstruction secondary to BPH may lead to urinary retention and severe bladder distention, which can result in renal insufficiency and gross hematuria. Recognition and treatment of BPH is critical in prevention of these severe complications.

Plastic Bronchitis: “Casting” Light on a Case of Recurrent Pneumonia

Plastic bronchitis is an uncommon disease featuring thick, bronchial cast formation and mucus plugging which can cause occlusion of major bronchi, respiratory distress, and death secondary to bronchial obstruction. A previously healthy 33 year old female presented to the intensive care unit from an outside hospital for recurrent pneumonias. Over the previous four months, she had multiple hospital admissions for recurrent bilateral pneumonias. Extensive workup at the outside facility including cystic fibrosis genetic testing, HIV, and fungal serologies were negative. She underwent multiple bronchoscopies that showed extensive mucus plugging and bronchial casts. She was intubated at the outside hospital for respiratory distress secondary to thick, mucous secretions and transferred to our hospital for further evaluation. On presentation, a chest x-ray showed diffuse alveolar opacities in the left lung with bilateral basilar infiltrates. Echocardiogram was unrevealing for an etiology. Laboratory workup was notable for a mildly elevated ESR and C-reactive protein. Autoimmune workup including ANA, ANCAs, and rheumatoid factor were negative. Bronchoscopy was performed and showed the entire left lung occluded by soft mucus plugs and bronchial casts as seen in Plastic Bronchitis. She was managed with inhaled hypertonic saline, dornase alfa and N-acetylcystine. She was extubated with symptom improvement and discharged. Follow up three months later demonstrated resolution of symptoms. Plastic bronchitis is a rare disease involving tracheobronchial mucous casts which can cause airway obstruction and death. It is associated with congenital heart disease, mucus hypersecretion, asthma, infectious etiologies and can occur at any age. Casts are rubbery in consistency and can be separated into type I (inflammatory) and type 2 (acellular). Inflammatory casts are composed primarily of fibrin with eosinophilic infiltrates and are associated with pulmonary disease. Acellular casts lack inflammatory cells, are composed of primarily mucin, and are associated with cardiovascular surgery. Plastic bronchitis is commonly reported after Fontan operations for congenital heart disease in the pediatric population. However, the cause is often idiopathic with no underlying etiology found. Due to the rarity of the disease, the management is not well defined. Bronchoscopy and cast removal is helpful to prevent fatal bronchial obstruction. As with our patient, mucolytics and hypertonic saline can be used, although limited outcome data are available. Case
reports have described T-PA as a possible treatment for plastic bronchitis, although again, outcomes are anecdotal. Casts may be self-limiting and resolve with time or correction of an underlying pathology. Since bronchial obstruction may lead to respiratory failure and death, recognition of this rare disease is crucial to preventing morbidity and mortality associated with plastic bronchitis.

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<th>Paolo Strati, MD</th>
<th>A Case of Vancomycin-Induced Immune Thrombocytopenia</th>
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| Pratik Patel, Jason Post | Thrombocytopenia is a common medical problem encountered by the general internist especially in the inpatient setting. The differential diagnosis of thrombocytopenia is broad and includes two major etiologies: decreased platelet production or increased platelet destruction due to an immune mediated or microangiopathic process. Workup may include a thorough history and physical, complete blood count with differential, peripheral smear, hemolysis labs, heparin-induced thrombocytopenia (HIT) screen and coagulation markers. Here, we report a rare cause of thrombocytopenia: vancomycin-induced immune thrombocytopenia. Case: 61 year old male was referred from an outside facility to our Emergency Department after a finding of thrombocytopenia. He had a total right hip arthroplasty three weeks prior to admission. Two weeks after the surgery, he developed septic arthritis of the prosthetic joint with joint cultures growing staph epidermis. He underwent a revision of arthroplasty with removal of prosthetic components and was started on a six week course of vancomycin. His outpatient followup ten days later revealed a drop in the platelet level to 7000 (from 173,000 at the time of discharge) and a gradual reduction in hemoglobin (6.9, from 13.5 six months before). During his hospitalization, the workup for thrombocytopenia, including a HIT screen (though the patient was not on heparin prophylaxis, exposure to heparin products during surgery couldn’t be ruled out), DIC labs, peripheral smear, reticulocyte count, and coombs test were unremarkable. Due to concern for vancomycin induced thrombocytopenia, his systemic vancomycin therapy was discontinued and he was initiated on daptomycin. He received two units of platelets with minimal improvement of his platelet count. After discontinuation of his vancomycin, his platelet count slowly trended up and was improved to 112,000 at the time of discharge and to 151,000 two weeks later during an outpatient followup. On blood drawn 4 days after the onset of thrombocytopenia, his labs returned positive for vancomycin dependent, platelet reactive IgG. Discussion: Only twelve cases of vancomycin-induced immune thrombocytopenia have been reported in the literature thus far. It should be suspected in a patient who has a normal platelet level at the start of vancomycin but who then develops thrombocytopenia, usually within one week. Other causes of thrombocytopenia need to be ruled out with a workup guided by the patient’s clinical presentation. The diagnosis of vancomycin-induced immune thrombocytopenia is made by demonstrating vancomycin dependent, platelet reactive IgG and/or IgM antibodies in patient’s serum and a return of platelet count to normal level with discontinuation of vancomycin. The antibodies are thought to target glycoproteins on the platelet surface and require presence of vancomycin (i.e. drug dependent) to bind to the platelet surface. In
summary, vancomycin-induced immune thrombocytopenia is rare but should be suspected in a patient who develops thrombocytopenia shortly after starting vancomycin.

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<th>Alan Sugrue, MD</th>
<th>Recurrent Spontaneous bilateral pneumothorax with thin walled cavities: A case that leads to the scalp</th>
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<td>Chris Stephenson, Luke Hafdahl</td>
<td>Spontaneous bilateral pneumothorax is a rare and life threatening condition. It is often associated with underlying lung disease or malignancy, either primary or metastatic. A 75 year old male presented to the emergency department complaining of shortness of breath, haemoptysis and chest discomfort for 3 weeks. He also described decreased weight loss of approximately 20 lbs over three months. He had a past medical history significant for removal of an angiosarcoma from his scalp in April this year. He also had bladder cancer s/p TURBT in 2013, prostate cancer s/p prostatectomy in 1995. He denied any infective symptomatology and review of systems was negative. He had a significant smoking history of 83-pack year. His laboratory values on admission were within normal limits apart from a normocytic anaemia (Hb 10.5). On physical examination he was tachypneic with a respiratory rate of 30. Auscultation of the lung showed decreased breath sounds of the right sided with hyperresonant percussion. He had no palpable lymphadenopathy; on his scalp he had a large incision from his recently removed angiosarcoma. Chest x-ray showed a right-sided pneumothorax with some cavitating lesions. While transferred to the interventional radiology (IR) suite for a right chest drain, he become progressively more short of breath, and was subsequently diagnosed with a new spontaneous left sided pneumothorax and had to have two pigtail chest drains inserted on both the right and left side. He also underwent a right lung biopsy of one of the cavitating lesion. His biopsy came with a diagnosis of metastatic angiosarcoma, with the primary lesion been from his scalp. He was commenced on weekly taxane therapy. His hospital course was complicated by multiple recurrences of a left sided pneumothorax, which we treated with a Heimlich valve (one way valve) attached to his left sided chest drain, which enabled him to be discharged. Angiosarcoma are a rare soft tissue sarcoma (2% of all sarcomas), they are highly malignant and are of vascular or lymphatic epithelial origin. Angiosarcoma of the scalp has a predilection for pulmonary metastasis, classically known to form thin walled cavities. The reason behind pneumothoraces remains obscure. Prognosis is poor with survival at 20% over two years with metastatic disease. Treatment is with taxanes based therapy, with newer agents Pazopanib showing promise. The case highlights the rarely described association between metastatic angiosarcoma and spontaneous pneumothorax, as well as the classically described thin wall cavities. It is extremely rare to develop bilateral spontaneous pneumothoraces and it can be difficult to manage recurrent spontaneous pneumothoraces in an ambulatory setting. The use of Heimlich valve enabled us to treat any further recurrent pneumothoraces, allowing him to return home, providing both benefits for the patient and health care system.</td>
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<th>Bryan Svobodny, MD</th>
<th>Wide Complex Tachycardia: Supraventricular or ventricular in origin?</th>
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<td>Arrhythmia is a common occurring event in the hospitalized setting, and determining whether arrhythmia originates above the ventricle versus</td>
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within changes clinical management. The criteria to discriminate between supraventricular and ventricular arrhythmia include assessing electric axis, relationship between atrial and ventricular contraction, and duration of ventricular contraction which will be further reviewed during this case. A 52 year old male whom was initially admitted with Ascending Cholangitis now status post ERCP and Stone removal whom went into tachycardia, thus a Rapid Response Team was called. On arrival, the patient was alert, oriented, talking in full sentences. Analysis of lead II on the bedside telemetry was remarkable for a wide complex tachycardia, with subsequent 12 lead EKG remarkable for a regular rhythm in the 180's. Based on EKG interpretation, it was thought that the arrhythmia was originating above the ventricle, rather then within, thus the decision was made to give adenosine, with subsequent return to sinus rhythm. This case illustrates the importance of interpreting whether an arrhythmia originated above versus with in the ventricle, as this drastically changes management, deciding whether to cardiovert, administer an ventricular anti-arythmic, versus giving a AV nodal blocker.

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<th>Miguel Teixeira, MD</th>
<th>Hypokalemia: The Least Liddle Thing</th>
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| Shrikant Tamhane, MBBS | Liddle’s syndrome is a rare cause of hypokalemia, but its simple treatment with dramatic improvement warrants an internist to not overlook it. This clinical vignette illustrates the need to question an established diagnosis and elaborates on the differential diagnosis of chronic hypokalemia and hypertension. CASE DESCRIPTION: Ms. JS is a 63 year-old female with a complicated medical history who was transferred to Mayo with sepsis in the setting of cholangitis secondary to choledocholithiasis. She was previously diagnosed with congestive heart failure, and was on chronic furosemide treatment, DJD and chronic pain requiring steroid injections, presumed Addison’s disease on Fludrocortisone and Hydrocortisone replacement, complicated obesity status post Roux-en-Y surgery, hypokalemia requiring 100meq a day and hypertension. The endocrinology consult service was asked to provide recommendation regarding her glucocorticoids during the perioperative period. Upon review of her medical history we noted she had chronic hypokalemia since her 20s which was attributed to boulimia-like behavior. She had a family history of hypokalemia and hypertension that began at an early age. Her echocardiogram showed preserved systolic ejection fraction without diastolic dysfunction. Her lab work up revealed an undetectable aldosterone level, but features consistent with mineralocorticoid excess by way of fluid retention, hypokalemia, and metabolic alkalosis. In the context of chronic hypokalemia and hypertension with low plasma aldosterone concentration and abnormally low renin levels, we explored alternative possibilities for her hypokalemia other than her furosemide treatment, supraphysiological doses of glucocorticosteroid, hypomagnesemia, albuterol nebulizations and diarrhea given no improvement despite removal of possible offenders. We considered Liddle”s syndrome, 11-beta-hydroxylase deficiency, familial glucocorticoid resistance, syndrome of apparent mineralocorticoid excess, and deoxycorticosterone producing tumors. The lack of virilization with normal adrenals on CT made 11-beta-hydroxylase deficiency and
familial glucocorticoid resistance unlikely and her 11-deoxy cortisol levels came back low. On high suspicion of Liddle’s syndrome, the patient was started on an empiric trial of amiloride 5 mg twice a day which resulted in marked improvement. Ms. JS is no longer requiring potassium supplements, her edema has improved despite the discontinuation of furosemide and her hypertension is now controlled. Genetic testing for Liddle syndrome is pending to confirm the diagnosis. As physicians we are taught to not only answer questions, but also to question answers. The case highlights the need to constantly explore alternative diagnoses, which can lead to an intellectually stimulating learning work environment as well as improved patient outcomes. Liddle syndrome is caused by dysregulation of an epithelial sodium channel called ENaC due to a genetic mutation. Amiloride or triamterene directly blocks ENaC. Liddle syndrome is an exceedingly rare disorder that results in cardiovascular and renal complications, but once treated, its prognosis is excellent.

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<th>Matthew Thoendel, MD</th>
<th>Physician Compliance with Respiratory Isolation Precautions in an Ambulatory Clinic</th>
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| John T. Ratelle      | Physician Compliance with Respiratory Isolation Precautions in an Ambulatory Clinic Matthew J. Thoendel, M.D., Ph.D., John T. Ratelle, M.D. Mayo School of Graduate Medical Education, Mayo Clinic, Rochester, MN Objective: To understand rates of compliance and barriers to respiratory isolation precautions during interactions with patients with upper respiratory infections (URIs) presenting to an ambulatory primary care clinic. Background: Upper respiratory infections are a large burden on the healthcare system with cough as the third leading reason for outpatient office visits following only general medical exams and progress visits. Upper respiratory infections can range in severity from common colds to potentially more severe cases including influenza, pertussis and pneumonia. Many of these diseases are highly contagious. They are typically spread through aerosolized droplets and contaminated secretions. Current recommendations for preventing spread include respiratory isolation precautions, which require providers to wearing a facemask during interactions when the patient removes their facemask; however these recommendations are not often adhered to. Methods: This quality improvement project involved a primary care internal medicine clinic at Mayo Clinic, Rochester, MN. We utilized the define, measure, analyze, improve, and control (DMAIC) model to better understand provider compliance with respiratory isolation precautions. Stakeholders were identified and included patients, internal medicine (IM) residents, staff physicians, nurse practitioners, nurses, clinical assistants, clinic supervisors and room stockers. A magnitude assessment was conducted in which patients with URIs filled out surveys immediately after their encounters to assess 1) whether wearing a mask was indicated and 2) whether the provider complied with this. Additionally, qualitative interview with providers were conduct to identify and understand barriers to adherence. Results: Initial magnitude assessment revealed that respiratory isolation precautions were indicated in 82% (65 of 79) ambulatory patient encounters. When indicated, providers were compliant with respiratory isolation
precautions 43% (28 of 65) of the time. A fishbone diagram was used to perform a root cause analysis which identified many barriers including providers being unaware of recommendations, lack of facemask availability, and providers being unaware of which patients had URIs. Conclusion: During the initial stages of this quality improvement project, we have shown that provide compliance with respiratory isolation precautions is suboptimal. Stakeholder interviews have identified several important barriers. Based on these findings multiple interventions have been proposed to improved provider compliance, including improving access to facemasks in examination rooms and notification systems for which patient encounters require respiratory isolation precautions.

| Mauricio Torrealba, MD  
David Miranda M.D.,  
Yader Sandoval, M.D. | Hypertrophic Cardiomyopathy: Transitioning from Exotic to Common and the Increasing Role of Internists in its Management. |
|-----------------------|----------------------------------------------------------------------------------------------------------|
|                        | Hypertrophic cardiomyopathy (HCM) is the most common inherited cardiac disease. Due to its frequency in the general population, it is essential for clinicians to recognize patients with HCM, primarily so appropriate risk stratification can be performed to detect patients at high-risk who can benefit from prevent of sudden death with the use of implantable cardioverter-defibrillators. We present a case of a previously ‘healthy’ individual that presented with confusion after ingesting illicit drugs and was found to have systolic murmur on routine evaluation. A 43-year-old male with no prior medical history was referred to the general medicine clinic to establish primary care after having an initial presentation in the emergency room (ER) with confusion. He had presented to the ER 2-weeks prior with confusion and a possible syncopal event. Once evaluated in the medicine clinic, his primary concern was memory loss. He denied a family history of sudden cardiac death or cardiomyopathies. Physical examination revealed an unremarkable neurological examination. On cardiac auscultation he was found to have a harsh systolic ejection murmur. Auscultation maneuvers were performed but no evident change was identified on auscultation. Transthoracic echocardiogram revealed a dynamic left-ventricular outflow tract obstruction in the setting of asymmetric septal hypertrophy with a maximum septal dimension of 3.3 cm consistent with the diagnosis of hypertrophic cardiomyopathy. The patient was referred to Cardiology and subsequently had a cardiac magnetic resonance imaging study demonstrating marked late gadolinium enhancement in the septal wall. He subsequently underwent implantation of a dual chamber ICD. HCM is a disease that over the past decades has transformed itself from a “rare” disease, to a common entity. More importantly, multiple research efforts over time have led to the identification of several high-risk features, that if present would warrant the consideration for preventative therapy (i.e. ICD). Consequently, it is important for clinicians to recognize and increase the awareness of HCM. It deserves note, that HCM is a condition in which clinical history, including a detailed family history and careful understanding of any clinical event such as syncope, is primordial to manage these patients. Furthermore, physical examination may often provide fundamental clues to reach the diagnosis. In addition to a careful history and examination, imaging with
echocardiography and cardiac MRI, as well as Holter monitoring will help risk-stratify these patients. Take Home Points: - Given its frequency, it is important for clinicians to recognize and increase the awareness of HCM. - A careful history coupled with a detailed physical examination may provide important clues to make the diagnosis and/or trigger additional evaluation.

Melissa Touroutoutidis, MD

An unusual case of splenic abscess

Splenic abscess is an uncommon infection typically resulting from infectious endocarditis or hematogenous seeding from other sites of infection. This is a case of a patient who developed extraintestinal Clostridium difficile infection that presented as a recurrent splenic abscess, an exceedingly rare presentation of C diff infection that proved difficult to manage. Case discussion: A 74 year old male presented with a week of increasingly lethargy, weakness, and dizziness as well as drainage from a percutaneous fistula at the site of a prior abdominal drain. He had been treated two months prior for a splenic abscess after presenting with LUQ abdominal pain, lethargy, and fever. This was managed with percutaneous drain because he was felt to be a poor surgical candidate. Clostridium difficile was isolated from this abscess and he was treated with a 4-week course of oral metronidazole and percutaneous drainage with removal of the drains shortly prior to the end of the course of antimicrobial therapy. He had been doing well for the few weeks prior to his current presentation. On imaging with CT abdomen with contrast, he was found to have recurrent abscess for which percutaneous drain was placed and cultures were obtained, confirming the diagnosis. A second course of metronidazole was started. Repeat imaging was performed and showed no decrease in size of the abscess despite adequate placement of the drain on imaging and sinogram. Aggressive saline flushes of the abscess pocket were then performed and after 3 days of flushes, imaging showed interval decrease in the size of the abscess. At this point the patient was discharged with a prolonged course of metronidazole and a drain in place. Splenic abscess is an uncommon infection, typically occurring as a result of infectious endocarditis or hematogenous spread of infection from other sites. Approximately 5% of patients with IE develop splenic abscess, which presents with fever that is recurrent or persistent despite appropriate antimicrobial therapy and left upper quadrant pain with or without splenomegaly. CT is the recommended imaging modality for identifying splenic abscess, although these lesions may be incorrectly categorized as splenic infarcts, which also can be a complication of bacterial endocarditis. Organisms implicated in the development of splenic abscess are often the same as those causing infectious endocarditis; mostly staphylococcal and streptococcal species, but enteric gram negatives are also frequently identified, including Klebsiella species, Escheria coli, and enteric anaerobes. Splenic abscess is rare and has only a frequency of somewhere around 0.05-0.7% annually. Splenic abscess secondary to Clostridium difficile is exceedingly rare with only a few case reports worldwide. Management of splenic abscess in general and specifically as it related to this case will be discussed.

Mazie Tsang, MD

The efficacy of Ibrutinib, a novel Bruton’s tyrosine kinase inhibitor, in
| Mazie Tsang, MD; Tait Shanafelt, MD; AND Sameer Parikh, MD. | **the treatment of Richter Syndrome**  
The efficacy of ibrutinib, a novel Bruton’s tyrosine kinase inhibitor, in the treatment of Richter Syndrome  
Mazie Tsang, MD; Tait Shanafelt, MD; AND Sameer Parikh, MD.  
Department of Medicine. Mayo Clinic, Rochester, MN.  
Introduction: Ibrutinib, a Bruton’s tyrosine kinase inhibitor, has revolutionized the treatment landscape for patients with chronic lymphocytic leukemia (CLL). However, its efficacy in the management of Richter Syndrome (RS)—defined as the transformation of CLL into a more aggressive lymphoma, typically diffuse large B-cell lymphoma)—is currently unknown. Here, we present our experience with the use of ibrutinib in the treatment of RS.  
Case presentation: Four patients (median age 71 years, range: 62-74 years; 2 males) developed biopsy-proven RS after a median of 4.3 years (range: 3.1-11.4 years) from their CLL diagnosis. At the time of CLL diagnosis, the B-cells in all patients had positive expression of ZAP-70 and unmutated immunoglobulin mutation status (both are adverse prognostic markers). Florescence in situ hybridization studies demonstrated deletion 17p in one patient (adverse prognostic marker), deletion 13q in one patient (favorable prognostic marker), and normal results in two patients (intermediate prognostic marker). All had received prior CLL therapy.  
At the time of transformation, three patients (75%) were treated with an anthracycline-containing regimen, R-CHOP (rituximab, cyclophosphamide, adriamycin, vincristine and prednisone), with no response. Subsequent regimens included R-ICE (rituximab, ifosfamide, carboplatin and etoposide, n=2); R-DHAP (rituximab, cytarabine, cisplatin and dexamethasone, n=1); and R-EPOCH (rituximab, cyclophosphamide, adriamycin, vincristine, prednisone and etoposide, n=1) with no response.  
Due to the refractory nature of RS, single-agent ibrutinib (dosage range 140-420 mg orally daily) was initiated in these three patients. The fourth patient was directly started on single-agent ibrutinib 420 mg orally daily at the time of transformation. All patients responded to therapy with an improvement in constitutional symptoms, lymphadenopathy/organomegaly, and transfusion requirements.  
The median duration of therapy with ibrutinib for all patients is 4.8 months (range, 0.9-8.2 months), and therapy is currently ongoing in 3/4 (75%) patients. Ibrutinib therapy was well-tolerated; no patient required discontinuation of therapy due to adverse effects. Dose adjustment was necessary for one patient due to concomitant use of medications metabolized through the CYP3A4 pathway (i.e. voriconazole)—this patient died of pulmonary mucormycosis, which predated the initiation of ibrutinib therapy.  
Conclusion: These cases illustrate the potential for ibrutinib as a novel therapeutic approach for patients with newly diagnosed and refractory RS. Although 7/85 (8%) relapsed/refractory CLL patients in the pivotal ibrutinib study developed transformation to RS, this case series demonstrates that ibrutinib has substantial clinical benefit in patients with RS that is refractory to standard treatment regimens. Future trials investigating the use of ibrutinib either as a monotherapy or in combination with standard chemotherapy regimens for RS are warranted. |
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<td>Tyler Ulbrich, MD</td>
<td><strong>Have we Made A Diagnosis or Just Given Steroids? The Age-old Question.</strong></td>
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IgG4-Related disease is an increasingly recognized immune-mediated condition, which tends to present in varying clinical patterns with common findings of tumor-like swelling of involved organs, and lymphoplasmacytic infiltrate enriched in IgG4 positive plasma cells. This is accompanied by varying degrees of fibrosis of the involved organs and elevated serum IgG4 concentrations in 60-70% of patients. Most frequently this disease coalesces as autoimmune pancreatitis, but evidence is mounting of presentations with retroperitoneal fibrosis, sclerosing mesenteritis, as well as a number of other variable systemic presentations. Case: A 38 year old female with tissue diagnosed IgG4-RD. She presented with an atypical pattern of parasthesias in a band-like distribution on bilateral mid-calves. This pattern eventually extended in a patchy fashion to her umbilicus. Patient had extensive imaging, metabolic, and neurologic workup which was all unremarkable. She was followed by neurology who felt that, because of migrating nature of patient’s pain and parasthesias she likely carried the diagnosis of fibromyalgia. Throughout the workup the only consistent objective finding remained serially elevated CRPs between 25mg/L and 40 mg/L. On follow up, the patient returned with epigastric pain. She was seen by GI, and had CT of her abdomen performed with contrast, which showed a 3.4x3.3 cm heterogeneously enhancing solid mass in the pancreatic body. Patient subsequently underwent EUS with FNA and core biopsies, showing a significant number of IgG4 positively-stained plasma cells, in the tissue of this biopsy consistent with presentation of retroperitoneal fibrosis or sclerosing mesenteritis variations of IgG4-RD. Serum IgG levels were elevated to 2200 mg/dL. The patient was started on a course of steroids and noted improvement in her ongoing parasthesias and overall clinical status. Subsequent CRP had decreased to the lowest it had been at 22 mg/L. The patient has re-imaging scheduled after steroid course upon return from an out-of-country excursion. Her retroperitoneal fibrosis or sclerosing mesenteritis presentation on imaging is well-documented in IgG4 literature, but there is no evidence of neurologic symptoms with IgG4-RD. Patient had only vague, fleeting, abdominal symptoms. This begs to question whether IgG4 was the etiology of her symptoms or if imaging uncovered a benign incidentaloma. Summary: IgG4 is well-documented in case presentations to contribute to sclerosing mesenteritis, and retroperitoneal fibrosis. Our patient, though showing evidence on imaging of these processes, had only one episode of fleeting abdominal pain. Her primary complaint was a migratory polyneuropathy, which did improve subjectively with steroids. This raises the question of whether neuropathic symptoms may be related to IgG4-RD and furthermore whether such extensive investigation, and subsequent steroid therapy was even warranted in this atypical presentation.

Martin Van Zyl, MD

An Aneurysm That Will Take Your Breath Away
Thoracic aortic aneurysms (TAA) have a prevalence as high as 1 in 300 in the general population and account for up to 1 in 3 aortic aneurysm-related admissions: with the remainder attributed to abdominal aortic aneurysms (AAA). The majority of TAA’s are degenerative in nature and the risk factors parallel those for AAA. As a consequence, approximately one quarter of patients with a TAA will also have a concomitant AAA.
These aneurysms are, more often than not, clinically silent—leading to significant diagnostic challenges and clinical under-recognition. The most common symptomatic presentations are often fatal and include rupture and dissection. As these deadly complications of a TAA are frequently credited to other conditions, such as acute MI or stroke, the aneurysm itself may go undiagnosed barring a post-mortem examination. Non-fatal symptomatic TAA’s are an uncommon phenomenon. A 69-year-old Caucasian male with a past medical history significant for severe chronic obstructive pulmonary disease (COPD), substantial tobacco use, hypertension, hyperlipidemia, and a remote open repair for a 6 cm infra-renal AAA, presented to the emergency department with acute onset shortness of breath. The patient was found to be in hypercapnic and hypoxemic respiratory failure which prompted admission and initial management for a presumed COPD exacerbation. Despite aggressive medical management, he continued to become increasingly hypoxic. Computed tomographic angiography performed to exclude pulmonary embolus demonstrated a 9.1 cm TAA of the descending intra-thoracic aorta compressing his left main bronchus nearly to the point of occlusion. He was transferred to the intensive care unit where the Pulmonology service placed a palliative stent in the left mainstem bronchus via bronchoscopy. Following this intervention the patient had significant improvement in his respiratory status and was able to transfer to the general medicine floor. Given the significant risk of rupture associated with an aneurysm of this diameter, the patient elected for surgical management. Subsequently, an endovascular descending thoracic aortic stent graft was successfully placed. The patient tolerated the procedure well and was shortly discharged home. This case illustrates an unusual clinical presentation of a TAA. Despite lack of symptoms and a high associated morbidity and mortality, screening in the general population is not currently recommended. Symptoms of a large TAA may include chest or back pain as well as a myriad of other maladies associated with compression of intra-thoracic structures. If a symptomatic patient is both fortunate enough to survive diagnosis and a suitable candidate for repair, surgical management is usually indicated; both open and endovascular options are well described. Understandably, these are high risk procedures but long-term prognosis is often favorable with the appropriate intervention.

Cyril Varghese, MD
Korosh Sharain,
Matthew Koster,
Clement Michet Jr.

**Clinical Vignette Winner- Residents**

**Pneumonia Masquerading as a Rash**

Relevance: 1: Recognizing that constellation of cough, pharyngitis with atypical dermatological and/or mucosal findings should prompt Mycoplasma antibody testing even in setting of a negative chest x-ray.

2: Repeated pneumonias as a child or teenager should prompt investigation into immunological disorders.

Case: A 34-year-old man was in his normal state of health until 2 weeks prior to admission when he developed a sore throat and productive cough followed by a 1 week history of generalized rash, subjective fevers, injected eyes and intense myalgias. He did not report any sick contacts or recent travels outside the United States. He reported to an urgent care center with these symptoms and was given a Medrol dose pack, but his symptoms persisted, so he presented for further evaluation. His past medical
history was significant for six episodes of pneumonia requiring hospitalized since childhood. Social history was significant for regular marijuana use. On presentation patient was vitally normal and stable with a diffuse morbilliform rash over face, torso and extremities. He had conjunctival injection and crackles at bilateral lung bases. He did not have any oral ulcers or tonsillar exudates. CBC was significant for leucocytosis (WBC: 23.4X10^9/L with a left shift). However, infectious workup was negative for Anaplasma, Ehrlichia, ASO, Lyme ELISA, RMSF AB, GAS PCR, HIV, Babesia, Adenovirus, CMV, EBV, and measles virus and negative blood cultures. Rheumatological workup was negative for ANA, rheumatoid factor, PR3, CCP AB, SSA/SSB, Sm AB, Scl 70, Jo 1 AB, Myeloperoxidase. Chest X-ray did not show focal consolidation. However, his constellation of symptoms including cough with sore throat, injected cornea and atypical rash, prompted Mycoplasma pneumonia IgM and IgG antibody testing, which were both positive. His history of recurrent childhood to early adulthood pneumonia warranted further investigation with Complement levels, including C1q, C2, C3 and C4 which were all low. Patient was discharged on oral doxycycline and showed remarkable improvement of his symptoms. Discussion: Mycoplasma pneumonia usually presents as self-limiting upper respiratory tract infection that evolves into a pneumonia with the typical diffuse reticular interstitial findings on chest x-ray. Rarely, M.pneumonia can present with other manifestations like morbilliform rash or mucositis involving the eyes, genital, anal or oral mucosa. While “walking pneumonia” is a common presentation among young adults, repeated bouts of pneumonia during childhood or young adulthood warrants further investigation. Dysregulation of complement activity can predispose patients to autoimmune or infective process. Our patient had a mixed complement deficiency. In general, deficiencies of the early components of the complement pathway (C1Q, C4 and C2) result in autoimmune disorders like SLE. On the other hand deficiencies in late complement components (C3-9) lead to recurrent infections.

### The Perfect Storm

While autoimmune disease itself is fairly common, the presence of two autoimmune diseases is less common, and a concurrent exacerbation of both disease states is rare. This patient presented with simultaneous thyrotoxicosis and worsening liver failure creating both a perfect storm and a rare diagnostic and therapeutic challenge. A 43-year-old male with a history of end stage liver disease secondary to Primary Sclerosing Cholangitis (PSC) (MELD low 30s) presented to the hospital for the third time in one month with altered mental status, lethargy, and diarrhea. Since his last admission, he had increasingly loose stools for which his lactulose had been reduced without effect. Review of systems was positive for fatigue, tremulousness, nausea, confusion, and diffuse joint pains. His exam was notable for tachycardia, low-grade fever, worsening jaundice and ascites, hyperreflexia, lethargy, and orientation only to self and place. He was initially treated for hepatic encephalopathy, until chart review from previous admissions revealed hypercalcemia from 11-13 with suppressed PTH. In the context of his persisting non-infectious diarrhea, hyperreflexia, tachycardia, and confusion, lactulose was stopped and a TSH was checked and found to
be undetectable (<0.02), with a free T4 of 5.28 (with normal thyroid studies one month prior). His hypercalcemia improved with IV fluids, pamidronate and further thyroid evaluation. The workup, including thyroid uptake and scan showing diffuse 46% uptake, ultrasound negative for nodules, and positive thyroid peroxidase and thyroid stimulating antibodies, was indicative of new onset Graves disease with a clinical presentation consistent with Graves Thyrotoxicosis. Vitals remained stable, however, his ESLD was simultaneously deteriorating (MELD 42) necessitating urgent transplant. The complexity of the patient’s condition required coordination of Endocrinology, Transplant Surgery, Surgical Oncology, and Hepatology. Treatment options were extremely limited – RAI ablation was difficult and would require 6 weeks minimum, too long given his progressive decompensating liver disease. Surgical Oncology was consulted, but thyroidectomy was considered too risky due to likely intra-operative arrhythmia and thyroid storm. Ultimately, treatment with propranolol, Lugol’s Solution (Saturated Solution of Potassium Iodide), and methimizole was considered the best option despite its hepatotoxic effects. Within 1 week of the above regimen, the patient was successfully transplanted, resulting in dramatic clinical improvement and he was discharged within the week. This case represents the rare pairing of PSC and Graves disease, but also serves to remind clinicians of the wide range of presentations of thyroid disease. It also should warn against premature diagnosis closure in patients, like ours, with recurrent admissions. Furthermore, this case demonstrates the necessity of a multidisciplinary approach in approaching clinical dilemmas otherwise lacking in evidence-based recommendations. Ultimately, this perfect storm produced a successful clinical outcome as a result of critical thinking, careful diagnosis, and teamwork in treating this complex patient.
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<th>James Verner, MD</th>
<th>Rare complications of Pneumonia</th>
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<td>Empyema necessitans is a rare complication of pleural space infections occurring when empyema fluid spontaneously dissects into the chest wall from the pleural space. These rare cases result from inadequate treatment of an empyema, usually following a necrotizing pneumonia or pulmonary abscess. The causative organism is often mycobacterium tuberculosis, however a few gram-negative organisms have been described causing this process as well. The patient is a 20 year old previously healthy male who presented with two weeks of dry cough, fever, sweats and right chest wall mass. He was an exchange student from Hong Kong and did not have a primary care physician. He was seen at an urgent care clinic at onset of symptoms, two weeks prior to admission for several days of cough. He was treated with a course of azithromycin for presumed community acquired pneumonia. Despite initial slight improvement in cough, he re-presented due to continued cough and new night sweats. A chest xray showed a right lower lobe airspace opacification with associated plural effusion. He was given levofloxacin but continued to worsen and he noted the development of a right-sided chest wall mass prompting his presentation to the emergency room. Other than his recent travel, he had no clear TB exposures or HIV risk factors. Exam revealed a large firm subcutaneous right chest mass without associated erythema or erosion. Lung exam was unremarkable with good air entry bilaterally. Chest CT showed large complex plural fluid collection containing multiple foci of air in the lower anterior right thorax with extension through the chest wall into the right breast measuring up to 11.7cm, suggesting empyema necessitans. He was taken to the OR by Cardiothoracic surgery with plural drainage and debridement of chest wall and removal of purulent fluid. Cultures of this fluid grew Fusobacterium Necrophorum. The patient was taken to the OR for several more rounds of debridement while on IV antibiotics and was discharged on IV antibiotics with a wound vac. Unfortunately, due to issues with insurance he could not receive a wound vac for his flight back to Hong Kong. Empyema necessitans is not a commonly described presentation or complication of pneumonia, but can occur and should be quickly recognized due to the significant morbidity that can be associated. This patient suffered from significant morbidity due to his disease process as well as issues with health insurance preventing full treatment (lack of wound vac going home). Not only does this case serve to remind clinicians of the less common complications of pneumonia, but also, it demonstrates the impact that lack of access to healthcare can have.</td>
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<th>Karrun Woan, MD</th>
<th>A Case of Acute Cognitive Decline - Cerebral Amyloid Angiopathy</th>
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<td>Cerebral amyloid angiopathy is a rare condition which usually presents with subarachnoid hemorrhage, but a subset marked by inflammation can present with acute cognitive decline. An 83 year old female with no significant PMHx who presented with a 1 year history of rapidly progressive dementia. She originally presented to her primary care physician 1 year ago with her husband complaining of more rapid decline in memory, with a documented MMSE of 19/30. She was diagnosed with Alzheimer’s disease and underwent trials of donepezil and rivistigmine, which was not well tolerated. Her dementia worsened</td>
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and 6 months ago was referred to neurology where she was had a MOCA of 8/30. Metabolic, inflammatory, infectious, and autoimmune work up revealed vitamin B12 deficiency but was otherwise unremarkable. Lumbar puncture was significant for elevated protein. EEG diffuse slowing with asynchronous right temporal/parietal region. Initial MRI revealed leptomeningeal enhancement with evidence of subarachnoid bleed. CT chest/abdomen/pelvis was negative. Serial MRI imaging over the prior 6 months revealed worsening disease. She was admitted for brain biopsy which demonstrated mural eosinophilic deposits which were congo-red positive, with evidence of reactive infiltrating inflammatory cells and focal areas of ischemia. She was subsequently started on high dose steroids with reports of some modest improvement. Dementia is a common medical condition among the elderly. Although there are many irreversible causes, it is important to identify those which may be amenable to medical intervention. Judicious use of imaging should be used in the context of the kinetics of cognitive decline. Aggressive work up in needed with acute cognitive decline and brain biopsy is warranted when cerebral amyloid angiopathy with related inflammation is suspected.

Jennifer Wu, MD  
Hoda Pourhassan, Suchithra Narayan

Locked in with Guillain-Barre

Guillain-Barre syndrome is a rapidly progressive disease resulting in ascending paralysis with loss of deep tendon reflexes and associated paresthesias. This disease comes in many variants with a wide range of clinical presentations. The severity of Guillain-Barre is variable and in its most aggressive form there have been cases of severe inflammatory polyneuropathy leading to a complete “locked in syndrome” and even cases of mistaken brain death. Case Description: An 85 year old man was admitted after an unwitnessed fall with bilateral SDH, scattered SAH, and a basilar skull fracture. Past medical history included paroxysmal atrial fibrillation, first-degree AV block, diabetes mellitus, hypertension, and psoriatic arthritis. Prior to admission, he was extremely active and cycled 20 miles a day. His intracranial hemorrhage was stable on repeat imaging and was managed medically. He was improving daily and was moving toward discharge when family noticed he began to ambulate less frequently than he had been previously, citing limiting fatigue. On hospital day 9, he was transferred to the ICU for new onset hypoxia and respiratory distress requiring BiPAP, as well as decreased responsiveness. Repeat imaging of his brain revealed unchanged SAH/SDH and no evidence of infarction. En route to obtain a CT/PE study, he suddenly became apneic and hypotensive, necessitating rapid-sequence intubation and pressors. On examination, he was able to move his eyes purposefully but was areflexic and unable to move his extremities to pain or command. Fearing a basilar infarction, Neurology was consulted and obtained a MRI/MRA Brain, which was negative for a brainstem lesion. A lumbar puncture was notable for elevated protein but negative for viral serologies. An EMG was then performed, revealing widespread sensory and motor demyelinating polyneuropathy consistent with severe Guillain-Barre syndrome. He was initiated on a 5-day course of IVIG but despite therapy, his course progressed until he was completely “locked in”, unable to even open his eyes. At this point, his family elected to
withdraw intervention and he passed away shortly after extubation. Discussion: The most striking feature of this case is the initial clinical impression that the patient had a severe and possibly fatal brain stem event. Given the more rare presentation of this disease and its clinical course, it became exceedingly important to have both a wide differential and to be weary of misdiagnosis. The final diagnosis in this specific case illustrates the importance of electromyography and in particular the disastrous effect misdiagnosis could have in a potentially reversible condition. Although this variant of Guillain-Barre is associated with significant morbidity, it should not go without recognition that antecedent history, diligent and thorough workup of differential diagnoses and steadfast clinical reasoning could be central components of potentially life-saving interventions.

Allison Yang, MD
Chayakrit Krittanawong, Niyada Naksuk, Jorge Brenes Salazar, Jevremovic Dragan, Hector Villarraga

A Rash with a Heart of Protein
Primary amyloidosis is a rare disease caused by deposits of abnormal amyloid protein in tissues. AL amyloidosis most frequently presents as heart failure but early stages may also manifest with non-specific symptoms. Without prompt treatment, the disease can progressive to fatal outcomes. A 49-year-old man presented with 8 weeks of a periorbital rash. He had been diagnosed with hypertrophic cardiomyopathy one year prior at another institution and he did not recall any previous diagnosis of hypertension. A trial of an angiotensin-receptor and beta-blockers had resulted in recurrent syncopal episodes. His physical examination was remarkable for orthostatic hypotension, periorbital ecchymosis and macroglossia with indentation marks. He had signs of congestive heart failure with elevated jugular venous pressure of 15 cm H2O and cardiac auscultation revealed the presence of S3 and S4. Outside echo report noted concentric left ventricular wall thickening, normal left ventricular systolic function and grade II diastolic dysfunction. 2D transthoracic echocardiogram repeated at our institution showed a sparkling pattern of myocardium, concentric biventricular wall thickening, mildly reduced left ventricular ejection fraction of 35%-40%, grade III diastolic dysfunction, enlarged and thickened atria and a small pericardial effusion. Bone marrow biopsy confirmed the diagnosis of AL amyloidosis. Unfortunately, the patient expired one week after admission due to ventricular arrhythmias. Increased ventricular wall thickness can be found in both hypertrophic and infiltrative cardiomyopathy and differentiating between the two conditions clinically is challenging. In amyloid cardiomyopathy, signs of right-sided heart failure are most prominent (peripheral edema, hepatomegaly, and ascites) and although left heart pressures are elevated, pulmonary edema is rare. Dynamic left ventricular outflow tract obstruction can occur but is also rare. Heart failure may also be accompanied by small vessel disease such as purpura as seen periorbitally in this patient. In contrast, patients with hypertrophic cardiomyopathy often present clinically with left ventricular outflow tract gradients and dyspnea, fatigue, and chest pain or syncope. Advanced heart failure symptoms including edema are less common. Echocardiographic features may be helpful in diagnosis. Hypertrophic cardiomyopathy rarely has severely increased symmetric left ventricular wall thickness. Thickening of the septum and all chambers including the
right ventricle and atria are found more commonly in amyloidosis. Diastolic dysfunction can be found in both, but restrictive pattern, or grade III-IV diastology should make clinicians suspicious for infiltrative cardiomyopathy. In addition, a bright echogenic myocardium secondary to abnormal protein deposition and small pericardial effusion is uncommon in other cardiomyopathies. This case presents both clinical and echocardiographic findings consistent with AL amyloidosis. As a rapidly progressive disease with a fatal outcome, a high index of suspicion is needed for early diagnosis and treatment.

Farah Yusuf, MD

Hyperthyroidism presenting as Hypokalemic Periodic Paralysis (HPP)

Periodic paralysis is a muscle disease in the family of diseases called channelopathies manifested by episodes of painless muscle weakness. Most cases of periodic paralysis are hereditary, usually with autosomal dominant inheritance pattern. Acquired cases of hypokalemic periodic paralysis have been described in association with hyperthyroidism. Thyrotoxic periodic paralysis (TPP) is an uncommon complication of hyperthyroidism. It is predominantly seen in males of Asian descent. It is associated with increase Na/K-ATPase activity primarily in skeletal muscle resulting in intracellular shift of K and resulting hypokalemia related paralysis. Case Discussion: 32 yo Filipino M with history of hyperthyroidism diagnosed in 2008 presented to the ED for evaluation of bilateral lower extremity weakness. He reported similar episodes in the past with hypokalemia since 2005. He admitted to poor compliance with Methimazole. He was found to have suppressed TSH and elevated T3/free T4 and normal potassium. He was discharged with increased methimazole and propranolol. Patient then developed profound weakness of bilateral upper and lower extremities 4-5 hours following discharge causing him difficulty with standing. and resultantly called EMS. He reported significant weight loss over the last month as well as palpitations, anxiety, tremor, and diaphoresis. He reported a family history of hypothyroidism in his maternal aunt and hyperthyroidism in 2 of his maternal great aunts. On examination, he had paralysis in bilateral upper and lower extremities, he was tachycardic with regular rhythm and the rest of the exam was otherwise normal. His electrolytes were notable for K: 2.2 mEq/L (3.5-5.3 mEq/L, Mg: 1.7 mEq/L (1.4-2.4 mEq/L). His TSH was suppressed with free T4 of 4.5 ng/dl (0.8-1.6 ng/dl) and total T3 of 276 ng/dl (80-200 ng/dl). His potassium was intravenously repleted, which lead to improvement of weakness. Methimazole and propranolol were continued for treatment of presumed Grave’s causing thyrotoxicosis. He was discharged with plans for radioablation. His motor and thyrotoxic symptoms improved significantly with normalization of electrolytes as well as with thyroid and adrenergic suppressive treatment. Conclusion: Thyrotoxic periodic paralysis must be distinguished from other causes of quadripareisis, such as myasthenic crisis, Guillain-Barre syndrome, acute myelopathy, tick paralysis, and botulism. Hypokalemia should point towards a diagnosis of periodic paralysis, in which thyrotoxicosis should be evaluated, particularly in the absence of a family history. This patient’s family history of hyperthyroidism raises suspicion for underlying genetic predisposition. Multiple mutations in Na/K-ATPase, Na and K gene have been described in literature. For treatment of acute attack of thyrotoxic
periodic paralysis, potassium chloride is recommended. If not responding to potassium administration, propranolol is recommended. Symptoms typically cease with return to euthyroid state.

Anteneh Zewde, MD

A case of fluoroquinolone resistant typhoid fever

21-year-old female otherwise healthy was recently in India for two weeks on a school mission trip. She reported having some nausea and diarrhea in her first week of stay in India that lasted 4 days. 10 days after being back she visited the ED for abdominal pain, nausea and fever of 105. Was tested for malaria and was sent home, came back again 4 days later with fevers. Blood culture drawn this time and she was sent home with antipyretics as she did not appear sick. Next day she was called and admitted with GNB bacteremia. She was not sick appearing on admission, she reported a skin rash that had disappeared on admission/likely rose spots and had classic step ladder fever with relative bradycardia which is almost pathognomonic for typhoid fever. Lab was positive for transaminitis and thrombocytopenia. Had persistent fever. B/c growing Salmonella O group D resistant to fluoroquinolones and sensitive to ceftriaxone and Bactrim. Patient was already started on ceftriaxone given increasing number of fluoroquinolones resistance. Patient grew 4/4 positive blood culture for Salmonella, stool culture was also positive. Patient had persistent bacteremia for 3 days which raised concern for gall bladder seeding/Famously know by Typhoid Mary with happens in up to 6%. Right upper quadrant ultrasound showed some sludge, no stone. She subsequently cleared her bacteremia and was discharged on Po Bactrim. Off note she did not receive pre travel typhoid vaccines. Two weeks later stool culture was done and was negative, which clears her to works as a nanny. An estimated 22 million cases of typhoid fever and 200,000 related deaths occur worldwide each year. 200 to 300 cases of S. typhi are reported in the United States each year. About 80 percent of these cases occur among travelers to countries where typhoid fever is endemic, particularly countries in South-Central Asia. Treatment of typhoid fever has been difficult due to resistant to ampicillin and Bactrim and chloramphenicol and now immerging resistance to fluoroquinolones in some parts of the world. Multiple resistant strain have caused outbreaks in Africa and India. About 17% of 2093 strains evaluated by CDC from 1990 6/2/1997 were resistant to 5 drugs. This case illustrates a case of multiple drug resistance typhoid fever. Only about 1/4th of patient travelling to endemic area receive pre travel typhoid vaccine. Among 580 cases of vaccine-preventable diseases among returned international travelers reported to the GeoSentinel Surveillance Network between 1997 and 2007, confirmed or probable enteric fever was the most common.