Severe babesiosis requiring red blood cell exchange transfusion

Introduction Babesiosis is a tickborne infection caused by intraerythrocytic protozoa that are endemic to areas of the Midwest and northeastern United States. Babesiosis is a reportable condition in 27 states including Minnesota. Incidence rates vary widely by county and were as high as 100 per 100,000 persons in 2013. The clinical severity of babesiosis ranges widely, but the disease can be fatal, especially in the immunocompromised. In patients with severe babesiosis, red blood cell (RBC) exchange transfusion can prevent rapid disease progression and reduce parasite burden. Clinical Case A 55-year-old male with history of chronic alcoholism with associated hepatic dysfunction was brought to the hospital by ambulance for altered mental status. For four weeks prior to admission, the patient was experiencing intermittent fevers up to 104.1 with associated lethargy. He lived on a farm with multiple animals located in a heavily-forested region of Minnesota. Upon arrival to the hospital, the patient was disoriented but alert with fever and tachycardia. Labs showed multiple abnormalities including pancytopenia, neutropenia, transaminitis, severe hyponatremia, and acute kidney injury. The patient was started on antibiotics for neutropenic fever. A peripheral smear showed intraerythrocytic inclusions consistent with babesia. Parasitemia was estimated to be 7%. Dual drug therapy with quinidine and clindamycin was initiated for treatment of babesiosis. After four days of treatment, there was no improvement in symptoms or parasitemia. The patient was then started on triple drug therapy with atovaquone, azithromycin, and clindamycin. Given the severity of systemic sequelae from babesiosis in this patient, Infectious Disease recommended that the patient be transferred to a tertiary care hospital for RBC exchange transfusion. Two days following exchange transfusion therapy, the patient’s symptoms improved and repeat peripheral smear showed less than 0.01% parasite burden. Discussion In this case, a patient presented with severe babesiosis that was refractory to both dual and triple drug therapy. Ultimately, RBC exchange transfusion was recommended. The Infectious Disease Society of America (IDSA) recommends RBC exchange transfusion in addition to drug therapy for patients with parasitemia &gt;=10%, significant hemolysis, or renal,
hepatic, or pulmonary compromise. However, there are no published studies to date that have compared antimicrobial therapy alone with combined antimicrobial therapy and RBC exchange transfusion. The principle of using exchange transfusion for babesiosis was adopted from malaria treatment. Interestingly the Center for Disease Control and Prevention (CDC) no longer recommends exchange transfusion for malaria after a systematic review showed that it does not improve survival. Despite the paucity of evidence surrounding exchange transfusion as a treatment for babesiosis, this case demonstrates that the treatment is an important option to consider for severe cases that are refractory to antimicrobial therapy.

**Patrick Boland**
Livia T. Hegerova, MD, Veronika Bachanova, MD, PhD, and Craig E. Eckfeldt, MD

**Hodgkin Lymphoma-associated Hemophagocytic Syndrome: Successful Treatment with CEPP Regimen**
Hemophagocytic lymphohistiocytosis (HLH) is occasionally associated with malignant lymphomas, however its association with Hodgkin’s disease is rare. The clinical course of lymphoma-associated HLH is rapidly progressive and often fatal even after chemotherapy. We report two cases of Hodgkin lymphoma-associated HLH successfully treated with cyclophosphamide, etoposide, procarbazine, and prednisone (CEPP). This regimen should be strongly considered in patients presenting with this unique disease as it contains treatment effective in both lymphoma and HLH-directed therapies such as etoposide.

**Maros Cunderlik**
Ellen Cales, MD

**A Traveler from Sub-Saharan Africa With Febrile Illness -- Must Be An Infection.**
Determining etiology of a febrile illness in a recent traveler from West Africa can be challenging. The diagnostic process is often complicated by unclear disease burden, exposures, a lack of reliable medical history, language and cultural barriers all resulting in uncertain pretest disease probabilities to guide medical decision making. Case: A 61 year old Nigerian man with the unclear medical history presented to a hospital ED for generalized malaise, weakness, and chest pain that started three days ago. Patient also reported he has been feeling generally unwell since he arrived from Nigeria six weeks ago. On presentation, he was found to be tachycardic, febrile, and mildly hypoxic. The initial workup revealed only mild leukocytosis and the chest film with a possible infiltrate thus he was started on broad spectrum antibiotics and admitted for further evaluation of possible infectious etiologies. In the following two days, however, the patient continued to have fevers up to 104F. On the second day of the hospitalization, the patient developed neck pain, severe hypoxia, tachypnea, profound weakness, and lower extremity areflexia all concerning for imminent respiratory collapse possibly due to acute inflammatory demyelinating polyneuropathy, meningitis, or sepsis. He was intubated and started on a stress dose of steroids. The additional history was obtained from the family members indicating the patient suffered from diabetes, periodic migratory joint pain and weakness in Nigeria, which were all treated with unknown doses of steroids for years. Furthermore, immediately upon his arrival into the US he appeared to be at his usual state of
health. He got worse only after a visit to a clinic a couple of days after his arrival where all of his medications from Nigeria were discontinued. Patient’s repeat LP and extensive infectious workup were negative. Knee arthrocentesis revealed negatively birefringent crystals and muscle electromyography showed the evidence of subacute myopathy and demyelinating and axonal polyneuropathy. The patient was subsequently diagnosed with acute gout flare, steroid induced myopathy, and polyneuropathy secondary to the steroid induced diabetes. In subsequent days the patient became hemodynamically stable, afebrile, extubated and slowly recovered. In conclusion, the evaluation of a febrile illness in a recent traveler from regions with endemic infectious diseases should promptly include additional investigations when initial infectious workup is negative. Given the uncertainties of disease prevalence in the regions of travelers’ origin, obtaining a medical history from collateral sources is the critical component of establishing accurate pretest probabilities to guide the diagnostic process. Furthermore, as this case demonstrates an acute polyarticular gout flare in the setting of chronic steroid induced myopathy and diabetic polyneuropathy can mimic severe sepsis or acute inflammatory demyelinating polyneuropathy.

Dorothy Curran
James Campbell, Dale Snover, Jonathan Kirsch

Drug-Induced Liver Injury After Garcinia Cambogia Supplement Use

Introduction: Garcinia cambogia/ Hydroxycitric acid, an ingredient in several Hydroxycut formulations that is also marketed as a stand-alone weight loss supplement, has been theorized to be involved in the pathogenesis of Hydroxycut-induced liver injury. However, only one case has been reported about Garcinia cambogia alone causing liver injury. We present a case of acute liver injury secondary to Garcinia cambogia use. Case Description: A 56 year-old Caucasian woman presented with one week of jaundice and fatigue. She had recently been diagnosed with hepatitis C. She denied taking any prescription or over the counter medications. Travel and social histories were negative for possible infectious exposures, but the patient did recall “internal bleeding” at age 5 following an auto accident, for which she most likely received blood transfusions. She had a 20-pack year smoking history and drank 15-20 drinks a week for many years. Vital signs were normal and body mass index was 27. Physical exam revealed new scleral icterus, jaundice, and spider angiomata. Total bilirubin was 22, alkaline phosphatase 290, ALT 1276, AST 886, and INR 1.05. Hepatitis C IgG was positive with log of HCV RNA quant of 5.3. Labs were negative for other infectious, autoimmune, and genetic causes of hepatitis, including hemochromatosis, alpha-1-antitrypsin deficiency, and Wilson’s disease. MRI revealed no hepatic lesions or biliary tract abnormalities. On further questioning, the patient admitted to taking Garcinia cambogia weight loss supplement twice daily for 3 months prior to her symptoms. Liver biopsy demonstrated evidence of cholestatic hepatitis consistent with autoimmune or drug related etiologies, most likely due to a drug related cause given the clinical history and negative autoimmune hepatitis serologies. She was discharged on hospital day 4, and advised to discontinue Garcinia cambogia and avoid alcohol. Discussion: Given the patient’s presentation, labs, and pathology, Garcinia cambogia was
implicated as the cause of the patient’s acute hepatitis. It is not unreasonable to suggest that the patient’s underlying hepatitis C infection and alcohol use may have contributed to her susceptibility to drug-induced liver injury. Therefore, we suggest that physicians ask their patients about non-prescription drugs and supplements, and particularly warn patients with known liver disease about the potential risks of hepatotoxicity associated with herbal and dietary supplement use. Increased attention by consumers, physicians, and regulatory institutions can lead to meaningful solutions to decrease the incidence of drug associated liver injury in the United States.

Nicolas Derrico
Chetan Shenoy, MBBS

**Giant Cell Myocarditis: Diffusing the Ticking Time Bomb**

Giant cell myocarditis (GCM) is a rare and particularly aggressive form of inflammatory cardiomyopathy characterized by myocardial destruction with dense lymphohistiocytic inflammation, including abundant giant cells. GCM typically causes fulminant heart failure with cardiogenic shock, arrhythmias, or heart block, and is almost universally and rapidly fatal. Current treatment approaches, including aggressive immunosuppression and urgent ventricular assist device insertion, have modestly improved survival however prognosis remains poor. In a multicenter, international study of 63 patients with GCM, the rate of death or cardiac transplantation was 89%, with a median survival of 5.5 months. We describe a case of GCM where timely recognition led to survival without ventricular assist device insertion or cardiac transplantation. A 58-year-old man consulted his PCP for one-week duration of severe dyspnea on exertion. His medical history was only significant for Crohn’s disease and a family history of cardiac disease. He was diagnosed to be in acute heart failure and hospitalized. An acute coronary syndrome was ruled out with ECG and serial troponins. Pulmonary embolism was also ruled out with a chest CT. Echocardiography revealed severe left ventricular (LV) dysfunction with a LVEF of 20% and an LV apical thrombus. He was treated with diuretics, beta-blocker, and an ACE-inhibitor, resulting in symptomatic hypotension. He was then transferred to our academic medical center for further care. Given his new-onset heart failure with a rapidly worsening course to NYHA Class IV symptoms, he underwent a cardiac MRI to diagnose the etiology of his cardiomyopathy. The cardiac MRI confirmed a severely reduced LVEF of 13%, a right ventricular (RV) EF of 26%, and multiple areas of delayed enhancement in a non-ischemic pattern - discontinuous lesions ranging from subendocardial, mid-myocardial, subepicardial, to transmural involvements. MRI also revealed thrombi in the LV, the RV, and the right atrium (RA). Together, these findings were consistent with an acute, aggressive, inflammatory cardiomyopathy. An urgent endomyocardial biopsy was performed despite the high risk of embolizing the RV or the RA thrombi during the procedure. The biopsy revealed GCM and the patient was immediately started on immunosuppression. He improved and was discharged home after a 12-day hospital stay. A cardiac MRI 3 months after his discharge showed a LVEF of 37%, RVEF of 36%, a smaller LV thrombus, and resolution of the RV and RA thrombi. Nine months later, he continues to do well and his symptoms are now considered NYHA Class I. GCM has an association with inflammatory bowel disease, and new onset,
rapidly worsening heart failure in such a patient should raise the suspicion for GCM. Despite the poor prognosis of this condition, early suspicion, timely diagnosis and aggressive management is essential in halting an otherwise rapid decline.

| Truong Do  
Tyson Sievers, MD;  
Dimitri Drekonja, MD | **A case of sudden-onset tremor**
Tremor, whether it is a rest, postural, or action, can have numerous etiologies. Recognizing specific presentations, such as opsoclonus-myoclonus syndrome (OMS), is important for the diagnosis of underlying pathologies. Case Description: A 60 year old female presented with new and sudden onset action tremor. Her past medical history was significant for right lower lobe pneumonectomy 1 year prior for lung adenocarcinoma without metastasis and remote hysterectomy for cervical dysplasia. She presented to the emergency department (ED) for her tremor where she received a computerized tomography (CT) scan of her head which was negative for midline shift, mass lesion, or hemorrhage. She followed up with her primary care physician, where she was noted to have leukocytosis and possible chest infiltrates on chest X-ray. She was prescribed amoxicillin/clavulanic acid. Her tremor waxed and waned, never improving to complete resolution, but after 7 days of symptom onset, she returned to urgent care due to an inability to ambulate. She was directly admitted for neurology consultation. Blurry vision was the only new complaint. She reported smoking ½ pack of cigarettes per day and drinking 2-3 drinks daily; alcohol did not affect her tremor. Medications included albuterol, budesonide/formoterol, and tiotropium. In the urgent care, she was hypertensive (200/100) but with otherwise normal vital signs. On examination, the patient demonstrated normal mental status, strength, and sensation. The significant finding was tremor that was present at rest and worse with action. Her left side was more prominently affected. Additionally, the patient had circling movements on extraocular muscle testing, best described as opsoclonus. Laboratory results showed a normal basic metabolic profile, urinalysis, and thyroid stimulating hormone. At this time, the patient was diagnosed with opsoclonus-myoclonus syndrome, an autoimmune disorder treated by addressing the underlying disease. Further workup demonstrated no significant findings for infection, with brain magnetic resonance imaging or with whole body positron emission tomography. Thus, attention shifted from identifying the cause of the tremors to treating them. Medications trialed included corticosteroids, metoprolol, lorazepam, intravenous immunoglobulin (IVIG), levitiracetam, and valproate. She was discharged with lorazepam, IVIG, and valproate as subjective or objective improvement were noted with these medications. Discussion: OMS, an autoimmune disease, is often associated with infection or neoplasia. In children, the major associated diagnosis is neuroblastoma. In adults, the workup should include infection and neoplasia. Although the etiology of our patient’s OMS was not identified, we describe her presentation as instruction for diagnosing this rare disorder and to review possible therapies. Because of the history of a resected lung cancer, close follow-up with CT imaging is planned for this patient. In summary, OMS should be considered in patients who present with abnormal eye movements and tremor.
**Scurvy: A Classical Case from Antiquity in the Modern Era**

We present the case of a 58 year old woman with extreme dehydration and malnutrition related to past anoxic brain injury and poor oral intake. On admission the patient was noted to have signs of extreme dehydration showing a sodium of 185, pancytosis & hemoconcentration with hemoglobin at 20.9 & hematocrit at 71.6. In addition the patient showed exam findings including folliculitis, bruising & altered mental status. History revealed that the patient had been in steady decline for some time and her diet consisted almost entirely of 2 servings of chocolate milk per day with little to no water or other oral intake. Over the course of patient care investigation into nutritional deficiency was initiated which eventually revealed a significantly low vitamin C level suggesting scurvy as a contribution to her disease state. Vitamin C deficiency AKA scurvy is a classical medical case defined by connective tissue dysfunction leading to bruising, bleeding, poor wound healing and other abnormalities. While prevalent in the past and in modern developing regions vitamin C deficiency is rare in adults from industrialized settings. This presents a challenging clinical scenario with implications for specific patient populations and demands keen clinical observation in order to diagnose this rare and potentially overlooked deficiency.

**Hindsight and the Importance of Early Warning Signs**

This case involves a young patient with known sickle cell disease who presented with mild abdominal pain and remitting signs of sickle crisis with rapid progression to small bowel infarction. Evidence of sickle crisis was subtle given remitting warning signs. Case Description: An 18 year old male with known sickle cell disease presented to a general medical and surgical facility complaining of mild abdominal pain that started 30 minutes prior. He was completing a road trip from Mississippi with his brother, when he noted fever, chills, absent sensation in his toes and fingers, and mild priapism while in the car. Upon presentation to the emergency room, these symptoms had resolved. His history was significant for frequent (1-2 times per year) sickle pain crises. His medications included folic acid, but notably not hydroxyurea. Initial exam was pertinent for fever (102.9F), tachycardia, right knee and shoulder arthralgia, with no abdominal pain or tenderness and no penile tenderness. Initial interventions included intravenous hydration, analgesia with dilaudid, and broad-spectrum antimicrobial coverage with cefepime and vancomycin. An elevated lactate (2.9) and creatine kinase (576) were noted. Chest and pelvic radiographs were normal. Despite hydration, analgesia and antibiotics, he became somnolent several hours after his initial presentation. He continued to decline despite administration of opioid reversal and a rapid response team was called to evaluate. He became hypotensive, tachycardic, and febrile to 104.5F. He was then intubated to protect the airway and transferred to the ICU. He was found to have gram negative bacteremia, worsening lactic acidosis (pH 7.08, lactate 20), and acute kidney injury (creatinine 1.97, normal previously). Disseminated intravascular coagulation was suspected due to a newly elevated INR (>15.0) and PTT (>180.0) with thrombocytopenia and anemia. Contrast
CT of the chest, abdomen, and pelvis was remarkable for fluid-filled distended loops of small bowel and submucosa hyperemia, consistent with shock bowel. Emergent exploratory laparotomy was performed. Upon examination in the operating room, the entire small bowel was thrombosed with significant clot burden. In addition, the entire small bowel arcade was thrombosed. Life-preserving measures were stopped at this juncture given this non survivable injury, and the patient expired in the operating room. Discussion: This patient’s unfortunate case demonstrates a very rare, but important complication of sickle cell disease. The presence of early-onset remitting priapism and myalgias was likely a heralding sign of an impending sickle crisis. However, a benign exam and findings typical of this patient’s previous sickle crises highlights the importance of recognizing a sickle cell crisis that warrants aggressive intervention. Additionally, this case highlights the need for appropriate sickle cell treatment with hydroxyurea.

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<th>Patrick Hoversten</th>
<th>A rare extrapancreatic manifestation of acute pancreatitis</th>
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| Guru Trikudanathan | Acute pancreatitis is a common reason for hospital admission worldwide and the inflammatory sequelae of the disease process, both local and systemic, make large contributions to patients’ overall morbidity and mortality. Local complications include pseudocyst formation and pancreatic necrosis. Systemic complications often seen following acute pancreatitis are development of pleural effusions, renal dysfunction, and major electrolyte or metabolic derangements. Purtscher retinopathy is a rare condition classically seen in patients following thoracic trauma, but has also been described following acute pancreatitis. A 21-year-old woman was brought to the emergency department by her father for altered mental status following a witnessed seizure in the setting of recent heavy alcohol use. The patient had a long history of alcohol abuse, worsened in the year prior to presentation. On admission she was also noted to have epigastric pain, a tender abdomen without peritoneal signs, a lipase of 5,428 U/L, and a transaminitis with AST predominance. Abdominal CT with contrast showed a necrotic collection along the anterior aspect of the pancreatic tail. On hospital day 20, the patient experienced a sudden onset of bilateral painless decreased vision in the absence of photophobia, flashing lights, or floaters. She endorsed mild weakness in her feet and had slightly reduced vibratory sense in lower extremities bilaterally. Other neurological review of systems and physical exam were unrevealing and the lower extremity deficits were attributed to alcoholic neuropathy. Brain MRI and carotid ultrasound demonstrated no findings suggestive of vascular thromboembolic processes that could have accounted for the bilateral vision loss. Dilated fundoscopic exam performed by ophthalmology revealed bilateral pallor surrounding the optic nerve with deep hemorrhages within this area of pallor suggestive of cilioretinal artery occlusions. Follow up fluorescein angiography showed delayed filling of the retina and choroid bilaterally along with perifoveal hyperfluorescent material suggestive of exudates. These findings were consistent with Purtscher-like retinopathy secondary to acute alcoholic pancreatitis. 8 months later, the patient’s vision had stabilized and was classified as moderate-severe low vision. Acute
Pancreatitis is a disease with widespread sequelae affecting tissues far beyond the gastrointestinal system. This case demonstrates a devastating and uncommon complication of a disease process commonly managed in inpatient medicine. Purtscher retinopathy is thought to be related to systemic complement activation leading to leukocyte aggregation and eventual leukoembolization and occlusion of the precapillary arterioles of the choroid and retina. Currently there is very limited evidence to suggest successful methods of treatment for this retinopathy apart from treating the underlying cause, and the vision loss can be permanent.

### Unusual presentation in a patient with ICH

Intraparenchymal hemorrhage (IPH); a subtype of intracerebral hemorrhage (ICH), can be simply defined as bleeding in the brain. IPH can be caused by different factors which are not limited to uncontrolled hypertension, ruptured aneurysm and coagulopathy. Fifteen percent of strokes result in ICH. However, compared to other types of strokes, it has the highest mortality. Vomiting is an important sign observed with ICH. A 55 year old black male was brought into the ED with complaints of lethargy. He was unable to provide history. According to his uncle who accompanied him, he has a documented history of diabetes mellitus, hypertension and hyperlipidemia. Prior to presentation, he was having a meal with his Uncle at Burger King when he suddenly vomited large quantities of partially digested food. The vomitus was non-bloody. He subsequently lost consciousness, and was brought to the hospital. He regained consciousness upon arriving at the emergency room but continued to vomit. Patient had no diarrhea, chest pain, or a prior incidence similar to this. Patient has no documented surgical history. He denies alcohol abuse or use of cigarettes. On physical exam, patient was lying in bed and lethargic. Vitals were BP 176/91; Pulse 92; Temp 98.4; RR 20. Head was normocephalic and atraumatic. Pupils equally round, reactive to light and accommodation. Oral mucosa was dry, neck was supple with no JVD. Lung were clear to auscultation bilaterally. Positive S1 and S2 present, no vascular bruits and 2/4 carotid pulse. Abdomen was obese, positive bowel sounds in all 4 quadrants, soft and non-tender. Overall neurological exam assessment was indicative of a GCS of 7 (eye response 1; verbal response 1; motor response 5). Neurologic exam was limited by the patient’s inability to follow commands but responded to pain stimuli on extremities. Meningeal signs were negative. Labs were significant for: PT 10.9; Glucose 282; K 3.3; CL 102; BUN 23; Cr 1.5. Head CT scan without contrast showed multiple intraparenchymal hemorrhages in both frontal lobes as well as the right temporal lobe. According to the Harvard Stroke registry, only 49% of persons with a supratentorial ICH vomited. In comparison, 90% of patients with ICH had very significant elevation in blood pressure. Thus, vomiting as a manifestation of ICH is relatively uncommon and can be confused with other etiologies such as Gastroenteritis or Gastritis. In addition, it is essential for clinician to ensure a thorough work up is conducted in order not to overlook subtle signs. This patient only presented with vomiting and syncope with no headache.
Katherine Weir  
Fiona He, MD

The link to SPINK: A rare genetic precursor to pancreatic disease

Pancreatic cancer is an uncommon but deadly complication of chronic pancreatitis. Despite frequent radiological assessments in this patient population, inflammatory changes can make a diagnosis of malignancy difficult, which can delay treatment beyond the early, potentially curable stage of this aggressive disease. A 44-year-old Laotian female with a history of insulin-dependent diabetes underwent CT imaging for back pain after a fall, and was incidentally found to have large intraductal pancreatic stones. These, along with a positive test for a SPINK1 N34S (Serine protease inhibitor Kazal type 1) gene mutation, led to a diagnosis of tropical calcific pancreatitis (TCP). The patient had no symptoms of her pancreatic disease aside from diabetes until two years later, when she began to experience epigastric pain radiating to her back. She was hospitalized for two months, but due to the severity of her symptoms, which were refractory to multiple sphincterotomies and pancreatic duct stent placements, she was transferred to a second facility for a planned Whipple surgery. At that time, the patient was on antibiotic therapy for CT findings of hypodensities in the liver which, supported by elevated CRP levels, were thought to represent abscesses. Subtle imaging changes also raised concern for a malignant process involving the pancreas, although this was difficult to discern due to inflammation. Further evaluation was pursued with EUS, revealing mass-like findings in the pancreas extending to the gastric wall with a loss of interface suggestive of malignancy. Biopsies of a peripancreatic node, the gastric wall, and tissue surrounding the celiac artery were performed with pathology confirmatory of adenocarcinoma. While final pathology was pending, a triphasic CT scan was done that showed bulky mediastinal, hilar, and retroperitoneal adenopathy, along with enlargement of the hepatic hypodensities. One of the liver lesions was further evaluated with CT-guided biopsy, and returned positive for adenocarcinoma. The tumor cells were strongly positive for CA19-9 and cytokeratin 7, markers indicative of a pancreatic or biliary primary cancer, and the disease was classified as stage IV. The patient was counseled on the poor prognosis associated with metastatic pancreatic cancer and options for palliative chemotherapy. TCP, although rare in the United States, is a frequently described cause of chronic pancreatitis in developing tropical regions. Although much remains to be elucidated regarding the pathogenesis of the disease, a mutation of the SPINK1 gene, which codes for a protease inhibitor, has been associated with the development of TCP. SPINK1 is hypothesized to play an important role in trapping prematurely activated trypsin to prevent autodigestion of the pancreas. Cancer incidence in patients with TCP is increased 100-fold compared to the general population. Physicians must therefore watch closely for the development of malignancy in patients diagnosed with this disease.

Research- Medical Students

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<th>Melvin Donaldson</th>
<th>Yoga for chronic pain among veterans</th>
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<td>Chronic pain is highly prevalent, costly and a leading cause of disability.</td>
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Nearly 2 million service members have returned to civilian life following deployment in recent conflicts in Iraq and Afghanistan and half have chronic pain. A number of vulnerability factors have been found to predispose people to pain chronicity and pain-related disability but less is known about predictors of resilience in chronic pain. Resilience is a concept that describes how people are able to thrive in the face of a significant stressor. A resilient course for chronic pain entails remaining free of pain-related disability despite experiencing significant pain. Yoga is an increasingly common strategy used by Americans to manage chronic pain, particularly because of its safety and the limited effectiveness of conventional pharmacotherapy. The relationship between yoga practice and resilience in chronic pain has not been investigated. Because even the most basic yoga practices possess components thought to be important in fostering resilience, yoga may be a promising means of fostering resilience and improving outcomes for people with chronic pain. We propose two specific aims and one secondary aim to explore yoga as a management technique for chronic pain: 1) examine pain and pain-related vulnerability and resilience factors among Iraq and Afghanistan veterans who regularly practice yoga and those who do not; 2) explore veterans' lived experiences of yoga in managing chronic pain, with special attention to the process of self-selection and the facilitators of developing a regular yoga practice; secondarily, conceptual model of how yoga may influence resilient pain outcomes. First, we propose a convergent parallel mixed methods design in order to build a rich understanding of how yoga shapes the experience of chronic pain. In this first stage, longitudinal data from the Readiness and Resilience in National Guard Soldiers study (Minneapolis VA) will be used to compare those with a yoga practice and those without across a broad range of personality traits and behaviors that may play a role in resilience to chronic pain. Simultaneously, we will collect qualitative data to explore the participant's perspectives on how yoga influences their chronic pain. The reason for collecting both quantitative and qualitative data is to converge the two forms of data and bring greater insight into the problem than would be obtained by either type of data separately. The final stage of the study is to refine a conceptual model of how the effect of yoga practice on resilient chronic pain outcomes may be mediated by pain resilience and vulnerability factors. We will do this with structural equation modeling. The conceptual model guiding this study will only be best understood when exploring the results in the context of the initial mixed method stage.

Amy Feng
Simon Ndely, Anisa Suleiman, Andrew Zhang

**National Medical Association Health Fair 2015: “Healthy U, Healthy Us”**
The Student National Medical Association (SNMA) is a nationwide organization committed to supporting underserved communities and creating culturally competent physicians. The University of Minnesota SNMA Chapter held its 9th Annual SNMA Health Fair on April 18th, 2015 at the Midtown Global Market. Our goal was to improve health education in underserved communities in the Twin Cities, and to characterize the social determinants of health in our participants. **METHODS** We partnered with 30 community organizations to provide
free health screenings and information, with the goal of equipping our participants to take an active role in their health. We administered a 20 question survey in English, Spanish, Hmong, and Somali to characterize our participants and assess if the health fair was successful in its goals.

RESULTS We had approximately 1,000 health fair participants, with 65 survey responses. Based on survey responses, the ethnicities represented were: 48% hispanic, 20% black, 20% white, 8% American Indian, and 4% asian. The highest education received was: 18% middle school, 43% high school/GED, 35% college, and 4% master’s/doctorate. Household income was: 41% unemployed, 32% under $20,000, 14% $20,000-$40,000, and 13% over $40,000. 83% of participants had health insurance but 63% had barriers to health care access including cost/inadequate insurance, time, and transportation. The number of primary care provider visits in the past year were: 17% zero times, 19% one time, 26% two times, 12% three times, and 26% four or more times. The number of emergency department visits in the past year were: 43% zero times, 29% one time, 14% two times, 11% three times, and 3% four or more times. 83% of participants had health insurance but 63% had barriers to health care access including cost/inadequate insurance, time, and transportation. The number of primary care provider visits in the past year were: 17% zero times, 19% one time, 26% two times, 12% three times, and 26% four or more times. The number of emergency department visits in the past year were: 43% zero times, 29% one time, 14% two times, 11% three times, and 3% four or more times. 84% were very or moderately confident in receiving good health care within the community, and 90% were very or moderately confident in taking an active role in their own health. Our health fair had a very positive or positive impact on 95% of participants and 94% plan on returning next year. DISCUSSION Our participants consisted primarily of minority populations, with hispanic representing our largest ethnic demographic. It was interesting to see that less than half our participants received education beyond high school, and the majority subsisted on a household income of $20,000 or less. Most participants indicated that they had health insurance and had seen their primary care physician at least once in the past year, but still expressed barriers to health care access. We were pleased to see that most survey participants were confident in the services offered by their community and were actively involved in their own health.

Prakriti Gaba

NOVEL IMPLEMENTATION OF CARDIAC PACING FOR EPILEPSY MANAGEMENT IN PRIMATE BRAINS

Current epilepsy treatment involves the use of pharmacotherapy; yet, 30% of patients remain refractory. While surgery can treat epilepsy, it negatively impacts neurocognitive function. These factors have favored movement towards less invasive epilepsy treatment. Here we test the use of 2 existing catheters (Cardema & EPT) and 2 novel minimally invasive pacing catheters (over-the-wire balloon & basket) for epilepsy therapy. Methods Under general anesthesia, venous access was obtained in 12 baboons, after which venograms and pacing from each of the 4 catheters was conducted in the occipital vein, vein of Labbe, and petrosal sinus, among other sites. Various pacing cycle lengths were tried. Whether or not electrical capture was obtained was recorded. Post-experimentation, necropsy was conducted. Results Capture was obtained at all sites by at least one catheter. Pacing cycle lengths ranged from 75–600 ms. Threshold was recorded in 4 of 12 experiments (10 mA = lowest threshold resulting in capture). Our novel over-the-wire balloon and basket catheters were most successful in obtaining capture (75% and 100% of all experiments) (Figure 1). Upon
necropsy, no hemorrhage was noted though catheter breakage was observed in one initial experiment. Conclusions Pacing of the cerebral cortex is feasible with all 4 catheter types but occurred most consistently with our novel over-the-wire and basket catheters. Further chronic animal studies and human trials are needed to confirm efficacy however.

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<th>Alexander Roseman</th>
<th>A chronic pain diagnosis is associated with a seven times increased adjusted odds of five or more inpatient hospitalization in a year period</th>
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| Nishant Sahni, M.D.| Having chronic pain is associated with higher health care expenditures and utilization which contributes to the high cost of health care expenditures in the United States. Objective: Assess the association between a chronic pain diagnosis and the number of inpatient hospital admissions in a year period. Design: Retrospective observational study. Setting: A nonprofit health care system that consists of seven hospitals and medical centers including an academic medical center. Patients: Patients between the ages of 18 and 82 that had at least one inpatient hospital admission during a one year period starting with their first inpatient admission in 2013. Measurements: We measured the number of admissions during a year period and two years prior, age, race, sex, ZIP code and corresponding poverty rate and mean household income, Agency for Healthcare Research and Quality comorbidities, Charlson Co-morbidity Scores, and three other disorders: Anxiety, Serious Mental Health (Schizophrenia, Bipolar Disorder, Manic-Depressive Psychosis, Major Depressive Disorder, Agoraphobia, and Personality Disorders) and Chronic Pain. Main Results: Having a diagnosis of chronic pain was associated with increased odds of having five or more inpatient admissions in a year period after adjustment for clinical and demographic variables (OR: 7.92, 95% CI 3.53 - 16.31, p<0.001). Additionally, patients with a diagnosis of chronic pain showed a significantly lower two year mortality rate after their first admission in 2013 (X2 = 7, df = 1, p<0.01). Patients with a chronic pain diagnosis were on average younger, female, reside in ZIP codes with higher poverty rates, and more likely to self-identify as Black or African American, American Indian or Alaska Native or Mixed Race. Additionally, patients with a chronic pain diagnosis had more inpatient admissions, but shorter lengths of stay than patients without a chronic pain diagnosis. Higher rates of Serious Mental Health Conditions (p<0.001), Anxiety (p<0.001), and Rheumatic disease (p<0.001) and lower rates of Congestive Heart Failure (p=0.02) were found in the Chronic Pain cohort as compared with the control cohort. Conclusions: Our findings suggest that a chronic pain diagnosis is associated with increased adjusted odds of five or more inpatient hospitalizations in a year period. The nature of these hospitalizations suggest that they are possibly associated with low priority conditions as the length of stay is shorter, the patients have a significantly lower two year mortality rate and lower Charlson Co-morbidity Scores. These findings suggest that it is warranted to investigate whether these patients are best served through inpatient hospitalizations.
| Marianne Scheitel  
Aimee Yu-Ballard, M.D., Ph. D,  Jane Shellum, Rajeev Chaudhry, MBBS, MPH | **Story of Two-Shared Decision Aids in the Outpatient Primary Care Practice**
The Statin Choice decision aid [1] and Diabetes Mellitus Medication Choice decision aid [2] have been shown to increase patient involvement in decision making. Both of these decision aids are available to providers at Mayo through Generic Disease Management System (GDMS), which is part of EMR at the Mayo Clinic. From January 1st, 2014 to October 31st, 2014, the statin decision aid was accessed 5,393 times and the diabetes decision aid was accessed 126 times through GDMS. In this study, we share results of a survey of the providers on the utility of decision aids. **Methods** We surveyed 142 primary care providers and 120 residents on their familiarity and for the perceived usefulness of the decision aids as well as the effectiveness of the decision aids in influencing shared decision making. The survey had skip logic, so if a provider indicated that they did not use one or both of the decision aids, then the provider was surveyed for reasons for not using the tools. **Results** We received 104 responses out of the 262 providers (39.7%). More providers were familiar with the statin decision aid (93/101, 92%) than the diabetes decision aid (57/104, 54%) (p<0.05). Providers responded to having more success in having the decision aid affect the patient’s medication decisions with the statin decision aid (33/78, 42.3%) in comparison to the diabetes decision aid (6/27, 22.2%) (p=0.069). Users of the statin decision aid and the diabetes decision aid indicated that they found the aids useful (76/78, 97%) and (25/27, 93%) respectively. For both the statin and diabetes decision aid, the top three reasons providers indicated that they did not use the decision aids are: not knowing GDMS had this functionality, lack of enough time, and being comfortable discussing treatment options without a decision aid. **Conclusion** More providers are satisfied with the statin decision aid. We presume that this is due to the individualization of the statin decision aid, but future studies are needed. **References** 1. Mann, D. M., Ponieman, D., Montori, V. M., Arciniega, J., & McGinn, T. (2010). The Statin Choice decision aid in primary care: a randomized trial. Patient education and counseling, 80(1), 138-140. 2. Mullan, R. J., Montori, V. M., Shah, N. D., Christianson, T. J., Bryant, S. C., Guyatt, G. H., ... & Smith, S. A. (2009). The diabetes mellitus medication choice decision aid: a randomized trial. Archives of internal medicine, 169(17), 1560-1568. |
the cases presented and discussions held in the conference. One hundred twenty-two conferences were reviewed, including conferences over a six year period from a single institution’s Department of Medicine. 49.2 percent of cases discussed cognitive error, 13.9 percent discussed system error/failure and 52.5 percent of cases involved an interesting or rare disease process. The subspecialty areas of critical care, infectious disease, hematology/oncology, gastroenterology, surgery, cardiology, and nephrology were represented heavily, while cases from other subspecialties were rarely discussed and most cases (71.3%) involved care that involved another institution. In conclusion, cases discussed at Medicine M&M tend to discuss cognitive error and rare diagnoses and comprise cases from a few specialty areas of medicine. Further, cases that involve care occurring at other medical institutions are commonly presented and might represent a bias in case presentation and an opportunity for improvement. Analysis of these conferences is not only instructive to a wider audience but also demonstrates the necessity at creating an index of M&M cases to avoid over-representation of specialties, patients, or disorders.

Quality Improvement - Medical Students

Elaine Downie
von Hohenberg, Maximilian; Ladner, William; Harrison, Andrew MD; Sick, Brian MD

Seeing Eye to Eye with Patients: Evaluating Community Need for Medical Specialty Care

Medical specialty care is often difficult to access for un- or underinsured patients. The Phillips Neighborhood Clinic (PNC) is a student run free clinic that provides primary and specialty medical care, via dedicated specialty clinic nights, to a largely underinsured neighborhood in Minneapolis. Prior to our project, specialty care offered at the PNC was limited to dermatology and foot care. In order to better serve community needs, we conducted a survey of PNC patients to assess the desire for a new area of specialty care and implemented a plan to provide that care. Methods: PNC volunteers surveyed patients to assess interest in new specialty care. Survey questions were: “Are you interested in additional specialty nights at the PNC?” and “What specialty would you be interested in?” Response options were: gynecology, ophthalmology, pediatrics, orthopedics, psychiatry and other. After community needs were assessed, the most requested specialty night (ophthalmology) was implemented. Patients are now surveyed at each specialty night to determine health insurance status, reason for visiting the clinic, and satisfaction with various aspects of their clinic experience (scale 1-5, with 1 being not satisfied and 5 being very satisfied). Results: 100 patients were surveyed. The majority of the patients (84%) were in favor of having an additional specialty night at the PNC. The specialty most patients desired was ophthalmology (36%), followed by orthopedics (25%), gynecology (17%), psychiatry (12%) and other (10%). In response to the survey results, monthly ophthalmology specialty nights were implemented at the PNC. Services provided include comprehensive eye exams, glaucoma screening, and refractions by University of Minnesota Department of Ophthalmology faculty and residents. Glasses are custom made and provided free of charge to patients who need them.
by volunteer opticians via donations from Lens Crafters and Edina Eye Physicians and Surgeons. To date, there have been two ophthalmology nights. At these nights, 26 patients were seen and 17 were provided with glasses. One patient was diagnosed with a retinal hemorrhage and was urgently referred for continued evaluation and treatment. Of the patients that were seen, 69% were uninsured and 92% reported being very satisfied with all aspects of their clinic experience. Conclusion: There is a large demand for medical specialty care for patients that are un- or underinsured. In the community served by our clinic, ophthalmology was the most requested specialty. Lack of health insurance is the largest barrier to eye care in resource poor communities. Having access to adequate eye care is important for multiple aspects of patient well-being as visual impairment predisposes patients to higher medical expense and further limits their access to healthcare. We have found a free way to provide our patients with this important service.

### Residents

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<td><strong>Alan Kubey, MD</strong></td>
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<td>Deanne Kashiwagi, MD</td>
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systemic costs. The institution spent nearly $50,000 over 14 months to cover the cost of the patient’s four hospitalizations; future charity funds can now be used for other patients in need. This tool has directly helped a minimum of 10 patients with an average 90-day savings of $1,597.15 (89.8% reduction). An initial 24-patient study cohort has shown theoretical 90-day savings of $2,071.35 (85% reduction). This case highlights a novel approach to the old problem of medication expense and shows the potential for a novel algorithmic-based tool to dramatically improve the delivery of high-value patient care.

Kathleen Lane, MD
Andrew Olson, MD,
Michael Rhodes, MD

Improving Diagnostic Reasoning Through Structured Peer Feedback

Residents on nightfloat rotations admit up to 40% of patients who are then cared for by daytime ward teams. However, they typically receive little formal feedback regarding their diagnostic reasoning. It is up to the nightfloat individual’s prerogative to sift through the day team’s notes and labs to determine how and why the diagnoses change in order to improve future clinical decisions. Further, according to the ACGME survey, up to 50% of our Internal Medicine residents are dissatisfied with the overall feedback they receive. Our training program lacks regular, standardized, formal feedback regarding clinical reasoning. Description of the Program

In order to address this lack of formal diagnostic reasoning feedback for trainees on nightfloat rotations, a “Diagnostic Reasoning Feedback” form was created and piloted. This form utilizes the secure messaging function of our electronic medical record. The pilot consisted of Internal Medicine and Medicine/Pediatrics trainees on inpatient general medicine ward day and nightfloat teams. When a patient was admitted by a nightfloat resident, the day team accepting that patient was asked to discuss the case and complete out the feedback form, briefly explaining how and why the differential diagnoses evolved over the first day of admission and provide relevant clinical pearls. The completed form was then sent securely to the nightfloat resident and available for review within 24 hours of admission. This form was designed to be brief and easily incorporated into the teams’ preexisting workflow. This form allows for formative feedback over the course of that resident’s nightfloat rotation directly from his or her colleagues. Surveys were distributed to residents before and after the pilot to determine satisfaction with the quality and type of feedback received, to evaluate changes in team discussions of clinical reasoning and diagnostic error, and to assess if this type of feedback changes current and future clinical practice.

Findings to Date

This project is currently being piloted through August and September 2015 and preliminary data will be presented at the meeting. We have received an IRB exemption and pledges of support from our program director, administration, and chief residents.

Lessons Learned

This project is currently being piloted through August and September 2015. We have no formal lessons to report as of yet but will have nearly two months of the project to report on at the meeting.

E. Kendahl Moser-Bleil, MD

Follow Up to Hepatitis C Birth Cohort Screening: Evaluation of Compliance after EMR Flag Implementation

Hepatitis C virus (HCV) is the most common chronic bloodborne
pathogen in the United States 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. The Centers for Disease Control and Prevention (August 2012) and the USPSTF (June 2013) recommend a one-time screening for HCV infection in all individuals in the “Baby Boomer” cohort. In 2014 charts from five HealthPartners primary care sites were reviewed to evaluate compliance with the updated screening recommendations. Overall only 14% of patients in the recommended age cohort had a known HCV status. Based on this data HealthPartners adopted an electronic medical record (EMR) health maintenance flag for those patients meeting screening criteria in January 2015. This study compared compliance with the HCV screening recommendations pre and post intervention.

Methods: Five primary care sites in the HealthPartners system were included: Inver Grove Heights Clinic, Midway Clinic, Stillwater Medical Group, University Avenue Clinic and Woodbury Clinic. Data was pulled for a five month period pre-intervention and the same five month period post-intervention (March through July 2014 & 2015). Patients born between 1945-1965, seen for health maintenance (V70.0 - Routine general medical examination at a health care facility) by Internal Medicine or Family Medicine providers, were included.

Results: Overall compliance with one-time screening recommendations increased significantly from 8.1% pre-intervention to 37.9% post-intervention (two sided z-test, $<0.05$, p<0.0001). However, pre-intervention compliance with one time HCV screening was lower than expected based on our pilot study (8.1% vs 14%). All five clinics included had increased compliance rates between 2014 and 2015. There was a general trend of increased compliance as time progressed in 2015. Although rates increased significantly after the intervention, >60% of patients in the age cohort remained with unknown HCV statuses.

Conclusion: There has been a significant increase in compliance with recommendations for one-time HCV screening in the baby boomer age cohort in selected clinics which correlates with the implementation of an EMR flag. Room for improvement remains as > 60% of eligible patients have unknown HCV statuses. Increased rates of testing in 2015 nearly doubled the number of patients identified with positive statuses. Additional study is needed to determine if the improvement in screening is limited to these clinics or is reflected in the entire HealthPartners system. Further study is also warranted to determine if the additional patients detected were evaluated for treatment.

Melissa Myers, MD

Increasing High-Value Venous Thromboembolism Prophylaxis: a Win-Win Situation

Venous thromboembolism (VTE) is a preventable and potentially fatal condition that hospitalized medical patients are at risk for. 1,2 Compared with the more traditional option of subcutaneous heparin, low molecular weight heparin (LMWH) has been shown to be superior for VTE prophylaxis with regard to both efficacy and bleeding risk, and
to have a lower risk of heparin-induced thrombocytopenia. Our institution uses the LMWH enoxaparin, which also provides the advantage of once daily dosing and thus fewer injections for patients. This also results in decreased costs, in terms of physical resources necessary to provide the injection itself and nursing time expenditure. This initiative focused on increasing the use of LMWH for VTE prophylaxis among medical patients hospitalized on four inpatient general medical resident teaching services at Mayo Clinic Hospital, Saint Mary’s Campus during May 2015. Baseline data revealed that on any given day, approximately 20 patients among these four medicine teams were eligible for LMWH, with only 1 in 3 of these patients receiving it. To improve the utilization of LMWH for VTE prophylaxis, an interprofessional QI team was formed in May, 2015, consisting of resident and attending physicians with nursing and pharmacy leadership. A systems analysis was performed, with stakeholder interviews revealing prescriber knowledge regarding the use of LMWH for VTE prophylaxis as the largest barrier to its utilization. Several Plan-Do-Study-Act (PDSA) cycles were performed beginning with peer-to-peer education and performance feedback by residents, which resulted in small increases in LMWH use. This was supplemented by a pharmacist-to-resident education session which led to even greater improvements in LMWH use. Data analysis demonstrated an increase in LMWH use from 33% to 66% (p<0.009) of eligible patients. Maintaining this change is an ongoing effort focused on continued education of residents who are new to the service each month. Sustained over a one month period, this increase would conserve over 450 injections and nearly 80 total hours of nursing time. In this manner, usage of LMWH for VTE prophylaxis rather than unfractionated heparin improves the quality, patient satisfaction, cost and efficiency of healthcare, and is a ‘win’ for patients, nursing staff, and providers.

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<td>Jithma Abbeykoon, MD</td>
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<td>The Effect of Implementing Gene Expression Classifier to Improve Management in Thyroid Nodule Cytology with ‘Indeterminate’ Diagnosis</td>
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Thyroid nodule cytology is classified into six categories under the Bethesda Classification System. Two of these categories, atypia of undetermined significance (AUS) and suspicious for follicular neoplasm (SFN), are labeled as ‘indeterminate’ diagnosis due to inability to clearly distinguish benign from malignant cytology. Afirma Gene Expression Classifier (AGEC) may help to determine the malignant potential of thyroid nodule among patients with ‘indeterminate’ cytology. This study aimed to assess whether the implementation of AGEC was associated with decreased proportion of surgical recommendations and lower financial cost. Methods: A retrospective cohort study included data from electronic medical records at the University of Kansas School of Medicine-Wichita Endocrine Clinic about patients who underwent thyroid nodule fine-needle aspiration between 2004 and 2014. Data were analyzed using the SAS software for Windows version 9.3 (Cary, NC). Descriptive statistics were presented as frequencies and proportions for categorical variables. Chi-square analysis was
conducted to assess the severity of the biopsy results, recommendation for surgery, surgical complications, and financial costs pre and post implementation of the AGEC. Results: A total of 299 consecutive patient’s charts were screened. Sixty-one (20%) patients had an ‘indeterminate’ diagnosis and underwent further analysis. Out of those 61 patients, 27 (44%) patients underwent evaluation in our institution before AGEC was implemented and 34 (56%) patients underwent evaluation after implementation. There was no significant difference in the rate of ‘indeterminate’ cytology reported before and after AGEC implementation, 44% vs. 56% respectively (p=0.204). However, surgical recommendation for patients with ‘indeterminate’ finding decreased from 81.5% to 50% (p=0.011), before and after AGEC implementation, respectively. This potentially may also have decreased the rate of morbidity and complications linked to thyroid surgery. Cytopathologic diagnosis in patients who underwent surgery before the use of AGEC showed only 20% as malignant compared to 86% of malignant cytopathology in patients who underwent surgery after evaluation by AGEC. Primary cost-benefit estimate showed implementing AGEC has saved $722/patient in medical evaluation and treatment of a thyroid nodule rendered with ‘indeterminate’ finding on cytology. Conclusion: AGEC implementation appears to decrease the number of unnecessary surgeries, correctly identify patients who actually need surgical intervention, reduce potential surgical complications and lower financial burden for patients with ‘indeterminate’ diagnosis of thyroid nodules.

**Sushil Garg, MD**  
Stuart Amateau, Shaw Mallery, Martin Freeman Mustafa A. Arain

**Health Care Utilization, Costs, and the Burden of Disease Related to Chronic Pancreatitis in the United States**

Chronic pancreatitis (CP) is a progressive inflammatory disease of the pancreas that results in the slow destruction of pancreatic parenchyma with ensuing fibrosis. Chronic pancreatitis is a major cause of morbidity with associated localized complications, exocrine insufficiency, diabetes and severe intractable pain. There are limited data on the rate and costs associated with inpatient admissions for CP. The aim of this study was to analyze a national database of U.S. hospitals to determine the incidence and inpatient costs of associated with CP. Methods We analyzed the National Inpatient Sample Database (NIS) for all subjects in which CP (ICD code 577.1) was the principal discharge diagnosis during the period from 1997-2012. Review of ICD-9 codes did not reveal a separate designation for acute-on-chronic pancreatitis. The NIS is the largest publicly available, all-payer inpatient care database in the United States. It contains data from approximately 8 million hospital stays each year. A Chi-squared test was applied to analyze the number of hospital discharges, the length of hospital stay (LOS) and the related hospital costs over the study period. Results There were 21815 admissions with a principal discharge diagnosis of CP as in 1997 compared to 14195 in 2012 (p < 0.001). The rate of discharge per 100000 persons decreased from 8±0.4 to 4.5 ±0.1 (p < 0.001 Figure 1) over the same time period. Moreover, the mean LOS decreased from 6.2 days to 5.0 days, reflecting a 19.3 % change (p < 0.001). However, during this period the mean hospital costs increased by 183.9 % from $
12725 per patient in 1997 to $36138 per patient in 2012 (p < 0.001, Figure 2). Interestingly, the in-hospital mortality rate did not change significantly, with a decremental trend from 0.81 % in 1997 to 0.59% in 2012 (p= 0.21 NS)  

Discussion  The number of inpatient admissions and rate of discharge for CP has markedly decreased over the last 16 years. In contrast, there has been a significant increase in hospital costs related to CP however there has been no significant change in the inpatient mortality rates. These trends may reflect improvement in the outpatient management of CP patients and increase in overall cost of healthcare, but further studies are needed to confirm this association.

Outcomes of Treatment of Pulmonary Hypertension in Patients with Interstitial Lung Disease.

Pulmonary hypertension (PH) is a known complication and is a poor prognostic factor in interstitial lung disease (ILD) (1, 2, 3). Effective treatment of PH in ILD patients could lead to improved clinical outcomes and possible mortality benefit. Methods: We identified patients with ILD and PH in the Interstitial Lung Disease Database at the University of Minnesota (n=1187) and Minnesota Pulmonary Hypertension Repository cardiac catheterization database (n=454). Inclusion criteria included: initial pretreatment mean pulmonary artery pressure (mPAP) ≥25 mmHg by right heart catheterization (RHC), pulmonary capillary wedge pressure (PCWP) ≤15 mm Hg, and initiation of PAH-specific vasodilator therapy. We excluded patients with connective tissue disease, chronic thromboembolic disease, left sided heart disease and patients who did not have follow up data. We examined the effect of PH-specific therapy on hemodynamic measurements (by RHC and echocardiogram), six minute walk distance (6MWD), pre- and post-walk test Borg dyspnea index and pulmonary function tests (PFTs). Follow up data was evaluated at 6, 12, 18, 24, 36, 48, 60, and 84 months after medication initiation. Linear mixed models were used to compare means at baseline, 12 months, and 24 months. Fisher’s exact tests and t tests were performed to examine the association between baseline characteristics and death. Proportional hazards models were conducted to further examine baseline characteristics associated with time to death. Results: 24 patients with ILD and PH were included. 14 were female, and average age at diagnosis was 59 ± 13.3 years. 9 patients had sarcoidosis, 5 nonspecific interstitial pneumonia (NSIP), 5 IPF/UIP (idiopathic pulmonary fibrosis/ usual interstitial pneumonia), 2 airway centered interstitial fibrosis, 1 respiratory bronchiolitis interstitial lung disease vs desquamative interstitial pneumonia, 1 pulmonary fibrosis, 1 Langherhan’s histiocytosis and 1 radiation-induced pulmonary fibrosis. 22 patients were treated with phosphodiesterase-5-inhibitors (sildenafil or tadalafil) and 2 with prostacyclin (1 inhaled and 1 intravenous treprostinil). Baseline and 24 month follow up RHC and echocardiographic measurements did not change significantly (Table 1). 7 patients died during the follow up period (range 6 – 84 months) (29%). Average time to death after medication initiation was 37.4 ± 25.4 months. Of note, sarcoidosis and earlier age at time of PH diagnosis were associated with a significantly lower rate of mortality.
### Rheumatologic Diagnoses, Characteristics and Needs of Somali Patients Referred to a Rheumatology Clinic Serving the Somali Population

Limited data is available on rheumatologic disease patterns in the Somali immigrant community. Objectives: To characterize the rheumatologic disease patterns in a Somali immigrant population, we investigated the clinical characteristics of patients referred to a Minneapolis rheumatology clinic. Methods: A retrospective chart review from 2010-2014 for 100 consecutive patients of Somali origin referred to Hennepin County Medical Center (HCMD) rheumatology clinic in Minneapolis, Minnesota. Results: Of the 100 reviewed patients, 33% did not have a clearly defined rheumatologic syndrome. 32% had osteoarthritis (OA) or myofascial pain. 35% had an inflammatory or an immunologic connective tissue disease. Coexisting mental health disorders were present in 44% of those with OA or myofascial pain. In addition, of those patients tested, 88% had low vitamin D levels. The “no show” rate for follow up appointments was 53%. Conclusions: Many Somali immigrants referred to rheumatology may not have an underlying rheumatologic disorder. A high rate of mental illness and vitamin D deficiency in this population should prompt providers to do additional screening for these disorders.

### Tropheryma Whipplei Infection (Whipple Disease): A Multicenter Experience in the United States

Whipple disease (WD) is a chronic infectious illness caused by the bacterium Tropheryma whippelii. Few cases have been reported in the United States. Aim: We report the demographics, clinical manifestations, treatment, and outcomes of 29 WD cases from four US referral centers within the last 20 years. Methods: Cases of WD diagnosed from 1995 to 2010 were identified in four referral centers in the United States. Classic WD was characterized by specific positive T. whippelii polymerase chain reaction (PCR) performed on intestinal small bowel biopsy and/or positive periodic acid-Schiff (PAS) staining of small bowel specimens. Localized infections were defined by a positive T. whippelii PCR result from samples of other tissues or body fluids. Results: Among 29 WD cases included, 23 (79%) were male, median age at diagnosis was 53 years (IQR, 44-61). Median interval from initial presentation to definitive WD diagnosis was 18 months (IQR, 8-60). Classic WD was the most frequent clinical presentation (n=15, 52%). Localized infections affected the central nervous system (n=7), joints (n=3), heart (n=2), eye (n=1), and skeletal muscle (n=1). Most frequent clinical manifestations were weight loss (66%), arthritis/arthralgia (55%), asthenia (52%), diarrhea (45%), and lymphadenopathy (38%). The preferred therapeutic regimen was ceftriaxone intravenously followed by trimethoprim and sulfamethoxazole orally(n=19, 68%). After the start of antibiotic therapy, 21 (72%) patients had evident clinical response, 3 patients had unclear clinical response, 2 patients deteriorated, and 3 patients were lost to follow-up. After a median
follow-up of 14 months, 5 patients died (Creutzfeldt-Jacob disease, aortic dissection, aortic valve stenosis, 2 unknown cause). Conclusions: WD remains a rare diagnosis in the United States. Classic WD with small bowel involvement is the most frequent clinical presentation. Negative small bowel PAS and PCR does not exclude the diagnosis of WD and positive PCR may be seen with extra-intestinal disease.

**Amit Sharma, MD**
Ankur Kalra, Pranay Rao, et al.

"Silent" Atrial Fibrillation Burden in Patients With Hypertrophic Cardiomyopathy

Symptomatic atrial fibrillation (AF) occurs in at least 20% of patients with hypertrophic cardiomyopathy (HCM). HCM patients with paroxysmal AF have an increased risk of heart failure and embolic stroke. Asymptomatic AF is often detected at routine device follow-up, and indications for rhythm control strategies and anticoagulation are not well-defined for this population. Burden and clinical significance created by asymptomatic and "silent" AF in HCM is unknown. Methods: Starting with the database of all HCM patients at Minneapolis Heart Institute, we studied 288 consecutive HCM patients implanted with implantable cardioverter-defibrillators (ICD), mostly for primary prevention of sudden death. Intra-cardiac electrocardiograms (EGMs) were reviewed to document presence of AF. We compared the baseline characteristics and rates of stroke between patients with known and "silent" AF. Results: Of the 288 patients, 100 patients were excluded due to having < 1 minute of atrial dysrhythmia. Of the remaining 188 patients, 110 were excluded due to absence of any AF and 22 were excluded due to a prior history of clinically significant AF. This left 78 patients to be included in the final analysis, of which 27 patients had silent AF and 51 patients had non-occult or clinically significant AF. Of the occult population, 2/27 or 7% of patients had embolic stroke compared with 5/51 or 10% of non-occult patients. P-value for this was 1.0 indicating no clinically significant difference in embolic stroke between occult and non-occult AF groups. Of the 27 patients with occult AF, 5 or 19% eventually progressed to non-occult or clinically significant AF. Conclusions: In a large HCM cohort, we identified about 14% of patients with occult (silent) episodes of AF on routine device interrogation. About 7% of “silent” AF patients proved to be at risk for embolic events and about 19% of “silent” AF patients progressed to symptomatic AF. There was no clinically significant difference in stroke between occult and non-occult AF groups and these findings suggest consideration for more aggressive surveillance, earlier anticoagulation, and anticipation of targeted rhythm-control strategies.

**John Shin, MD**
Jan Buckner, MD and Sani Kizilbash, MBBS

The efficacy of chemotherapy in treating recurrent grade 2 and 3 ependymomas in adults

The role of chemotherapy in treating recurrent ependymomas in adults is uncertain. This study aimed to investigate the efficacy of temozolomide and bevacizumab compared to traditional platinum based regimens in this setting. Methods: A retrospective review was performed of the medical records of all adults (age >= 18) with recurrent grade 2 or 3 ependymomas at the Mayo Clinic who were treated with chemotherapy between 1993 and 2015. Efficacy was assessed by (i) best response by RANO criteria within a 6 week to 4 month period after initiation of chemotherapy and (ii) time to
Results: 12 patients were identified, treated with a total of 27 chemotherapy regimens. 12 of these were platinum-based. No complete or partial responses were observed. Stable disease was observed in 67% (8/12) of patients treated with platinum-based chemotherapy, 100% (2/2) treated with nitrosourea-based therapy, 25% (1/4) treated with temozolomide based therapy, 40% (2/5) treated with bevacizumab and 20% (1/5) treated with other regimens.

Platinum-based therapy was associated with a non-statistically superior time to progression compared with non-platinum based therapy (181 vs 63 days, p = 0.09). The median times to progression for temozolomide and bevacizumab monotherapy were 70 and 90 days, respectively.

Conclusions: Bevacizumab and temozolomide based therapy are not superior to platinum-based therapy in recurrent adult ependymoma.

Tyson Sievers, MD

Limited hepatitis B immune globulin following liver transplant for hepatitis B

The standard of care at many institutions for prevention of hepatitis B virus (HBV) recurrence after liver transplant (LTx) is indefinite hepatitis B immune globulin (HBlg) therapy in combination with an oral nucleos(t)ide inhibitor. This regimen, which is both expensive and time consuming, results in HBV recurrence rates of 5%. Long-term data regarding the efficacy of other prophylactic options is lacking. The goal of this study was to examine the long-term outcomes in LTx patients with HBV who were treated with nucleos(t)ide inhibitors and no HBlg maintenance. Our hypothesis is that oral nucleos(t)ide inhibitors, in the absence of HBlg, can yield equal or greater efficacy than HBlg in preventing recurrent hepatitis B after LTx for hepatitis B. Methods and Results Charts of patients who received LTx at our institution for HBV-related liver complications (cirrhosis, HCC, acute liver failure) were reviewed and analyzed retrospectively. There were 45 patients included in this study who received limited HBlg prophylaxis and were maintained on nucleos(t)ide inhibitors long-term. Mean follow up time was 4.8 years post-transplant (range 0.2 to 11 years), during which three patients (6.7%) developed recurrence of HBV, which was defined by presence of HBV DNA or positive hepatitis B surface antigen (HBsAg). Two of those patients became HBsAg positive while remaining HBV DNA negative. The third patient with recurrence became HBV DNA positive while remaining HBsAg negative and was found to be non-compliant with medication and became HBV DNA negative again once tenofovir was resumed. Discussion Our HBV recurrence rate at the end of the study was 6.7%. However, one instance of recurrence in our study was related to medication non-compliance. Once this patient resumed tenofovir, the HBV DNA level became undetectable and has remained negative, now 9.4 years post LTx. The clinical impact of HBV recurrence in our study seems to be minimal. Two of the three patients with recurrence have maintained excellent liver function after a mean 6 years follow up since recurrence. Only one patient with HBsAg positivity required retransplantation due to biliary strictures, not HBV recurrence. This patient’s course can be explained by the well-known complication of biliary strictures that occurs in deceased donor LTx. Conclusion Indefinite HBlg therapy adds significant expense to the prevention of HBV post-LTx. Our regimen of nucleo(t)side inhibitors with only limited

Tyson Sievers, MD

Limited hepatitis B immune globulin following liver transplant for hepatitis B

The standard of care at many institutions for prevention of hepatitis B virus (HBV) recurrence after liver transplant (LTx) is indefinite hepatitis B immune globulin (HBlg) therapy in combination with an oral nucleos(t)ide inhibitor. This regimen, which is both expensive and time consuming, results in HBV recurrence rates of 5%. Long-term data regarding the efficacy of other prophylactic options is lacking. The goal of this study was to examine the long-term outcomes in LTx patients with HBV who were treated with nucleos(t)ide inhibitors and no HBlg maintenance. Our hypothesis is that oral nucleos(t)ide inhibitors, in the absence of HBlg, can yield equal or greater efficacy than HBlg in preventing recurrent hepatitis B after LTx for hepatitis B. Methods and Results Charts of patients who received LTx at our institution for HBV-related liver complications (cirrhosis, HCC, acute liver failure) were reviewed and analyzed retrospectively. There were 45 patients included in this study who received limited HBlg prophylaxis and were maintained on nucleos(t)ide inhibitors long-term. Mean follow up time was 4.8 years post-transplant (range 0.2 to 11 years), during which three patients (6.7%) developed recurrence of HBV, which was defined by presence of HBV DNA or positive hepatitis B surface antigen (HBsAg). Two of those patients became HBsAg positive while remaining HBV DNA negative. The third patient with recurrence became HBV DNA positive while remaining HBsAg negative and was found to be non-compliant with medication and became HBV DNA negative again once tenofovir was resumed. Discussion Our HBV recurrence rate at the end of the study was 6.7%. However, one instance of recurrence in our study was related to medication non-compliance. Once this patient resumed tenofovir, the HBV DNA level became undetectable and has remained negative, now 9.4 years post LTx. The clinical impact of HBV recurrence in our study seems to be minimal. Two of the three patients with recurrence have maintained excellent liver function after a mean 6 years follow up since recurrence. Only one patient with HBsAg positivity required retransplantation due to biliary strictures, not HBV recurrence. This patient’s course can be explained by the well-known complication of biliary strictures that occurs in deceased donor LTx. Conclusion Indefinite HBlg therapy adds significant expense to the prevention of HBV post-LTx. Our regimen of nucleo(t)side inhibitors with only limited
HB Ig is an efficacious and cost effective means to prevent recurrence of post-liver transplant HBV.

**Mazie Tsang, MD**  
Kari G. Chaffee, Timothy G. Call, Wei Ding, Neil E. Kay, Tait D. Shanafelt, Sameer A. Parikh

**Pure Red Cell Aplasia (PRCA) in Chronic Lymphocytic Leukemia (CLL): Etiology, Therapy, and Outcomes**

PRCA is characterized by severe normochromic normocytic anemia, reticulocytopenia, and markedly reduced bone marrow erythroid precursors with intact leukocytic and megakaryocytic lineages. There is limited information about the prevalence and outcomes of PRCA in CLL, with the majority of information derived from case reports and small series. We describe the clinical features, therapy, and outcomes of CLL patients with PRCA seen at our institution. Methods: The Mayo Clinic CLL Database includes all patients with a diagnosis of CLL evaluated at Mayo Clinic Rochester, MN between January 1995 and December 2014. We identified patients diagnosed with PRCA per the following criteria: those who presented with normocytic anemia, had decreased erythroid precursors on bone marrow examination, and reticulocytopenia that could not be explained by any other cause besides PRCA. The baseline demographics, clinical characteristics, therapy, and outcomes were abstracted. We generated descriptive statistics and calculated overall survival (OS) from diagnosis date (PRCA, autoimmune cytopenia [AID], or CLL) to last known alive or death date. OS was plotted using Kaplan Meier curves and compared between groups using log-rank statistic. Results: Of the 3945 CLL patients seen during the study interval, we identified 30 patients who met the diagnostic criteria of PRCA. The median time to PRCA from CLL diagnosis was 4.5 years (range -0.1 -14 years). Of the 13 patients with IGHV results available, 12 (92%) were IGHV unmutated. Twenty-one (70%) were male and their median age at PRCA diagnosis was 67 (range 40-81 years). Parvovirus testing was positive in 6 of 24 (25%) patients who were tested; 3 of these were treated with IVIG, 2 with prednisone and IVIg, and 1 with prednisone and rituximab. Eight patients (27%) had both PRCA and autoimmune hemolytic anemia (AIHA), and 1 patient (3%) had concomitant PRCA and immune thrombocytopenia (ITP). Of the 27 patients for whom we have treatment data, 10 required only one treatment regimen and 17 required 2-6 regimens, with two patients requiring splenectomy for concomitant AIHA. The median survival of CLL patients after a diagnosis of PRCA was 4.6 years. There was no difference in survival between PRCA cases with and without parvovirus (p=0.92). Compared to newly diagnosed CLL Rai stage III/IV patients, there was no difference in OS (p=0.53). There was no statistically significant difference in survival from an AID cytopenia diagnosis when comparing PRCA, ITP, AIHA, and Evans syndrome. Conclusion: PRCA is a rare complication in CLL, occurring in <1% CLL patients seen at our institution over the past 20 years. Parvovirus was the etiologic factor in ~25% of patients and did not influence outcomes. There appears to be no significant difference in outcomes of PRCA patients compared to patients with other AID in CLL.
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<th>Name</th>
<th>Case Description</th>
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<tr>
<td>Abdul Ahmad, MD</td>
<td>Extrapulmonary Tuberculosis Mimicking Crohn''s Disease</td>
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<td>Peter Lund, MD</td>
<td>A 31 year old female originally from Zambia presented to the Emergency Department with abdominal pain, diarrhea, nausea, and vomiting. She has a past medical history significant for Crohn''s disease diagnosed 9 years ago. She has had terminal ileitis and ascending colitis on previous evaluations. She had presented with similar GI complaints one month prior and was treated with prednisone without significant improvement. The patient presented with abdominal distention, 3-4 non-bloody loose stools per day along with intermittent fevers and chills. The patient denied cough, hemoptysis, weight loss, oral ulcers, myalgias or arthralgias. On exam she was afebrile with normal vital signs. Her abdomen was obese, slightly distended, and diffusely tender without guarding, rebound or organomegaly. She had mild sacral/sacral-iliac joint tenderness, and no lumbar or thoracic spinal tenderness. There were no oral ulcerations or lymphadenopathy. Laboratory studies were notable for normal CBC and LFTs. She subsequently underwent an upper endoscopy, which showed mild gastritis and duodenitis with bland biopsies. H. Pylori was negative. She then had colonoscopy that showed ascending colon colitis, compatible with Crohn''s disease. Biopsy revealed granulomatous colitis with suspicious for tuberculosis, and less compatible with Crohn''s disease. AFB stains were negative. CT of the abdomen showed normal liver, normal spleen, normal gallbladder, kidneys, and adrenals, and was essentially unremarkable. X-rays of her lungs and lumbar spine were without evidence of any other extrapulmonary manifestation of tuberculosis. Interferon Gamma Release Assay (Quantiferon Gold) testing was positive supporting the diagnosis of tuberculosis. She had no known exposure to TB, She did have BCG vaccination as an infant. Past PPD testing positivity had been attributed to the BCG. She began treatment for presumed TB enteritis (ethambutol, INH, pyrazinamide, and rifampin) during her hospital course and was discharged home with plan for further follow up with Infectious Disease. The patient has responded well to the antituberculous therapy with resolution of her symptoms. Discussion: Tuberculous enteritis is not usually accompanied by classical TB constitutional symptoms or abnormal chest radiography. It can have a very indolent course unlike pulmonary TB or other extrapulmonary manifestations. TB enteritis can mimic Crohn’s disease and poses a diagnostic challenge. Clinicians should pay close attention to patients from endemic regions presenting with Crohn’s like symptoms such as abdominal pain, hematochezia, or persistent diarrhea. Lack of responsiveness to steroids can also support the diagnosis of TB enteritis. Treatment for extrapulmonary TB is similar to pulmonary TB and generally involves 4 drug regimen (Isoniazid, Rifampin, Pyrazinamide and ethambutol) for 2 months followed by Isoniazid, Rifampin for another 4 months.</td>
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<td>Mohamoud Ali , MD</td>
<td>Mixed Cryoglobulinemic Vasculitis associated myopericarditis</td>
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<td>A well-documented extrahepatic complication of Hepatitis C virus (HCV) infection is mixed cryoglobulinemic vasculitis Type II. While typical manifestations of HCV-associated cryoglobulinemic vasculitis are well-</td>
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described (palpable purpura, arthritis, glomerulonephritis, peripheral neuropathy, etc.), rarely do affected individuals develop cardiac-related manifestations such as myopericarditis; nearly all who do are liver transplant recipients. In the present report, we describe a rare case of myopericarditis in a non-transplant HCV patient, and apparently the first presenting with cardiac tamponade and preserved systolic heart function. A 45-yr-old male with a history of hepatitis C (genotype 1a) presented to Hennepin County Medical Center with four days of fever, pleuritic chest pain, and generalized abdominal pain complicated by intractable nausea. Initial workup revealed a troponin of 13 g/dL, diffuse ST-wave elevations, and a small pericardial effusion on transthoracic echocardiography (TTE). Subsequent cardiac magnetic resonance imaging showed a pericardial effusion and subepicardial foci of delayed enhancement suggestive of myocarditis. A more extensive serologic workup commenced; results included positive antinuclear and cytoplasmic-antineutrophil cytoplasmic antibodies, positive anti-SSA titer, and an elevated rheumatoid factor. Subsequent renal biopsy revealed capillary microthrombi composed of cryoprecipitate on light microscopy accompanied by diffuse IgM and C3 deposition in the capillary loops on immunofluorescence. These findings were consistent with cryoglobulinemic glomerulonephritis, a form of membranoproliferative glomerulonephritis (MPGN). At that time, the patient was thought to have a viral pericarditis; after failing first-line therapy with aspirin and colchicine, he was placed on systemic glucocorticoids, improved clinically, and was discharged. Unfortunately he returned three months later with similar symptoms complicated by a substantially lower GFR and a large pericardial effusion that had evidence of diastolic collapse with impending tamponade on repeat TTE. The pericardial fluid had a negative gram stain and culture. His symptoms eventually improved with pulse steroids, rituximab and plasmapheresis, but he required intermittent hemodialysis for volume overload and rapidly progressive GN; while his symptoms were much improved overall, he remains dialysis-dependent. While myopericarditis has been reported in cryoglobulinemic vasculitis associated with disorders such as Sjogren’s syndrome and in HCV-related cryoglobulinemic vasculitis following liver transplantation, this appears to be the first case of myopericarditis in a non-transplant HCV patient presenting with cardiac tamponade and preserved systolic heart function. While the absence of a myocardial biopsy – a complex procedure fraught with difficulty – means that myocarditis could not be definitively diagnosed, the constellation of clinical and imaging findings, the renal biopsy findings, and the response to immunosuppressive therapy makes HCV-associated cryoglobulinemic myopericarditis the most likely explanation for the patient’s findings. The mechanism by which cryoglobulins affect the myocardium is likely to be via small-vessel vasculitis, although this is uncertain. Thus, clinicians should be careful to assess for possible cardiovascular involvement in patients with cryoglobulinemic vasculitis.
| Vidhu Anand, MD, Thenappan Thenappan | Trends of Inpatient burden of Primary Pulmonary Hypertension in USA: Analysis of Nationwide Inpatient Sample Data base from 2001-2012  
**BACKGROUND:** Primary pulmonary hypertension (PPH) is a rare pulmonary vascular disease characterized by endothelial dysfunction and vascular remodeling of small pulmonary arteries, resulting in elevated pulmonary artery pressures. The cause of endothelial dysfunction is usually unknown. PPH is a progressive disease resulting in reduced cardiac output, right heart failure, and death. We aimed to evaluate the characteristics of hospitalizations for PPH in United States.  
**METHODS:** We analyzed the National Inpatient Sample Database (NIS) for all subjects in which PPH (ICD code 416.0) was the principal discharge diagnosis from 2001-2012. Data is presented as mean ± SE.  
**RESULTS:** In 2001, there were 3177 admissions with a principal discharge diagnosis of PPH as compared to 1345 in 2012 (p<0.001). Rate of discharge per 100,000 persons decreased significantly from 1.1 ± 0.1 to 0.4± 0.0 (p<0.001). However, the mean length of stay (7.03±0.5 in 2001 vs 7.6±0.6 in 2001, p= 0.5) and in-patient mortality (7.75±1.07 % in 2001 vs 6.32±1.68 % in 2001, p= 0.47) has not changed significantly between 2001 and 2012. It is important to note that during this period the mean hospital charges increased by 269.8 % from $29507 per patient in 2001 to $79607 per patient in 2012 (p<0.0001). In 2012, 68% of patients were between ages 45-84 years and 72.9% were females. Medicare was billed for about half the hospital stays in 2012 (49.4%). The routine discharges constituted about 62.45% of total discharges, followed by home health care (18.6%) and nursing home/ rehab (6.7%). Conclusion: The number of inpatient admissions and rate of discharge for primary pulmonary hypertension has decreased significantly over the last 13 years. The cost associated with these admissions has however increased substantially, even though there is no significant change in the duration of inpatient stay and inpatient mortality rates. |
| Dagney Anderson, MD Dr. Karina Keogh | Watch the Gap: Recognizing 5-oxoprolinuria as a cause of anion gap metabolic acidosis  
**Introduction** Acquired 5-oxoprolinuria is an often unrecognized cause of anion gap metabolic acidosis. This condition, which can be precipitated by even relatively small amounts of acetaminophen, should be considered after excluding more common culprits such as lactic or ketoacidosis. Malnourished patients, particularly those with renal dysfunction, chronic alcohol use, or a systemic infection, are at higher risk. If unrecognized, continued acetaminophen administration ultimately leads to altered mentation and a widening anion gap.  
**Case** A 61 year old female presented to the Emergency Department for evaluation of progressive generalized weakness. She noted a twenty pound weight loss over two months in the setting of chronic, daily alcohol use and depression. Albumin was 2.1 upon presentation. She was initiated on nasogastric tube feeds, which could only be increased slowly due to the development of refeeding syndrome. Her oral intake remained persistently low despite a trial of appetite stimulants, but she reached her goal caloric intake with supplementation. Several weeks into her hospitalization, she |
developed a progressive anion gap metabolic acidosis accompanied by a compensatory respiratory alkalosis. At that time, she was persistently tachypneic with respiratory rates in the mid-20s to low-30s. Her breathing was unlabored and her lungs were clear to auscultation. She continued to appear cachectic with pitting edema of her extremities, largely unchanged since admission. Workup for typical causes of anion gap acidosis was unrevealing. She had evidence of renal dysfunction with an eGFR of 44, but this was stable. A review of her medication administration record was notable for daily use of one to two grams of acetaminophen over a six day period slightly preceding the rise in her anion gap from 15 to 23. A urine organic acid screen was notable for a 5-oxoproline level that was eighteen times the reference range. Acetaminophen was discontinued and N-acetylcysteine was administered. This resulted in normalization of her anion gap in four days. 

Discussion While providers often exhibit caution in utilizing acetaminophen in patients with hepatic dysfunction, there is generally less awareness about potential complications in other settings. Malnourished patients are prone to developing acquired 5-oxoprolinuria as a result of depleted glutathione stores. Those with concurrent renal dysfunction have even lower tolerance for acetaminophen due to impaired excretion of 5-oxoproline. Accumulation of this organic acid results in an anion gap acidosis and can manifest with significant neurologic symptoms including altered mental status. Discontinuing acetaminophen is the initial intervention of choice, with N-acetylcysteine serving as a benign, though unproven, adjunct.

| Htin Aung, MD | Hyponatremia is a common electrolyte disturbance with an estimated prevalence of 15-20% in hospitalized patients, and severity is predictive of in-hospital mortality and outcomes. Establishing the etiology of hyponatremia requires careful examination of the patient with appropriate testing. A hypo-osmolar hyponatremia with hyper-osmolar urine suggests an anti-diuretic hormone mediated process. However, endocrinologic assessment is required before establishing a diagnosis of Syndrome of Inappropriate Antidiuretic Hormone release (SIADH). Our case highlights the importance of assessing the hypothalamic-pituitary-adrenal axis in determining the etiology of hyponatremia. We present a 71 year old woman with treated hypothyroidism admitted to the hospital with chronic asymptomatic hyponatremia. The patient was in her usual state of health until two weeks prior to presentation when she developed a viral upper respiratory infection. This was managed conservatively. However, hyponatremia was incidentally found on labs with plasma sodium of 123 mmol/L, with normal plasma sodium 11 days earlier. She received intravenous fluids with normal saline, but sodium remained unchanged at 124 mmol/L. She was advised to restrict free water and followed up two days later with a repeat laboratory evaluation. However, the plasma sodium further declined to 114 mmol/L. She continued to be asymptomatic, but she was admitted to the hospital for further evaluation. Upon further questioning and review of the records, she had a past medical history for dilated cardiomyopathy with reduced ejection fraction noted 5 years ago, as |
| James Gregoire, Todd Nippoldt |
well as a reported remote history of Sheehan Syndrome. Examination of the patient was however unremarkable. Further tests revealed a normal TSH but a low serum osmolality. Urinary osmolality was 488 mOsm/kg, and urinary sodium was 122 mmol/L. The presentation was suggestive of SIADH. Discussions with her revealed that she was diagnosed with Sheehan syndrome in the remote past. She recovered well but had marked oligo-amenorrhea, loss of axillary and pubic hair after the delivery. Several years later she was started on thyroid hormone replacement. Further review of the records revealed that the patient has had episodes of hyponatremia for the past 5 years. These episodes of hyponatremia seemed to coincide with various illnesses. The current degree of hyponatremia seem to be the most severe however. Further workup revealed a morning cortisol of 4.5 mcg/dL. A Cosyntropin stimulation test revealed cortisol of 4.4 mcg/dL at baseline, and 10 and 13 mcg/dL at 30 and 60 minutes, respectively. There was a concern for adrenal insufficiency. Further evaluation revealed low prolactin, low FSH, and low Insulin-like Growth Factor 1. A designated MRI revealed a partially empty sella. A diagnosis of anterior pituitary insufficiency due to postpartum hemorrhage with delayed onset of secondary adrenal insufficiency was made. After initiation of corticosteroid replacement, the patient’s hyponatremia resolved, and her fatigue improved.

| Tariq Azam, MD | Into the Black Box |
| Thomas Poterucha, MD | Drug-drug interactions can lead to adverse outcomes, and represent a largely preventable cause of morbidity and mortality. We present a 74 year old gentleman with history of AAA with repair complicated by polymicrobial and fungal endograft infection on chronic antibiotics and antifungals who presented with 4 weeks of rapidly progressive diffuse muscle weakness leading to an inability to lift his body off of his bed. Exam was notable for diffuse distal predominant weakness, lymphedema of the bilateral upper extremities, and dark colored urine. On presentation, he had a CK of 71000, potassium of 7.1 with EKG changes, and acute kidney injury with a creatinine of 2.3 (baseline 1.4). Urine myoglobin was strongly positive. Prior to these symptoms, he lived independently. He was placed on itraconazole 3 months prior to admission. Approximately 5 weeks prior to admission, he was started on simvastatin by his home provider. Based on his history and presentation, he was diagnosed with statin-induced rhabdomyolysis potentiated by concurrent itraconazole administration. Simvastatin was stopped and he was initiated on RRT. His renal function gradually recovered and he began to gain back some strength. He is currently pending placement for rehabilitation. As the pharmaceutical armamentarium continues to expand, the risk for clinically harmful drug-drug interactions grows. More patients are being treated by a variety of specialists, oftentimes in entirely separate groups or hospital systems, leading to greater chance of incomplete medication reconciliation. As individual providers cannot know every relevant interaction between medications, electronic medical record (EMR) systems have been created with alerts to warn prescribers. While effective and well intentioned, these systems have a number of
limitations. 1. Limited ability to differentiate severity of interactions  2. Ever expanding data on DDIs 3. Inability to communicate  4. Alert fatigue  5. Reliance on electronic systems Despite these challenges, EMR system alerts on DDIs are a key component of a modern medical practice. There are several opportunities for improvement. Expert guided stratification of interactions can be coded into an alert system. For example, interactions graded as severe are produce a pop up alert, while less serious ones are designated in a less intrusive manner. Another idea would be to take common DDIs that are class effects and mark them as such, providing an easier to understand clinical risk. Finally, a national outpatient prescription database that can be accessed by licensed providers to assist in accurate medication reconciliation and prevention of medications errors would perhaps have prevented our patient’s severe illness. DDIs are mostly avoidable causes of morbidity and mortality. As with much of the practice of medicine, avoidance of poor outcomes from DDIs begins with excellent history taking and provider-patient relationship. This step is likely the most effect measure we have.

Tori Bahr, MD

First ever documented geobacillus toebii infection
A 43 year-old man with history of end-stage renal disease secondary to membranoproliferative glomerulonephritis on chronic hemodialysis since age 10, currently dialyzing with home hemodialysis, presents with two days of fevers up to 102 with large and small joint polyarthralgias. In the three weeks prior to presentation the patient had been unknowingly dialyzing with a solution recalled for contamination with Dietzia species, a reclassified rhodococcus. The initial infectious workup was negative as well as serial blood cultures. His arthralgias eventually localized to the right hip and MRI showed a large effusion with internal debris and erosive changes. He underwent joint aspiration with cell count showing 25k WBCs, but cultures again were negative. Ultimately his fever curve improved on piperacillin/tazobactam and he was discharged with oral clindamycin and rifampin to complete a four-week course for possible septic arthritis. As a last attempt to identify an organism the joint aspirate was sent for universal 16s PCR sequencing and returned positive for Geobacillus toebii. This is the first reported case of possible Geobacillus toebii infection. Although fairly ubiquitous in the environment this gram-positive rod first cultured from hay compost is difficult to culture in the lab. Perhaps the explanation for the multiple negative cultures obtained during his hospitalization. Attempts are now being made to have the contaminated dialysate tested with universal 16s PCR sequencing as well. Our case highlights the unique role of universal 16s PCR sequencing offers in the diagnosis of culture negative septic arthritis. Knowledge of the appropriate use of this test is essential for the clinician when approaching these patients in the future.

M. Usmaan Bashir, MD
Ben Nordhues, MD; Minetta Liu, MD

A Case of Opioid-Induced Acute Colonic Pseudo-Obstruction (Ogilvie Syndrome)
Introduction: Constipation is a common side effect associated with narcotic pain medications. Unfortunately, little tolerance to this side
effect develops, especially when compared to tolerance to analgesic effect. This makes balancing harms with benefits quite difficult in patients with chronic pain. Case Presentation: A 25 year old woman with medical history significant for T4, N0, M0 squamous cell carcinoma of the oral cavity and severe radiation-related mucositis was undergoing chemoradiation when she developed severe parotitis and pneumonia. She was hospitalized for treatment of her pneumonia and parotitis as well as pain control. During that hospitalization, she had a PEG tube placed to aid in nutrition as she was unable to maintain sufficient caloric intake due to her mucositis. There was significant difficulty during that hospitalization in finding an appropriate dose of narcotic pain medication that could provide analgesia without excessive sedation. She was ultimately discharged from the hospital in stable condition on an appropriate regimen of antibiotics and pain medication. On a followup visit with her oncologist for scheduled chemotherapy the day after discharge, it was noted that she was hypotensive, in exquisite abdominal pain, had worsening diarrhea, and a new neutrophilic leukocytosis. With the hypotension, diarrhea, leukocytosis, and recent antibiotic administration, there was concern that this may have represented c. difficile colitis or possible ruptured bowel given her recent PEG tube placement and physical exam findings. Her electrolyte panel was significant for hypokalemia and a normal anion gap metabolic acidosis with a normal lactate. She was directly admitted where a CT abdomen/pelvis showed a significantly distended but non-obstructed colon without evidence of inflammation or perforation. Follow-up PCR testing was negative for c. difficile colitis. This was then felt to be more likely Ogilvie syndrome or acute colonic pseudo-obstruction related to her narcotic usage and electrolyte abnormalities rather than a bowel perforation or toxic megacolon. Discussion: Management is typically directed at treating the underlying etiology, as well as supportive with bowel rest, nasogastric tube placement, discontinuation of contributing medications, and occasional use of mild tap water enemas. In this vein, her symptoms were managed conservatively and hinged around treating her reversible causes such as re-hydration, correction of electrolyte abnormalities, encouragement of walking, and down-titrating the dosages of her opioid medications. She ultimately responded to methylnaltrexone and a scheduled bowel regimen to ultimately achieve resolution of her pseudo-obstruction. Had her symptoms not improved, another possible pharmacologic option includes the use of neostigmine as a pro-motility agent. Should pharmacotherapy fail in alleviating the pseudo-obstruction, colonoscopic decompression remains a viable option for management. Finally, definitive management of refractory pseudo-obstruction is surgical decompression with cecostomy or colectomy.

Anne Becker, MD

Cervical lymphadenopathy in a renal transplant patient

Abstract Title: Cervical lymphadenopathy in a renal transplant patient
Anne L. Becker, MD, PGY-2, Internal Medicine, Hennepin County Medical Center, Minneapolis, MN

Introduction: Cervical lymphadenopathy has a broad differential that includes infectious, malignant, and autoimmune etiologies. This case highlights the
increased complexity of diagnosis and management in an immunosuppressed renal transplant patient. Case description: A sixty year old Hmong woman with history of renal transplant in 4/2011 on immunosuppression, chronic hepatitis B, and LTBI previously treated for four months, was admitted 12/2014 with three weeks of persistent lymphadenopathy and fevers. Additional symptoms included diarrhea, myalgia, poor appetite, malaise, and finger joint swelling. Admission workup included blood and fungal cultures, viral testing (TB, respiratory virus, CMV, EBV), CT (neck, chest, abdomen, pelvis) to assess the extent of lymphadenopathy, stool studies (culture, O&P, cyclospora, C.difficile), and left hand X-ray to evaluate PIP swelling. She was started on vancomycin, zosyn and azithromycin and ID was consulted. By hospital day (HD) two, all signs were pointing to TB as the etiology of her symptoms. The CT revealed diffuse lymphadenopathy with a necrotic R supraclavicular node, diffuse bilateral pulmonary nodules (miliary pattern), and her sputum and lymph node biopsy were AFB+. An I&D of the left finger PIP revealed Tuberculosis verrucosa cutis. She was started on anti-tuberculous treatment (RIPE), but then changed to RIF/PZA/ETH due to resistance. Stool studies were unrevealing and the diarrhea was thought to be TB-related. The patient’s immunosuppression regimen for her renal transplant included cyclosporine, mycophenolate, prednisone, and Bactrim prophylaxis. Her doses of immunosuppressants were adjusted to account for interaction with rifabutin, and decreased to help with clearance of TB from the sputum. On HD fourteen, the patient began to have new daily fevers without any signs or symptoms of new infection, presumably related to immune system reconstitution syndrome (IRIS), as the patient's immunosuppressive regimen was scaled back in order to help with clearance of the infection. Work-up for nosocomial/opportunistic infection was completely unrevealing and her fevers improved with acetaminophen. Her sputum AFB never cleared in the hospital and she was discharged home with County Public Health follow-up on HD twenty-one. Her sputum was AFB negative after three months of treatment. Discussion: The presentation of cervical lymphadenopathy in a transplant patient on immunosuppression is concerning for a severe systemic process such as EBV related PTLD or TB. Clues in this patient included her history of partial treatment for LTBI, her status as an immigrant from a TB endemic area, and the chronicity of her non-specific symptoms including fevers and malaise. Special considerations include the need for adjustment of immunosuppressive therapy during treatment and the likelihood of developing IRIS during treatment.

Mike Bierle , MD
Kevin Brough, Svetomir Markovic

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<td>Hemophagocytic lymphohistiocytosis (HLH) is a rare clinical syndrome characterized by extreme immune activation. Diagnosis is complicated, as it can mimic more common conditions and has relatively nonspecific findings. A 64 year old man with a history of essential thrombocytosis well-controlled with hydroxyurea, nonischemic cardiomyopathy with an ejection fraction of 15% and recurrent ventricular tachycardia despite multiple ablations is admitted for sepsis from acute cholecystitis. He developed incessant VT leading to cardiogenic shock</td>
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requiring extracorporeal membrane oxygenation support. He underwent a VT ablation after failing electrical and chemical cardioversion. This was complicated by right ventricular perforation and was subsequently received a total artificial heart as a bridge to transplant. He developed acute kidney injury requiring dialysis and colonic ischemia requiring complete ascending, distal transverse and descending colectomy with a Hartmann’s pouch. He subsequently required abdominal reexploration with cholecystectomy, ileostomy G-tube placement and tracheostomy, and remained in the ICU with severe debilitation, hepatic congestion, and ongoing need of continuous renal replacement therapy. He developed hemoperitoneum and although anticoagulation was discontinued, frequent blood transfusions were required. A subsequent EGD and ileoscopy showed ischemic-appearing nonbleeding gastric and ileal ulcers. When repeat CT abdomen revealed increasing hemoperitoneum, he underwent an exploratory laparotomy for hematoma evacuation. Intraoperative and blood cultures grew staph epidermidis and he was started on vancomycin and meropenem. He then developed progressive pancytopenia over 7 days that did not improve despite discontinuation of multiple medications associated with bone marrow suppression. Labs demonstrated: bilirubin 38, AST 214, ALT 271, reticulocyte count 220, triglycerides 280, ferritin >120,000, LDH 2500, INR 1.1 and aPTT 34. His pancytopenia worsened with nadirs of: hemoglobin 5.6, platelets 54, WBCs 0.4 and absolute neutrophil count 20. A bone marrow biopsy demonstrated hemophagocytosis with no infectious or neoplastic elements. EBV and CMV PCRs were negative. His CTs were reviewed and showed hepatic and splenic enlargement. Hemophagocytic lymphohistiocytosis was diagnosed and he was treated with high dose dexamethasone and cyclosporine. His platelets improved to 194 but he became progressively hemodynamically unstable. His wife elected to withdraw hemodynamic support after careful discussion, and he died shortly after. This case illustrates the difficulty of diagnosing HLH in critically ill patients. HLH should be considered in patients who decompensate unexpectedly. Unusual gastrointestinal bleeding, as seen in our patient, has been reported. Treatment should be directed at suppressing T cell activity. We chose a modification of the most recently developed regimen, HLH-2004. This regimen consists of induction with dexamethasone, cyclosporine and etoposide, which was omitted given our patient’s severe renal and hepatic failure. Our patient had several negative prognostic markers, including the extreme elevation in ferritin and bilirubin. The prognosis is poor, leading to multiorgan dysfunction and death if not identified and treated promptly.

Jared Bird, MD
Adam Sawatsky, MD

Solving Seizures with Steroids

Introduction: A 53 year old female was admitted to the medical ICU in status epilepticus which was successfully treated with intravenous benzodiazepines. She had a past medical history of pulmonary sarcoidosis off of immunotherapy, diabetes mellitus, hypertension, hyperlipidemia, and depression. A MRI of the head 3 days prior had demonstrated enhancement of dura over right frontal lobe. Laboratory
evaluation at the time of presentation demonstrated severe hypercalcemia to 13.5 mg/dL. Clinical Course: An EEG demonstrated generalized slowing but no signs of epileptiform discharges. A repeat MRI of the head showed no new intracranial abnormalities, but demonstrated scattered enlarged lymph nodes and abnormal signal within the cervical spine with enhancing calvarial lesions. The differential for the hypercalcemia and bone lesions included multiple myeloma, lymphoma, or extrapulmonary sarcoidosis. During the hospitalization, she underwent a PET scan which demonstrated many foci of FDG uptake in the skeletal bones, and lymph nodes of the face, neck, and chest. There were additional calcified granulomas in the left lung, left hilar lymph nodes, and spleen. Her hospitalization was complicated by ongoing altered mental status and confusion. Given these findings, a bone marrow biopsy was performed, demonstrating no evidence of malignancy, but showing 30% involvement by non-caseating granulomas, consistent with extrapulmonary sarcoidosis. Her hypercalcemia was corrected gradually with intravenous hydration and she was initiated on high dose corticosteroid therapy for treatment of her sarcoidosis. Her mental status gradually improved and she was discharged with outpatient follow-up in the pulmonary clinic. Discussion: Sarcoidosis is a clinical condition with an overall prevalence estimated to be 20 per 100,000 individuals in the general population. It affects African American patients more frequently than other races, with the lifetime risk for developing sarcoidosis estimated to be 2.4% in African American patients versus 0.85% in the Caucasian population. Sarcoidosis most frequently affects the lungs in patients and may be asymptomatic. The most common pulmonary symptoms include cough, dyspnea, and chest pain with Type B symptoms of fatigue, fevers, and weight loss occurring more frequently in the elderly. While the majority of patients will present with pulmonary sarcoidosis, up to 30% of patients will have extrapulmonary involvement. Neurosarcoidosis is quite rare at 4.6% and bone marrow involvement is seen in 3.9% of all patients with sarcoidosis. Ultimately, diagnosis of extrapulmonary sarcoidosis requires biopsy demonstrating non-caseating granulomas. After diagnosis of extrapulmonary sarcoidosis, treatment is similar to pulmonary disease with the mainstay of treatment being high dose corticosteroids. If there are ongoing symptoms, consideration can be made for starting immunosuppressive medications such as methotrexate or azathioprine.

Whitney Blackwell, MD

Diagnosing Nocardia in the Immunocompetent Patient

Nocardia is a gram-positive bacterium that is usually regarded as an opportunistic infection, but in one-third of cases infects immunocompetent hosts to cause localized or systemic disease. Conditions that put immunocompromised patients at risk for Nocardia include diabetes mellitus, glucocorticoid therapy, malignancy, human immunodeficiency virus infection, or solid organ/stem cell transplant. Nocardia often has a delayed diagnosis. The mean time from the initial development of symptoms to definitive diagnosis is forty two days to one year. The difficulty in diagnosis is in the nonspecific symptomology and isolating and cultivating the bacterium. A 62 year old male with a
past medical history significant for mast cell disease, hyperlipidemia, hypertension, obstructive sleep apnea, Raynaud’s, pacemaker placement secondary to sick sinus syndrome, and recently diagnosed polymyalgia rheumatica on steroid therapy was transferred from an outside hospital for rapidly progressing cavitary lung lesions. Nine months prior to evaluation and being placed on steroids, he noted intermittent symptoms including fevers to 104 F, night sweats, malaise, fatigue, and cough with associated pleuritic chest pain and dyspnea. He had been seen and evaluated by multiple physicians and treated for pneumonias on four different occasions without resolution of symptoms. Lab work showed mild normocytic anemia, normal white blood cell count, and elevated erythrocyte sedimentation rate and C-reactive protein. Computed tomography revealed three dominant, macro lobulated soft tissue masses, two of which resided within the right upper lobe and a third of which resided within the left lower lobe, all with central cavitation. He also underwent a computer-tomography guided biopsy of the right upper lobe cavitary lesion. The biopsy and culture were negative for seven days until filamentous bacteria on Grocott’s methenamine silver stain consistent with Nocardia; in addition, his sputum culture returned positive for Nocardia. He was initiated on intravenous Amikacin and Bactrim. A definitive diagnosis of Nocardia is from tissue isolation, which is only obtained in 44 percent of non-invasive and 85-90 percent of invasive methods. This case illustrates the difficulty and delay in diagnosis of Nocardia lung infections. When a patient that presents with cavitary lung lesions that has negative cultures and pathology, it is reasonable to consider Nocardia as the cause. When Nocardia is suspected, the lab should be notified. Specific stains and culture media can be used to help assist in isolating the bacterium and cultures need to be kept for an adequate incubation period of up to 21 days.
| Jessica Boarini, MD | Don’t be too “rash” when making a diagnosis: sometimes the clues are skin deep!
The overlap between Rheumatology and Infectious Diseases can be a treacherous one. This case demonstrates how a life-threatening infectious process mimicked a preexisting autoimmune disorder. A 58 year old female presents to the emergency department complaining of bilateral lower extremity swelling and a new onset rash of her right leg. She was recently diagnosed with ANCA vasculitis and autoimmune glomerulonephritis and was being managed with immunosuppressant therapy. On exam she presented classic rheumatologic findings including: malar rash, Raynaud’s Syndrome and wine colored patches on the dorsum of her hands. Evaluation of her right leg revealed a large area of ecchymosis with several large fluid filled bullae, and two areas of necrotic tissue which appeared black. Due to the history of ANCA vasculitis the decision was made to begin treatment with high dose steroids for a presumed vasculitis flare. Infection remained a concern and prompted blood cultures and empiric coverage with broad spectrum antibiotics. Culture results were reported positive for Pseudomonas aeruginosa less than 24 hours after admission. A punch biopsy was performed and revealed vasculitis with a neutrophilic infiltrate, but no microorganisms were seen on Gram stain. The diagnosis of ecthyma gangrenosum was made based on the clinical findings and positive blood cultures. Ecthyma gangrenosum (EG) has long been considered a pathognomonic skin finding in patients with pseudomonas sepsis, and is the result of a necrotizing vasculitis secondary to bacterial infection of the epidermal vessel walls. It is classically described as a triad of immunodeficiency, pseudomonas bacteremia and positive skin biopsy or tissue cultures. This characteristic skin finding was notably absent in this patient, but the appearance of the rash and Pseudomonas bacteremia are typical. A review of publications reveals multiple reports of EG not fitting the classical description, with more recent publications proposing a wider definition of the diagnosis. There is no standard histopathological criteria, and reports vary from the presence of microorganisms to simply describing vasculitis with an inflammatory infiltrate. In our case a tissue culture was not obtained and the biopsy was performed after antibiotics were started. Regardless of the histopathological results, the characteristic necrotic rash found on this patient was a red flag that antipseudomonal coverage was indicated. This patient was eventually discharged to acute rehabilitation following several complications during her admission, but repeat cultures remained negative for Pseudomonas. The history of ANCA vasculitis and rheumatologic findings could have distracted from considering other etiologies and delayed administration of antibiotics. The finding of a necrotic rash, even with a history of pre-existing vasculitis, should prompt clinicians to consider infection in their differential. Though the nuances of exact criteria for ecthyma gangrenosum are yet to be determined, the end point remains the same: early antibiotics are key! |
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<td>Michael Bourne, MD, Jordan M. Kautz</td>
<td>Rapid development of esophageal varices and intractable hiccups in a patient with hepatocellular carcinoma</td>
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A 54 year old gentleman with a history of coronary artery disease (CAD), Hepatitis C without cirrhosis, obesity, depression, and nicotine dependence presented to the emergency department (ED) with two weeks of intractable hiccups and hematemesis of about ¼ cup of blood on two occasions. Two weeks before presentation to the ED, he was seen as an outpatient because of two months of abdominal pain. Colonoscopy and esophagogastroduodenoscopy (EGD) were both normal without evidence of varices. He developed intractable hiccups after the procedures. Computed tomography (CT) of the abdomen and pelvis revealed multiple hepatic lesions concerning for malignancy as well as presumed thrombi of the portal and middle hepatic veins, moderate ascites, and lymphadenopathy throughout the abdomen and chest. He was placed on enoxaparin and discharged with a plan for liver biopsy. On arrival to the ED he was hemodynamically stable with hemoglobin (Hgb) of 13.6 g/dl. On exam he had a distended, tender abdomen. His hiccups did not respond to chlorpromazine. Soon after admission, he developed frank hematochezia and became tachycardic. Emergent EGD was performed which revealed recently bleeding large (>5mm) esophageal varices not present on EGD ten days previously. He underwent banding with complete resolution of active bleeding. His Hgb was 8.4 g/dl after the procedure and he was started on octreotide, nadolol, and ceftriaxone. Alpha fetoprotein was elevated at 378,160 ng/ml. Ultrasound-guided biopsy of the liver revealed poorly differentiated BCLC stage C hepatocellular carcinoma (HCC). He had no ultrasonic evidence of cirrhosis. He was discharged on nadolol and ciprofloxacin. Enoxaparin was discontinued as gastroenterology believed the intraluminal vascular masses represented invading tumor and not thrombus as initially thought. After consultation with oncology, given his poor prognosis, he enrolled in hospice and passed away several weeks later. Discussion: Non-cirrhotic portal hypertension can develop due to malignant invasion of the hepatic veins or portal vein. HCC is the most common offender in this scenario. The time frame for the development of esophageal varices in non-cirrhotic portal hypertension is not well defined in the literature and likely varies according to the etiology, acuity, and progression of the portal obstruction. This patient’s clinical course suggests that large esophageal varices, with potential for catastrophic bleeding, can develop in days to weeks. Unfortunately the patient had been on anticoagulation as the intraluminal masses were initially thought to be thrombus which placed him at increased risk for life-threatening variceal hemorrhage. It is unknown why his intractable hiccups, likely secondary to the HCC or enlarged lymph nodes, developed after his first EGD and completely resolved after his second EGD. We have described a case which demonstrates that non-cirrhotic portal hypertension can quickly develop from malignant vascular invasion resulting in life-threatening variceal bleeds.

David Brennan, MD  
Diabetic neuropathy, more than just stockings and gloves  
Diabetic neuropathy, more than just stockings and gloves  
David Brennan, PGY-1, Department of Internal Medicine, Mayo School of Graduate Medical Education, Rochester MN.  
Introduction: The most common diabetic neuropathy is the “stocking and glove” pattern. Other forms of diabetic
neuropathy can be more difficult to recognize. Diabetic amyotrophy is a proximal neuropathy syndrome with a unique clinical course. Case Presentation: A 55 year old man with a recent diagnosis of type II diabetes mellitus developed severe burning pain over the lateral aspect of his left hip. Over weeks, the pain spread up to the lower back and down to the knee, and eventually affected the same distribution in the contralateral leg. Workup with his local providers included a normal lumbar spine MRI, abdominal CT and head CT. An EMG was inconclusive. The patient was started on gabapentin with little relief. Over the next two months, the patient lost 50 pounds, required narcotics for pain control, and developed severe proximal lower extremity weakness. After falling over in the bathroom one morning, he decided to travel to an academic tertiary care hospital for further workup. On admission, exam showed a well-appearing man with significant proximal muscle atrophy in the lower extremities, left greater than right, with intact reflexes, sensory function and distal strength. Standing from a seated position was difficult. Back exam was normal, and there was no rash or lymphadenopathy. Blood tests were normal except for a hemoglobin A1C of 7.9. CSF analysis showed elevated protein. MRI of the lumbar plexuses showed increased T2 signal and enlargement of the bilateral lumbosacral plexuses and peripheral nerves extending to the level of the knees. And a repeat EMG showed a bilateral lumbar radiculoplexus neuropathy affecting the L3, 4, and 5 myotomes. After ruling out infectious, neoplastic and auto-immune etiologies, we made the diagnosis of diabetic amyotrophy. We discussed treatment options with the patient and initiated a twelve week course of pulse corticosteroids. Four weeks after discharge, the patient’s pain and weakness were gradually improving. Discussion: Diabetic amyotrophy is one of the less-common, but well-defined patterns of diabetic neuropathy. This present case demonstrates the classic presentation, laboratory and imaging findings. Patients with this condition usually reach maximal symptom severity at about one year with half requiring wheelchair assistance. Most often a gradual recovery ensues, with or without specific treatment. Corticosteroid therapy is not supported by strong evidence, but some case reports have shown dramatic results. This less-common diabetic neuropathy syndrome has a unique natural course and its diagnosis can facilitate effective patient care and counseling.

Andrew Briggler, MD, Dr. John Ratelle

An Uncommon Cause of Recurrent Syncope in a 55 year-old Woman

Orthostatic hypotension (OH), defined as a reduction of systolic blood pressure (SBP) of at least 20 mm Hg or diastolic blood pressure of at least 10 mm Hg within 3 minutes of standing, can be devastating to one’s functionality and quality of life. While common in the elderly, OH is less frequent in younger individuals and carries with it a broad differential diagnosis of autonomic disorders. A 55-year-old woman presented to the emergency department with syncope. She endorsed a one month history of postural dizziness, lightheadedness, and recurrent syncope upon standing. Prior to her presentation, she had been started on midodrine, fludrocortisone, and pyridostigmine with modest but very short-lived benefit; she was unable to get out of bed except for a brief two-hour period after taking her medications. Additional
symptoms included chronic constipation, dry eyes, dry mouth, and 50 pound weight loss over the previous year. Her past medical history was otherwise unremarkable. Physical examination revealed marked OH with a drop in SBP of >70 mmHg upon standing, along with supine hypertension and an associated headache. Remainder of exam did not reveal any additional heart, lung, or neurologic abnormalities. During her hospitalization, thermoregulatory sweat testing, along with Valsalva and tilt table testing, were consistent with generalized autonomic failure. She had an extensive evaluation for an underlying etiology, which included blood testing (specifically antinuclear and ganglionic acetylcholine receptor antibodies), fat pad aspiration, MRI head, and a PET scan, all of which were unrevealing for a cause of her autonomic dysfunction. Her condition was ultimately felt to be consistent with seronegative autoimmune autonomic ganglionopathy for which she is planned to undergo a three-month course of intravenous immunoglobulin immunotherapy. Additionally, she was educated on lifestyle modifications, countermaneuvers, and her doses of midodrine, fludrocortisone, and pyridostigmine were adjusted to avoid supine hypertension. OH is a relatively uncommon cause of syncope in younger patients, occurring in approximately 0.5-6% of patients under the age of 60. OH can be related to medications (such as alcohol and antihypertensives), volume depletion, or autonomic failure, the latter of which can be further categorized by anatomic location (brain, spinal cord, peripheral neuropathy) and primary versus secondary. Specific treatments for autonomic failure depend on the underlying cause, but general measures to reduce and prevent OH do exist. Nonpharmacological measures include increasing salt and fluid intake, elevating the head of the bed, abdominal and leg compression, and physical maneuvers to increase blood pressure, such as squatting or leg crossing. Medication options for OH are limited, with midodrine having the greatest evidence to support its use.

Kevin Brough, MD, Dennis Bierle, M.D., Andrew Greenlund, M.D., Ph.D.

The Straw That Broke the Camel's Mental Status

A 66 year old female with chronic orthostatic hypotension was admitted for overnight bowel cleansing in preparation for a surveillance colonoscopy. Her medical history included adenomatous polyps, roux-en-Y 30 years prior, cervical myelopathy and radiculopathy resulting in chronic pain treated with fentanyl patches, gabapentin, and amitriptyline, anxiety treated with duloxetine, and pulmonary emboli for which she takes warfarin. Her medication list included 20 other home medications and supplements. The morning after admission, she complained of nausea and received ondansetron. Her nausea progressed to vomiting and she developed headache and chills with a temperature of 37.8. Nursing noted slowing of her response to verbal interaction, and vitals revealed tachycardia, tachypnea, hypoxia, and hypertension. Physical exam showed a diaphoretic, flushed female who was confused, tremulous, hyperreflexic, tachypneic, and tachycardic. Electrocardiogram revealed T wave inversions in the lateral leads which were new from the year prior. Chest x-ray showed perihilar opacities but there was poor inspiration. Troponins were negative. CBC and electrolytes were normal with a lactate <1, normal ABG and creatinine, and toxicology screen was positive for opioids and barbiturates. She
was given broad spectrum antibiotics until blood cultures returned negative at which time they were discontinued. She was transferred to the Medical ICU where she became more lethargic repeating sentences, and repeat vitals were as follows: blood pressure 216/88, heart rate 148, respiratory rate 24, oxygen saturation 92% on 3.5 liters per nasal cannula, temperature 39.5°C. A CT head and chest were performed but showed nothing to explain her symptoms. Fentanyl was stopped and she was given cyproheptadine. Her mental status returned to baseline and vital signs normalized. Discuss: Any medications which increase central nervous system serotonergic activity can cause serotonin syndrome. However, it is more common that when multiple serotonergic medications are combined. Our concern is that as polypharmacy seems to be an increasingly prevalent problem in our aging population, this will become more common. However, because patients may be taking smaller doses of multiple medications which contribute to development of excess serotonin neurotransmission, it could be more difficulty to recognize. In our case, the patient was taking 27 medications and supplements at home which included duloxetine, amitriptyline, and fentanyl. Thus, when she received ondansetron in the hospital for nausea, this small increase in serotonin activity pushed her into serotonin syndrome. Serotonin syndrome is a clinical diagnosis caused by an increase in central nervous system serotonergic activity. It can be life-threatening, and symptoms may include agitation, hyperthermia, dilated pupils, tremor, hyperreflexia, ocular clonus, muscle clonus, dry mucous membranes, increased bowel sounds, flushed skin, diaphoresis, altered mental status, and muscle rigidity. Early recognition is key to treatment, which includes discontinuing serotonergic agents, providing supportive care and administering serotonergic antagonists.

Robert Caldwell, MD

**Metastatic Melanoma Presenting as DIC**

Acute disseminated intravascular coagulation (DIC) in cancer is rare, often fatal, and represents a hematologic emergency. Identification of it and the underlying process responsible are key to proper management. Case: A 52 year old female presented to the Emergency Department with a chief complaint of bruising. Her past medical history was notable only for insomnia. While at her daughter’s wedding the evening of presentation she and family members noted scattered bruises thought her body without any recollection of trauma. Earlier that morning she recalled bleeding gums when brushing her teeth but aside from this, the remainder of her review of systems was negative. On physical exam she had scattered ecchymosis throughout her extremities with a developing hematoma about her right humerus. No petechiae were seen in the mouth or on her skin. Labs were notable for WBC 8.6, Hgb 11.6, platelet count 18,000, INR 3.3, D-Dimer >4.00, and fibrinogen <60, consistent with DIC. Hematology was emergently consulted and recommended vitamin K, cryoprecipitate, platelets, FFP transfusion and admission the ICU. DIC without signs of infection in an otherwise healthy 52 yo female was concerning for acute promyelocytic leukemia (APL) so she was also started on all-trans retinoic acid (ATRA). On hospital day #1 she underwent bone marrow biopsy which returned the following day with metastatic melanoma. Further history obtained...
thereafter revealed that she had two moles removed several years earlier which she was told were “precancerous.” Carboplatin and taxol were started emergently while awaiting molecular studies. BRAF testing eventually returned positive so she was transitioned to Vemurafenib (BRAF inhibitor) only. Throughout the course of her stay she required 5 units PRBC, 22 units cryoprecipitate, 15 units FFP and 11 units of platelets. This led to normalization of all coagulation parameters within 1 week and ultimately, to clinical improvement. On hospital day 16 she was discharged home. Conclusion This case underscores the importance of quickly recognizing DIC using both clinical and laboratory findings so that an investigation into the underlying cause can be conducted as soon as possible. The presence of DIC in the absence of an obvious cause should prompt a search for malignancy (especially APL). Treatment of the underlying cause is paramount to resolution of DIC.

Douglas Challener, MD, Kathleen Lowe, Jason Szostek  

Worsening Restless Leg Syndrome  
A 61-year-old, right-handed man was admitted to inpatient medicine for evaluation of generalized weakness and falls. During the four weeks prior to admission he was evaluated several times in the outpatient setting for gait unsteadiness, bilateral hand numbness, anxiety, urinary urgency and progressively worsening restless legs syndrome (RLS), a diagnosis established 20 years prior and previously well-controlled on low-dose pramipexole. Outpatient evaluation included an upper extremity EMG, which demonstrated moderately severe bilateral median neuropathies, and laboratory testing revealed a normal CBC, glucose, ferritin, creatinine, TSH, urinalysis, urine gram stain and culture. Despite initiation of gabapentin for worsening RLS and clonazepam for anxiety, all symptoms progressed. Two days prior to admission, in-and-out bladder catheterizations were started for newly discovered urinary retention. At the time of admission, the patient had not slept for over three days because of generalized restlessness improved only with movement and consistent in character with his previously well-controlled RLS. Complicating his need to constantly move was his worsening gait instability, which had resulted in 4 falls that day. Of equal alarm to the patient and his family was new progressive right hand weakness. Neurological exam was notable for the following: normal cranial nerves, distal greater than proximal upper limb weakness more pronounced on the right side, hyperreflexive lower extremity reflexes, bilateral extensor toes, light touch sensation reduced in a stocking pattern, and pinprick sensation reduced in a glove pattern to the elbows and preserved in the lower limbs. Gait assessment was limited by profound truncal instability. Computed tomography imaging of the brain in the emergency room showed no acute abnormalities. Magnetic Resonance Imaging (MRI) of the spine revealed a T2 signal change at the C5-6 level with significant central stenosis at C4-5, findings consistent with a cervical myelopathy from severe cervical spinal stenosis. Within 36 hours of diagnosis, the patient underwent C4-C6 anterior diskectomy and fusion. On postoperative day #1, the patient experienced his first night of restful, continuous sleep as his RLS dramatically improved. Within 24 hours of surgery, all neurologic deficits improved along with resolution of his urinary retention. Following one week of inpatient rehabilitation and
two months of outpatient physical therapy, the patient is able to ambulate with only the assistance of a cane. Much to his delight, his RLS continues to be well-controlled on low-dose pramipexole. This case illustrates a remarkable case of severe, refractory RLS secondary to cervical spondylitic myelopathy. It highlights the importance of looking for secondary causes of RLS particularly when cases manifest or rapidly progress in a severe, debilitating manner. Cervical myelopathy, one of the most common causes of spinal cord dysfunction in older adults, should be considered in patients presenting with severe, refractory RLS.

Georgios Christopoulos, MD, Brody Slostad, Sorin Pislaru

A case of drug reaction with systemic symptoms and eosinophilia in a 52 year-old hospitalized patient with acute pericardial effusion. A 52 year-old male with a past medical history of Guillain Barre syndrome-associated quadriparesis, hypertension, hyperlipidemia and type 2 diabetes mellitus was admitted to the Neurology Intensive Care Unit with progressive weakness, healthcare-associated pneumonia with sepsis, acute kidney injury requiring hemodialysis and respiratory failure. The patient was intubated and treated with fluids and antibiotics, including vancomycin and ceftriaxone. On day 13 he developed a pruritic urticarial rash on the trunk and proximal extremities. Subsequent echocardiography demonstrated a small pericardial effusion that had developed over the course of 10 days. Dermatology and Cardiovascular services were consulted for further diagnosis and management. Physical examination showed a rash on the proximal upper extremities, lateral chest wall, flank and thighs consisting of pink coalescing papules and patches with a target-like appearance. Cardiovascular exam was remarkable for distant heart sounds with no appreciable murmurs or gallops. Laboratory evaluation demonstrated a normocytic anemia (Hemoglobin 8.6 g/dL), leukocytosis with eosinophilia (white count 22.7 *10^9/L with 12% eosinophils), a normal platelet count (290 *10^9/L), aspartate and alanine aminotransferase levels 162 and 415 U/L respectively, alkaline phosphatase 316 U/L and total bilirubin 3.7 mg/dL (direct bilirubin 3.3 mg/dL). Transthoracic echocardiogram revealed a small circumferential pericardial effusion, respirophasic septal motion concerning for constriction, no regional wall motion abnormalities and an ejection fraction of 55%. In comparison, the prior study obtained 10 days ago demonstrated minimal posterior effusion with an ejection fraction of 63% and no evidence of constriction. A biopsy of the skin lesions of the proximal right arm showed the presence of perivascular inflammation with neutrophils and eosinophils and intravascular neutrophils consistent with drug-induced urticarial tissue reaction. The patient was diagnosed with drug reaction with systemic symptoms and eosinophilia (DRESS). He received a 2 week course of systemic steroid therapy which led to improvement of the rash and resolution of the pericardial effusion on follow-up echocardiography. DRESS syndrome is a drug-related reaction that occurs after 3 weeks of administration of the offending medication. It presents with fever, lymphadenopathy, a urticarial or papulomacular rash on the trunk and proximal upper and lower extremities, eosinophilia, liver function test abnormalities and end-organ damage. Most commonly associated medications include antiepileptics (phenobarbital, levetiracetam, carbamazepine,
phenytoin, lamotrigine) and antibiotics, including vancomycin and ceftiraxone, which were used in the patient’s case. DRESS is often associated with end-organ failure, most commonly involving the liver (80%), kidney (40%), lungs (33%) and cardiovascular system (15%) and carries a 10-20% mortality rate, often secondary to liver failure. Early recognition is essential to prevent morbidity and mortality. Treatment consists of discontinuing the offending medication, steroids and antihistamines.

Melanie Clemenz, MD, Joseph Bert MD, Elie Gertner MD

Aggressive Vasodilatation, Anticoagulation and Plasmapheresis as Limb Saving T Therapy in the Antiphospholipid Syndrome

APS is defined by two major components: the occurrence of either a vascular event or pregnancy morbidity, and the presence of at least one type of auto-antibody known as antiphospholipid antibody (aPL) on two separate occasions at least 12 weeks apart. APS antibodies include lupus anticoagulant (LA), anticardiolipin antibody (aCL), and anti-beta-2 glycoprotein 1 antibody (B2GP1). Clinical manifestations of APS are vast and can range across every organ system. History: A 28 year-old female with history of Systemic Lupus Erythematosus and Lupus Nephritis, Raynaud’s syndrome, as well as a prior history of APS during pregnancy (positive LA, aCL, and B2GP1) presented with a 2 week history of left 5th digit pain, and discoloration. The finger initially blanched, then progressed to cyanotic discoloration with increasing pain as well as blister formation. She also started to have pain in her left thumb, as well as her 2nd-4th digits with worsening cyanosis. Initial Examination revealed 2+ radial pulses bilaterally. The left 5th digit had 5 mm by 8 mm eschar on the finger pad with surrounding blue-black base of the entire distal phalanx. The rest of the 5th digit appeared blanched. There was hyperemia of the left hypothenar eminence. The thumb was cool and painful to touch. The tips of the 3rd and 4th digits were cooler than surrounding skin on the palm and arm with discoloration.. All 5 fingernails had numerous splinter hemorrhages. (see photographs). The R hand was normal as were the feet. The Rheumatology service requested a conventional angiogram of the hand which showed extensive distal microembolic occlusion in digital arteries involving all 5 digits, most severely affecting the index, ring and 5th fingers. The patient was started on continuous tPA via catheter to the affected area as well as alprostadil for vasodilation. Repeat angiogram 24 hours later showed new clots forming distal to the catheter. Given her APL history, the ischemia and the worsening coagulable status she was treated aggressively with anticoagulation and alprostadil as well as institution of daily plasmapheresis. Over the next 48 hours and continuing for the full 5 days of treatment she had significant evidence of reperfusion, including improved warmth, capillary refill, and total resolution of all but the eschar over the 5th digit’s finger pad. She was started on hydroxychloroquine as well as anticoagulation with warfarin and her fingers continue to remain pain free and well perfused at follow up.

Natalie Cobb, MD

A Bad Case of Raynaud’s disease

A 28-year-old woman presents to the hospital for five days of left hand pain and discoloration. She has a past medical history significant for Systemic Lupus Erythematosus (SLE) as well as Raynaud’s disease. She
reports that approximately two weeks ago she had onset of discoloration in the fingers of her left hand that she felt were typical of a Raynaud’s vasospasm with a progression of color from white to blue to red. However, after several days she noted that her pinky finger did not seem to fully recover. She presented to an urgent care clinic and was told that she had “a bad case of Raynaud’s”, but no further studies or treatments were pursued. The following week, she presented to the hospital after her fifth digit progressed to a black discoloration associated with severe pain. She denied any trauma or cold exposure, but did endorse feeling mores stressed recently, which was similar to her two previous episodes of Raynaud’s. Her history was otherwise remarkable for a second trimester stillbirth pregnancy from placental thrombosis. At presentation, there was dusky hue to the pads of her second and fourth fingers on her left hand as well as a central black area on fifth. Her laboratory studies were unremarkable. She was initiated on intravenous prostaglandin therapy given a prior inability to tolerate calcium channel blockers. Her symptoms however did not improve. The following day she underwent a left upper extremity arteriogram and was found to have extensive microemboli of all five digits, but most severe in the second, fourth, and fifth. She was started on catheter-directed thrombolytics and unfractionated heparin. A transthoracic echocardiogram was negative for any evidence of an embolic source. Despite thrombolytic therapy, she had minimal improvement. A repeat arteriogram showed multiple new thrombi. Review of records from the patient’s previous stillbirth revealed that she was positive for B2-glycoprotein antibodies as well as weakly positive for anticardiolipin antibodies, consistent with a diagnosis of Antiphospholipid Antibody Syndrome (APS). Given her poor clinical response to thrombolytics and anticoagulation, the patient underwent five sessions of plasmapheresis. After completion, she had regained a pink hue to all of her fingers with the exception of a small residual necrotic focus at the distal pad of her fifth digit. She was started on plaquenil as well as indefinite anticoagulation with warfarin. Systemic Lupus Erythematosus has a broad constellation of clinical manifestations and complications. While Raynaud’s phenomenon is common in patients with SLE, it is only one possible cause of digital ischemia. Asymmetric findings should prompt consideration of alternative diagnoses including thromboembolic disease. Treatment for APS in the setting of SLE includes plaquenil and anticoagulation as well as consideration of plasmapheresis or intravenous immune globulin for catastrophic events.

Kendra Coonse, MD, Arya Mohabbat, MD

When being ticked off is better than having a tick on: A less than enDEERing case of Anaplasmosis

Anaplasmosis is a tickborne disease with a clinical presentation of headache, fevers, chills and myalgias, which often poses a diagnostic challenge due to the non-specific nature of these symptoms. With growing incidence in the upper Midwest, early diagnosis and treatment by a general internist becomes an increasingly important skill. A 70 year old woman presented to the emergency department with a one week history of severe headache, fatigue, diffuse myalgias and arthralgias, and abrupt onset of night sweats and confusion. Although
the patient was previously healthy, her husband was currently hospitalized with cryptococcal meningitis, and she had been visiting him on a daily basis. On presentation the patient was febrile to 100.4. Physical exam was remarkable for diffuse lymphadenopathy and splenomegaly. Initial laboratory workup revealed profound leukopenia and thrombocytopenia. Urgent head CT was unremarkable. Given her clinical presentation, laboratory findings, and significant exposure history, there was immediate concern for meningitis. Lumbar puncture was performed and the patient was initiated on empiric broad spectrum coverage with intravenous vancomycin, ceftriaxone, ampicillin, acyclovir, fluconazole and dexamethasone. The patient was thus admitted for further workup and extensive laboratory investigation of potential infectious, autoimmune and neoplastic etiologies was undertaken. A head MRI was also performed to more thoroughly investigate potential intracranial abnormalities, however this was unrevealing. The following day, the tickborne disease panel obtained on admission returned positive for Anaplasma phagocytophilum. Armed with this information, further questioning revealed that the patient lived in a heavily wooded area in northern Wisconsin and was frequently outdoors feeding the wildlife including deer. Treatment was subsequently narrowed to oral doxycycline for a total 10 day course. Approximately one day after starting doxycycline, the patient noted significant symptomatic improvement and was subsequently discharged the following day. Labs performed at a one week follow up appointment demonstrated complete resolution of the neutropenia and thrombocytopenia. This case illustrates the diagnostic challenge of Anaplasmosis, as the presenting symptoms are often non-specific. Nevertheless, diagnostic clues may be obtained via a thorough exposure history, which in additional to basic laboratory tests, can provide a wealth of information even before confirmatory results return. Early recognition and treatment is associated with improved outcomes, and may limit the need for further invasive and costly investigations.

Blake Daley, MD

Acute T-Wave Syndrome: Well Then, Wellens

Case An 87-year-old female with a history of hypertension, dyslipidemia, and diabetes mellitus presented to the emergency department with 2 hours of non-descript chest pain, back pain, and headache. Blood pressure on arrival was 212/91 mmHg. Initial troponin I concentration was .031 ng/ml (reference range 0-.03 ng/ml), with a peak concentration of .082 ng/ml. Baseline electrocardiogram (ECG) can be seen in figure 1, with a follow up ECG performed (figure 2) 8 hours later while chest pain free concerning for Wellens’ syndrome (a syndrome associated with critical stenosis of the proximal left anterior descending artery). Transthoracic echocardiography was performed (figure 3) with ejection fraction noted to be 68% and possible mid-distal septal hypokinesis. Patient was taken for coronary angiography (figure 4) 18 hours after presentation, which revealed no occlusive disease or evidence of a thromboembolic event. General Wellens’ syndrome was first described in patient cohorts by Wellens and de Zwaan in 1982 (1), and is associated with electrocardiographic T-wave changes that primarily occur the anterior and precordial leads. Initial ST segments in
leads V2-V4 are usually normal, with a sharp 90 degree turn at the T-wave apex leading to a terminal negative waveform (2) and may present hours to days after myocardial ischemic pain has subsided. Wellens’ wave pathophysiology Critical stenosis of the proximal LAD results in disruption of normal ventricular repolarization patterns. Differential diagnosis for acute T-wave changes Coronary ischemia is the leading cause of acute T-wave changes and may result from acute coronary syndromes. However, acute pulmonary embolism, stress cardiomyopathy, hypertension, cardiac strain, pericarditis, and intracranial hypertension should also be considered. The differential should be tailored accordingly to presenting symptoms, history and risk factors, and clinical stability. Take home point The case presented posed an interesting cardiovascular dilemma surrounding acute T-wave changes in a high risk patient, which resulted in a negative coronary angiogram. The patient’s clinical course could possibly be explained by her hypertensive emergency with underlying hypertensive heart disease and demonstrates that Wellens’ waves (although associated with critical LAD stenosis) have multiple etiologies.

Brinda Desai, MD

Is It Just HIT?

Heparin-induced thrombocytopenia (HIT) is a severe complication of exposure to heparin (unfractionated heparin, low molecular weight [LMW] heparin) that can occur in patients exposed, regardless of the dose, schedule, or mode of administration. 63Y M with a history of unprovoked bilateral pulmonary emboli, left lower extremity deep vein thrombosis status post inferior vena cava (IVC) filter, and medical management with bridging from heparin to warfarin presented with severe low back pain. CT-Angiogram was significant for new right lower extremity clot, pelvic clot, and IVC deep vein thrombosis extending to the level of his IVC filter; admitted and started on Lovenox. He subsequently had a >50% decrease in platelets prompting transfer to our institution for concerns for HIT. Patient scored 8 on the 4T scoring tool for HIT and was started empirically on argatroban. Laboratory evaluation confirmed HIT the next day. On Day 2 of argatroban therapy, patient became tachycardic and febrile. His legs appeared to have initial findings of critical ischemia due to the large venous clot burden. A 2nd IVC filter was placed secondary to a clot noticed on top of the initial IVC filter. In addition, directed thrombolytic therapy was initiated to his lower extremities; however, he developed acute thrombocytopenia. Lytics were discontinued and he was restarted on therapeutic argatroban and started on steroids in conjunction with a successful mechanical thrombectomy of the lower extremities to establish patency of venous blood flow. Given the concern for possible HIT-T/catastrophic antiphospholipid antibody syndrome, plasmapheresis and IVIG were initiated along with the continuation of steroids. In the following days, the patient improved dramatically. His platelets continued to improve and his pain began to resolve. Given the patient”s marked improvement, the decision was made to not begin Rituxan. He was bridged from argatroban to warfarin. Given his complexity, the decision was made to continue monitoring both INR and chromogenic factor X levels until further evaluation by heme/onc. On the day of discharge, the patient was noted to be therapeutic via
both levels: INR was 2.8 and chromogenic factor X was 25% (therapeutic range 20-40%). He had 2 IVC filters in place on discharge with plans for removal of the filters within 3 months of placement. His final diagnosis at the time of discharge was ill-defined endothelial activation syndrome with plans for further work-up as an outpatient for a more conclusive diagnosis. With an increase in the number of patients on heparin or heparin-like products and about 5% of the population reported to develop HIT, it is crucial that the medical community not only increase their vigilance of HIT but further complications from heparin products. Recognition of these possible complications is critical to institution of appropriate therapy.

Jaspreet Dhaliwal, MD, Karanpal Singh Dhaliwal, MBBS. Daraspreet Singh Kainth, MD.

Charcot Spinal Arthropathy masquerading as back pain

Introduction

Back pain is one of the most common chief complaints evaluated and treated by general internists. Charcot spinal arthropathy, also known as neuropathic spinal arthropathy, is a rare disorder affecting patients with spinal cord injury that should be included in the evaluation of back pain in this patient population. This progressive condition can lead to joint dislocations, pathologic fractures, and debilitating deformities which contribute to back pain. Case Description A 39 year old male consulted his doctor for back pain. At the age of 17, he was involved in a toboggan accident that left him paraplegic. He had undergone spinal fusion from T1-T12 with rods and hooks. At baseline, he was plegic in the lower extremities, had a T5 sensory level, and had bowel and bladder incontinence. He was wheelchair bound. He had been developing worsening back pain with transfers. His wife had been noticing that his posture had been worsening over the past years and that it was harder for him to sit upright in the wheelchair. On physical exam, a firm lump was palpated on his lower back at the midline. The MRI of his spine demonstrated fluid in the T12-L1 disc space with edema in the T12 and L1 vertebral bodies concerning for a discitis. In addition, a large posterior paraspinal fluid collection from T11-L1 was present which appeared to communicate with the T12-L1 disc space via a tract. The differential at this point included discitis, abscess formation, atypical infections such as TB or fungal infection, granulomatous disease, pseudomeningocele formation, and Charcot spinal arthropathy. His WBC count was normal. Tap of the spinal fluid collection demonstrated no organisms, few PMNs. The cultures remained negative. Beta-2-transferrin levels on immunofixation of the tapped fluid were negative ruling out pseudomeningocele. CT of the spine demonstrated severe dorsal subluxation of T12 on L1 and severe erosive changes involving the posterior elements and vertebral bodies adjacent to the large fluid collection. The presence of this unstable spine deformity along with the clinical and laboratory findings led to the diagnosis of Charcot spinal arthropathy. The patient was referred to Neurosurgery and then successfully underwent extension of his fusion across the Charcot T12-L1 joint, which is the accepted method of treating this disorder. Discussion When diagnosing and treating back pain in patients with spinal cord injury, the disorder of Charcot spinal arthropathy must be included in the differential. The characteristics of the disorder can often be confused for infection or pseudomeningocele. Recognizing that denervation of the spine can lead to pain, joint
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<th>Author(s)</th>
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<td>Adriana Dhawan, MD, Ellen Overson, MD</td>
<td><strong>It's Not Snot!</strong></td>
<td>Streptococcus pneumoniae is the most common cause of bacterial meningitis in adults, accounting for 60-71% of community acquired cases. As a less common predisposing factor, individuals with head trauma and resultant cerebrospinal fluid (CSF) leak, including from basilar skull and cribriform plate fractures, are at increased risk for pneumococcal meningitis. Case Description: A 59 year old recently immigrated Somali-speaking female with past medical history relevant for hepatitis B cirrhosis presented to an outpatient clinic with complaints of high fevers, vomiting, severe headache, neck pain, and left-sided, clear, dependent rhinorrhea. Her dramatic presentation prompted hospital admission, where she was additionally found to have a leukocytosis and CSF studies consistent with bacterial meningitis. Cultures isolated Streptococcus pneumoniae as the etiologic organism, and the patient responded well to IV antibiotics and dexamethasone. On the anticipated day of discharge, the primary care physician who had initially evaluated her contacted the primary hospital team to raise the concern - &quot;What about the clear fluid from her nose? Was it a CSF leak?&quot;. The lack of such a history upon admission prompted the inpatient team to further investigate, confirming ongoing CSF rhinorrhea with a beta-2 transferrin test. The patient was subsequently found to have a subtle left ethmoid abnormality suggestive of focal cribriform plate dehiscence, later attributed to a history of multiple remote traumatic head injuries. It has been established that the inconsistent use of interpreters in non-English speaking patients to obtain critical history can result in poorer outcomes, and in this case contributed to a delayed evaluation and diagnosis of a serious, potentially surgically correctable risk factor for recurrent meningitis. Discussion: This case, in addition to showcasing an uncommon presentation of S. pneumoniae meningitis likely secondary to remote traumatic skull fracture and persistent CSF leak, highlights the difficulties and shortcomings of hospital systems to appropriately evaluate and care for non-English speaking patients entering the healthcare system.</td>
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<td>Virginia Dines, MD, Dr. David Froehling MD</td>
<td><strong>Bilateral Pulmonary Emboli in a Patient with Chronic Urticaria</strong></td>
<td>It is well established that the occurrence of thromboembolic disease in an otherwise healthy individual should raise the suspicion for underlying malignancy, however so too should chronic urticaria. Observational studies have demonstrated an association between chronic urticaria and malignancy, particularly leukemia and lymphoma. Here, we present a case of a patient with chronic urticaria and unprovoked pulmonary emboli. A 55 year old male with past medical history of polymyalgia rheumatica in remission and a five month history of chronic urticaria presented to the Emergency Department with a two week history of progressively worsening dyspnea on exertion and increasing non-productive cough. He had no recent hospitalizations, surgeries, or periods of immobility. The patient was found to have extensive pulmonary emboli in the upper, mid, and lower lungs.</td>
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bilateral. Additionally, lower extremity ultrasound revealed an acute deep vein thrombosis in the right femoral vein and a thrombus in a left lower extremity superficial vein. The patient was started on anticoagulation. At his three-week follow up visit, dyspnea and cough had improved, however he noted a fifteen-pound unintentional weight loss over the previous two months. Age appropriate cancer screening was up to date with an unremarkable colonoscopy, normal PSA, and a chest CT at the time of initial presentation that was negative for suspicious nodules. Complete blood count and electrolytes were normal. He had recently undergone dermatologic evaluation for chronic urticaria, which he had been experiencing for the past five months. Symptoms had improved temporarily with prednisone and anti-histamines; however he continued to experience daily symptoms. Skin biopsy was consistent with a non-specific inflammatory reaction. A CT of the abdomen and pelvis was then performed which revealed retroperitoneal and iliac lymphadenopathy concerning for low-grade lymphoma. No biopsy was pursued at this time in the setting of ongoing anticoagulation. Two months later repeat CT scan showed stable diffuse lymphadenopathy, and symptoms of chronic urticaria persisted. Plans were made to pursue CT guided lymph node biopsy and final pathology is pending. While the exact nature of the relationship has not been firmly established, chronic urticaria may indicate an underlying malignancy and thus necessitates a high index of suspicion. This case highlights the need for age appropriate cancer screening and a thorough review of systems upon patient encounters. The identification of persistent urticaria of unknown etiology should prompt clinicians to further consider and explore the possibility of underlying malignancy, particularly leukemia or lymphoma.

Christine Ding, MD

Staph epidermidis - more than a contaminant

Neutropenic fever is a dreaded but not uncommon complication in patients undergoing chemotherapy. Consensus guidelines recommend prompt initiation of broad-spectrum empiric antimicrobials. However, a source of infection is often not identified. A 68-year-old man presented to his primary care doctor with increased fatigue and a cold that had persisted for what seemed like months. He was diagnosed with acute myeloid leukemia and quickly admitted to the hospital for induction chemotherapy. Despite prophylactic acyclovir, voriconazole, and levofloxacin in addition to filgrastim, his absolute neutrophil count plummeted to zero and he developed a fever. He remained asymptomatic and physical exam was normal. His antibiotics were broadened to cefepime. Within 24 hours of collection, all of the initial sets of blood cultures obtained from his Hickman catheter and peripheral draw were growing gram-positive cocci in pairs and clusters. Accordingly, vancomycin was added to his antibiotic regimen for presumed staphylococcus aureus bacteremia and his Hickman catheter was removed. Despite this, repeat blood cultures persistently grew gram-positive cocci in pairs and clusters. The patient underwent immediate transthoracic to rule out endocarditis. The next day, his initial blood culture results were finalized with staphylococcus epidermidis. Subsequent blood cultures were negative and patient received an additional 10 days of IV vancomycin with resolution of fevers. This case demonstrates that in
patients with severe immunosuppression, even organisms commonly thought of as contaminants can cause serious infections.

Daniel Dudenkov, MD, Floranne Ernste, MD

It’s Finally Lupus...With Hemophagocytic Syndrome Hemophagocytic syndrome (HPS), or hemophagocytic lymphohistiocytosis (HLH), is a rare systemic, inflammatory disorder of macrophage activation that leads to hemophagocytosis in the reticuloendothelial system. It is diagnosed when five of the following eight clinical features are met: fever; splenomegaly; cytopenia (at least 2 cell lines); hypertriglyceridemia or hypofibrinogenemia; hemophagocytosis in bone marrow, lymph node or spleen; low natural killer cells; hyperferritinemia; or elevated soluble CD25. Secondary (or reactive) HPS, which is the more common form of HPS in adults, is typically seen in association with infection, malignancy or autoimmune disease. Acute lupus hemophagocytic syndrome is a term defined by the presence of a systemic lupus erythematosus (SLE) flare in the setting of HPS with no evidence of infection or malignancy. A 38-year-old Bhutanese refugee from Nepal, previously healthy, presented to an outside hospital with a 6-month history of sore throat, dysphagia, fevers, diffuse arthralgias and abdominal pain, and a 1-month history of diffuse skin lesions. She was transferred to the Mayo Clinic Saint Mary’s Hospital with a diagnosis of HLH and limited records. On physical exam, she was somnolent with mild tachycardia but otherwise vitally stable. Skin exam revealed erythematous, nonblanching lesions on the ears, knees and toes. Joint exam revealed diffuse joint tenderness and Jaccoud’s arthropathy of the hands. Labs revealed pancytopenia; acute kidney injury with proteinuria; elevated ESR, CRP, triglycerides, ferritin, coagulation tests and liver function tests; and low fibrinogen and natural killer cells. A thorough infectious work-up including viral and fungal serologies, blood cultures and urine cultures was negative. PET/CT showed diffuse lymphadenopathy and splenomegaly, with increased uptake in the axial and appendicular bone marrow. Autoimmune labs revealed significantly elevated antinuclear antibodies and antibodies to dsDNA, SSA/Ro, Smith, and RNP, as well as low complement levels. Biopsy of a skin lesion revealed histologic findings consistent with SLE. Axillary lymph node biopsy was negative for malignancy and demonstrated necrotizing histiocytic lymphadenitis, which is often associated with lupus. Bone marrow biopsy revealed hemophagocytic histiocytes. The patient was treated with pulsed high-dose IV methylprednisolone and one dose of IV cyclophosphamide, with clinical improvement. At discharge she was continued on a prolonged steroid taper, hydroxychloroquine and mycophenolate mofetil. This case demonstrates a rare occurrence of HPS secondary to acute SLE, with clinical improvement after treatment with aggressive immunosuppression. HPS secondary to autoimmune disease has typically been associated with juvenile idiopathic arthritis or adult onset Still’s disease. Early recognition of HPS is essential to making a prompt diagnosis and instituting therapy since HPS can rapidly progress to multi-organ failure and death. When a diagnosis of HPS is made, it is important to work-up infection, malignancy and autoimmune disease, because the treatment also involves management of the underlying cause.
**Heidi Egloff, MD, Jeremy Jones M.D., Timothy Call M.D.**

**A Curious Case of Hemolysis**

Transfusion reactions associated with the Kidd antibodies (anti-Jka) can lead to severe hemolysis and even death. The diagnosis of anti-Jka associated hemolysis is hampered by a number of technical difficulties including additional antigenic reactions (i.e. cold agglutinins) as well as variable anti-Jka activity in the serum. A 74-year-old Cambodian man with a history notable for marginal zone lymphoma in complete remission and cold agglutinin disease presented to his primary provider with dyspnea on exertion. Initial workup revealed macrocytic anemia and thrombocytopenia with a hemoglobin 5.1 and platelets 39. He was referred to his hematologist who recommended red blood cell transfusion. Within 15 minutes of receiving his transfusion, the patient became febrile to 39.4, with rigors and chest pain. Transfusion was stopped and he was admitted for presumptive transfusion reaction secondary to cold red blood cell transfusion. Upon arrival the patient was stable and physical exam was unremarkable, however hemoglobinuria was present on admission. Initial labs were notable for Hb 5.1, MCV 103.9, WBC 5.7, plt 38, haptoglobin <14, DAT IgG negative and C3 positive, cold agglutinin titer > 512. As the primary hemolysis was believed to be secondary to cold agglutinin disease, all subsequent transfusions were performed using a red cell warmer. In addition, a bone marrow biopsy confirmed a relapse of marginal zone lymphoma. Rituximab and methylprednisolone therapy were initiated for treatment of his relapsed lymphoma and cold agglutinin disease. Despite these precautions, the patient experienced fever and dyspnea with additional warmed blood transfusions and showed evidence of hemolysis of these units as well. Further re-evaluation with an antibody detection assay confirmed a new Jka antibody, not present on prior assay evaluations. Following Jka-antigen-free transfusion, the patient’s hemoglobin improved to 7 and remained stable. Kidd antibody transfusion reactions have a variable presentation in the literature, noting a range of immediate severe reactions to delayed hemolytic reactions. As a clinical entity, they represent an important diagnostic consideration in the evaluation of transfusion-related hemolytic reactions. As in the above case, Kidd antibodies often evade diagnosis secondary to variable presence in serum on antibody detection screening. The presence of the strong cold agglutinin antibodies also masked the detection. Implementation of Jka-antigen-free blood is crucial in prevention of further hemolysis.

**Derek Eklund, MD**

**Antibiotic stewardship versus the world: where “superbugs” are really coming from.**

Antibiotic stewardship is the practice of the appropriate use of antimicrobials in an effort to improve patient care, reduce antimicrobial resistance, and to decrease the spread of multi-drug resistant organism (MDRO) infections. This is proving to be a challenging endeavor when the selection pressures for MDROs are on a much larger scale than just antibiotic choices in the clinical setting. Multiple recent studies from India, a world leader in exportation of pharmaceuticals, would suggest that environmental exposure from the manufacture and improper disposal of antibiotics could be linked to creating these “superbugs.” A 69 year old male visiting from India with a history of diabetes and
recurrent cystitis presented with severe flank pain, fevers, nausea, and vomiting for 3 days. He had been in the United States for 3 months and had been intermittently taking nitrofurantoin that he was prescribed in India for recurrent cystitis. His exam was notable for fever, tachycardia, severe right abdominal and costovertebral angle tenderness. His WBC count was 21, creatinine 3.3, and lactate 3.0. His urinalysis had pyuria and nitrites. He was given ceftriaxone and transferred to the MICU. An abdominal CT scan showed severe right sided emphysematous pyelonephritis. Ceftriaxone was to be changed to piperacillin-
tazobactam for additional anaerobic coverage until infectious disease empirically switched to meropenem to cover extended spectrum beta lactamase (ESBL) organisms given the prevalence of MDROs in India. A nephrostomy tube was placed, but minimal drainage occurred. He underwent radical nephrectomy 6 hours later. His urine culture did grow out an ESBL E. coli with CTX-M gene detected. He did have bacteremia as well and completed a 14 day course of meropenem. This case illustrates the growing prevalence of MDRO infections and the challenges of practicing antibiotic stewardship. Limiting antibiotic use and choosing the narrowest spectrum antibiotic is the new standard of practice. Given the expansion of MDRO infections the initial choice of antibiotics and narrowing without culture data is not so straightforward. Not all blame for the expansion of these MDROs lies in the physician’s hands. Recent research from India evaluated the wastewaters from a rural and an urban hospital looking for E. coli resistance. Out of 190 isolates, 96% were ESBLs and 44% were resistant to both fluoroquinolones and cephalosporins. Another study from 2014 detected fluoroquinolones in well water and soil from all villages within 3 km of a pharmaceutical industrial region of India. Quinolone resistance genes were discovered in 42% of well water samples and 100% of river sediments. More research and consideration is needed on the effect of environmental exposure of active pharmaceutical ingredients during manufacturing and disposal. As new physicians our goal of antibiotic stewardship will be tested unless new global policies are in place.

Jarrett Failing, MD, Megan Dulohery, M.D.

Take my breath away – a case of dyspnea
A 68-year-old woman with anxiety, 30 pack-year smoking history, and recently diagnosed COPD at an outside hospital presented with two weeks of increasing anxiety and one day of dyspnea. She noted earlier in the day having a panic attack and becoming acutely short-of-breath, which persisted. She also had a cough, 10-lb weight-loss, and some mild dyspnea over the past few weeks. No chest pain, fever, edema, or orthopnea. On exam she was afebrile, sating 94% on 2 L oxygen, breathing comfortably but with diminished breath sounds throughout entire left lung fields but no wheezing, enlarged bilateral cervical nodes, and normal cardiovascular exam. She had a normal EKG and troponins, mildly elevated BNP, elevated WBC at 19.1, and mild anemia. Chest x-ray showed a left hilar density with abrupt cutoff of the left mainstem bronchus. CT angiogram chest confirmed presence of large left hilar mass completely occluding the left mainstem bronchus. The scan also revealed acute segmental and subsegmental pulmonary emboli. She was started on heparin and given lorazepam with improvement in her
symptoms. She underwent bronchoscopy, which showed a malignant
submucosal process completely/nearly completely occluding the distal
left mainstem bronchus. It was not amenable to an endobronchial
intervention such as stenting or tumor debulking. Endobronchial biopsy
revealed non-small cell lung cancer with negative tumor markers. A
subsequent PET scan showed metastatic disease and progression to a
completely collapsed left lung. She is discussing treatment options with
medical and radiation oncology, but given the advanced stage it will be
a palliative approach. The patient had several contributing factors
driving her dyspnea including lung cancer with central airway
obstruction, anxiety, pulmonary embolism, and smoking history. The
differential diagnosis of dyspnea is broad. A cardiopulmonary cause
such as asthma, congestive heart failure, coronary artery disease,
COPD, pulmonary embolism, pneumonia, and interstitial lung disease is
found in over 80% of cases. However, avoiding premature closure is
important as dyspnea is found to be multifactorial in one-third of
patients. Central airway obstructions can be intrinsic or extrinsic—
malignant or nonmalignant. Up to 30% of lung cancer patients will have
complications from obstruction. Dyspnea can be a presenting symptom
in lung cancer in 45% of cases. This case re-enforces the importance of
the lung cancer screening guidelines in smokers: as by the time it
presents symptomatically it is too often too late.

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<th>Hongfei Fang, MD, J.</th>
<th>Osteolytic Lesions in Recurrent Metastatic Prostate Adenocarcinoma</th>
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<td>Fernando Quevedo, MD</td>
<td>An 85-year old male with a past medical history significant for localized prostate adenocarcinoma (Gleeson 6) diagnosed in 1998 and treated with brachytherapy presented to his primary care physician for a general medical exam. His PSA levels were actively monitored post-treatment, with his most recent measurements at 0.7 and 2.1 in 2012 and 2013 respectively. This elevation of his PSA was monitored without any further intervention. However, no PSA levels were measured again until 2015. At that time, his PSA was found to be 46.8. He reported a history of mild fatigue and left hip pain which he attributed to his other comorbidities, but had no unexplained weight loss and was otherwise clinically asymptomatic. A prostate exam noted only mild asymmetry with no significant nodularity. A CT scan was ordered which revealed new lytic skeletal metastases in the left ilium and vertebral body as well as metastatic lymphadenopathy. Of importance, the lytic nature of these lesions is uncharacteristic of prostate adenocarcinoma, which is more sclerotic in nature and suggests either a different malignancy or significant small cell component in prostate cancer. Biopsy of the left ilium was positive for metastatic adenocarcinoma with some neuroendocrine differentiation. The patient was subsequently started on hormonal therapy and continues to be asymptomatic at this time. This case demonstrates the importance of performing a biopsy when findings on imaging do not match the clinical history. When metastatic bone lesions are found in prostate adenocarcinoma, they are most often osteoblastic in nature. The findings of purely lytic skeletal lesions in prostate adenocarcinoma is very rare, and may mean a different cancer or prostate cancer with small cell component. Empiric treatment for prostate adenocarcinoma could be inappropriate in such presentations, as pure small cell or a different cancer will not respond</td>
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### Steven Feng, MD

**Monomorphic Ventricular Tachycardia-The good, the bad, and the antiarrhythmics**

Monomorphic Ventricular Tachycardia encompasses a number of varied ventricular tachyarrhythmias which can be unpredictable and dangerous in its course. Right ventricular outflow tract ventricular tachycardia (RVOT-VT) is a benign variant which can be treated both medically or via radiofrequency ablation. This case highlights the importance in identifying and diagnosing these arrhythmias to aid in its management.  

**Case Description**  
A 43 y.o. female with no past medical history of heart disease presented with dizziness and palpitations. She was found to have NSVT and sustained VT (often > 1 minute in length).  
An ECG showed a ventricular tachycardia with a left bundle branch pattern, consistent with right ventricular outflow tract outflow tachycardia.  
She was initially loaded with lidocaine in the ED and started on a lidocaine drip, which converted her to normal sinus rhythm. However, her ventricular tachycardia returned. Her rhythm was eventually controlled with verapamil, as well as atropine for post-conversion bradycardia. Due to her lack of heart disease, and her diagnosis of RVOT-VT, the cardiology service elected to ablate her arrhythmogenic tract, which was successful.  
She was discharged with follow up.

### Teresa Fox, MD

**Water Woes**  
Water Woes Teresa Fox, Resident, Internal Medicine, University of Minnesota  
A 62 year old male presented to the Emergency Department from an orthopedic postoperative care-suite after having a witnessed seizure. The patient had undergone an uncomplicated lumbar laminectomy the day prior and was being observed overnight for post-operative urinary retention. Prior to falling asleep the evening after surgery he was noted to be slightly confused, however this was attributed to narcotic medications. Just after midnight, the patient had an episode of full body tonic-clonic convulsions and was brought to the Emergency Department.  
At the time of assessment the patient had ceased seizing, however remained lethargic. He denied headache, chest pain or shortness of breath. His past medical history was significant only for hypertension and hyperlipidemia and his current outpatient medications were hydrochlorothiazide, atenolol and atorvastatin.  
He had no prior history of seizure or stroke. He was married with two children and was a life-long non-smoker. He reportedly drank a glass of wine with dinner several times a week. His vital signs were normal and cardiopulmonary exam was unremarkable. He was oriented only to self and displayed significant expressive aphasia. No other focal neurologic deficits were noted. Head imaging was unremarkable, however lab work revealed a serum sodium of 116 and a serum osmolality of 247.  
Electronic medical record review showed normal serum sodium on pre-operative labs obtained one week prior to presentation. The patient’s family was interviewed for supplemental history. His wife reported that the patient was instructed to hydrate plentifully after surgery in order to facilitate urination. He subsequently consumed a very large amount of fluid (upwards of 25 glasses or water and 4-5 sodas) in hopes to urinate and thus be allowed to return home. With this additional...
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<th>Abby Gardner, MD</th>
<th>Neurologic Toxicity Following Prolonged use of Metronidazole</th>
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<td>Metronidazole is widely used for anaerobic infections and is generally well tolerated, rarely causing side effects. However there are a few case reports of an unusual adverse event, neurologic toxicity. This usually occurs at high cumulative doses and often presents with neuropathy, gait, and speech problems. This case illustrates a 77 yo F who presented with dysarthria, ataxia, and peripheral neuropathy in the setting of metronidazole treatment for a brain abscess and ongoing alcohol use. Description: The patient is a 77 yo F with past medical history of multiple brain abscesses thought secondary to necrotizing pneumonia, alcohol abuse, and CAD who presented to the hospital complaining of slurred speech, ataxia, weakness, and peripheral neuropathy. An MRI on admission revealed decreased size of cerebral abscesses, and no new lesions. Laboratory workup including B1, B6, B12, and TSH were all within normal limits. Due to the incongruent symptoms of peripheral neuropathic signs and cerebellar signs metronidazole toxicity was suspected and the drug was held. The patient experienced rapid improvement of symptoms within 3 days of stopping metronidazole and was able to discharge to an acute rehab facility by hospital day 5. Discussion: Cerebellar toxicity following metronidazole use is rare, and presentation can vary. Of the previously reported cases the age ranges from 17 -74, and the symptoms are generally the same as they are in this case including dysarthria, ataxia, and neuropathy. The largest variability in prior reports is seen in the clinical course following discontinuation of the drug, improvement in symptoms ranged from 2 days to 4 months. Recognizing this rare adverse event associated with metronidazole is extremely important as the toxicity can be severely debilitating and stopping the medication can lead to dramatic and often rapid recovery. Toxicity should be suspected in any patient receiving prolonged therapy presenting with new neurological symptoms. A thorough workup including a brain MRI should be completed and metronidazole should be stopped immediately.</td>
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<th>Tricia Hadley, MD, Mohammad-Ali Jazayeri, MD</th>
<th>Peripheral arterial thromboembolism in the setting of undiagnosed atrial fibrillation</th>
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<td>The most commonly studied thromboembolic consequence of atrial fibrillation is stroke. Although peripheral thromboemboli are less common, 60-95% of patients operated on for acute limb ischemia are...</td>
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found to have atrial fibrillation and are at greater risk of repeat embolic events. Thus, a thorough investigation for a source of embolism is warranted to minimize morbidity and mortality. Case Presentation: a 64 year old female with no known significant medical history and 30 lapse in medical care presented with a several week history of progressive fatigue, weakness and lower extremity edema in the absence of any additional cardiac symptoms. In the emergency department she was evaluated for extreme weakness and concern for stroke where she was found to be in atrial fibrillation with rapid ventricular response and decreased biventricular systolic performance. CT revealed four-chamber enlargement with significant left and right atrial thrombi and subsegmental pulmonary embolism. She was also noted to have acute limb ischemia of the right lower extremity secondary to a femoral-popliteal occlusion requiring embolectomy and TPA. Therapeutic anticoagulation was started following surgery. Her atrial fibrillation was managed with a rate control strategy as rhythm control was contraindicated. Follow-up TTE demonstrated improvement of biventricular systolic performance. Her hospital course was complicated by respiratory failure and encephalopathy. Discussion: Atrial fibrillation is associated with an increased risk of thromboembolic events among which peripheral events confer increased risk of recurrence and overall mortality and repeat embolic event compared to those occurring centrally. In comparison to other prothrombotic states, including mitral stenosis and myocardial infarction, atrial fibrillation induced events are associated with greater morbidity and mortality. Since most studies examining complications of atrial fibrillation focus heavily on stroke, peripheral events are not as well characterized but equally if not more important. In this patient’s case, without regular medical care her atrial fibrillation went undiagnosed for likely an extended period of time. Consequently she developed tachycardia-induced cardiomyopathy, contributing to her critical condition and serving as a substrate for her embolic complications. Her case demonstrates clearly the potentially devastating consequences of undiagnosed atrial fibrillation and reflects the evolution of thought regarding thromboprophylaxis with the addition of vascular disease to the CHADS-VASC risk stratification tool in 2010.

Paul Hampel, MD, Tasha Lin, MD, Deanne Kashiwagi, MD.

Sacral herpes zoster: Pain without urination

Herpes zoster, a painful, vesicular rash in a dermatomal distribution commonly referred to as shingles, is the result of reactivation of the varicella-zoster virus (VZV), and has a lifetime incidence of close to 1 in 3 in the U.S. Approximately 12 percent of patients experience a complication. Urinary retention is a rare complication associated with sacral dermatomal distribution. Case Description: An 84-year-old man presented to the Emergency Department with back and leg pain, where he was diagnosed with sciatica and discharged to home. The following day he developed urinary retention prompting another visit to the ED, at which time a urinary catheter was placed and he was instructed to return the following day for its removal. Upon his return, he was noted to have a gluteal and penile rash (S1-S3 dermatomal distribution) clinically consistent with herpes zoster (HZ). He was then started on valacyclovir, his catheter was removed and he was discharged to home.
Subsequently, the patient became febrile with confusion and urinary incontinence. He presented to the Emergency Department with these symptoms, and was found to be tachypneic with radiographic findings concerning for pneumonia. He was diagnosed with healthcare associated pneumonia and transferred for inpatient management. The patient was treated with empiric antibiotic coverage, as well as burst-dosed steroids for concern of possible COPD exacerbation. By the following morning his respiratory status had improved and antibiotic coverage was deescalated as infectious work-up returned negative. He was initially started on acyclovir for concern of disseminated HZ, which was also deescalated to valacyclovir. His urinary retention persisted, requiring continued catheterization, and a differential diagnosis including pharmacologic causes (primarily opiate related retention), constipation, and urinary tract infection was evaluated. The patient did not require opiates for pain control after the first 24 hours of hospitalization. Although he had mild constipation initially, by hospital day two he was having soft, daily stools. Urine cultures did not grow bacteria. The patient’s urinary retention began to improve with improvement in his rash, and HZ was determined to be the most likely cause of his urinary dysfunction. He was discharged with tamsulosin and education on in-and-out self-catheterization. Discussion: At the cross-section of two common diagnoses in the aging population, urinary retention and herpes zoster, lies a relatively rare presentation that connects the two. This case highlights the importance of consideration of HZ complications beyond post-herpetic neuralgia. Furthermore, in patients with sacral HZ, wariness and predictive counseling for urinary symptoms should be deployed.

Gil Harmon, MD, James P. Utz, M.D.

An unusual presentation of dyspnea: diagnosing and treating idiopathic subglottic stenosis

Idiopathic subglottic stenosis (ISS) is a rare form of airway stenosis that predominantly affects women. As its name implies, stenosis is limited to the subglottic region and upper portion of the trachea. The underlying etiology of the disease is unknown, though previous studies have suggested a link with GERD and limited granulomatosis with polyangiitis. Treatment involves surgical/procedural correction of the area of stenosis followed by medical therapy. Herein, we describe a case of ISS from presentation through diagnosis and treatment. Case description: A 47-year-old female never-smoker with benign past medical history presented to our inpatient pulmonology service with a chief complaint of acute on chronic respiratory distress. She had no history of asthma or parenchymal lung disease. Her breathing concerns began one year prior to her inpatient presentation. At that time, she developed a URI, and central airway stridor was noted for the first time. She improved slightly in the subsequent weeks, but from that time forward had low-grade, persistent stridor and dyspnea. These symptoms were exacerbated by exertion and two subsequent URI’s. At the time of presentation to our inpatient team, she had acute worsening of her dyspnea and had audibly stridorous breath sounds. She was unable to complete a sentence without pausing to breathe. Her exam was notable for increased work of breathing and significantly prolonged inspiratory and expiratory phases. The lungs themselves had
decreased air movement but no wheezes or rhonchi. Centrally, the upper trachea was notable for stridorous breath sounds on inspiration and a tight wheeze on expiration. Bronchodilator and IV corticosteroid therapy were not immediately helpful. The patient was taken for CT of the neck and chest. Findings were notable for soft tissue density within the subglottic region near the cricoid cartilage, extending into and narrowing the lumen of the subglottic trachea. ENT consultation was obtained, confirming severe subglottic stenosis. The patient underwent a laryngoscopic procedure with CO2 laser treatment of the stenosis. Cuts to the stenotic area resulted in restoration of normal subglottic luminal diameter. Mitomycin was applied, and Kenalog was injected. Post-procedurally, symptomatic improvement was immediate. Stridor was no longer evident. H2 blocker, PPI, inhaled corticosteroid, and Bactrim therapy were initiated and continued at discharge. Discussion: Herein we present a case of newly diagnosed idiopathic subglottic stenosis. Given its rarity, diagnosis of this disease requires a broad differential diagnosis and careful physical examination. The treatment paradigm is still under investigation but generally involves procedural correction of the stenosis itself, followed by medical therapy directed at potential underlying causes of stenosis. A clear etiology for ISS has not yet been elucidated.

Michael Hart, MD

**Acute Rheumatic Fever In The Setting of Sickle Cell Crisis: A Diagnostic Conundrum**

Acute Rheumatic Fever is a syndrome classically diagnosed using Jones Criteria in children 2-3 weeks after an episode of acute streptococcal pharyngitis. The clinical manifestation of ARF in adults is variable and lends to the difficulty in diagnosing patients with comorbidities that can present similarly. Here is a case of sickle cell pain crisis with development of migratory polyarthritis of unclear etiology. A 34 y.o. male with known history of Sickle Cell Disease and Beta-thalassemia came to the hospital with shortness of breath, severe chest and leg pain. He was found to be in sickle cell pain crisis and had a left lower lobe pneumonia believed to be the predisposing insult. During his stay, he developed high fevers and migratory joint pain with associated erythema and tenderness to palpation. Rheumatology performed arthrocentesis of an affected joint which showed absence of crystals, and a preliminary diagnosis of sickle cell arthropathy was made. This arthritis resolved spontaneously in the following days with resolution of his pain crisis. He was discharged home with plan for outpatient followup but returned to the hospital 3-weeks later with similar sickle cell pain crisis and polyarthritis. Reevaluation by rheumatology yielded a dry tap of the right wrist, and the differential was broadened to include gout, disseminated gonococcal infection, and post-strep rheumatic fever. Further workup was significant for newly identified pericardial rub on exam, ECG with new first-degree AV-block, elevated CRP, and positive ASO-antibody test. These findings, in the setting of migratory polyarthritis, met the Revised Jones Criteria for a diagnosis of Acute Rheumatic Fever. After receiving Bicillin 1.2M Units IM, the patient’s symptoms dramatically improved. Identifying ARF can be very difficult when the clinical picture is muddled by complicated comorbidities. This case demonstrates an unusual presentation of ARF.
in the adult population, the importance of broadening your differential in the face of recurrence, and the utility of the Revised Jones Criteria in making a diagnosis.

**Tarrek Hegab, MD**

**Stones, bones, abdominal moans, and psychic groans**

In the United States, sarcoidosis is more prevalent among young adults, women and African Americans. Despite this, it is a disease that affects men and women of all ages and races. A previously healthy 48-year-old Caucasian gentleman presented to the emergency department with a two-week history of progressive fatigue, vomiting, arthralgias and weight loss. Physical examination was unremarkable. Laboratory investigations were notable for hypercalcemia, hyperuricemia and acute renal failure necessitating emergent dialysis. CT scans of the chest and abdomen were significant for mediastinal lymphadenopathy and hepatosplenomegaly. The patient underwent a renal biopsy, which demonstrated non-specific, severe acute tubular injury. Subsequently, he underwent mediastinoscopy with excisional lymph node biopsies, which revealed noncaseating granulomas in the absence of organisms. A diagnosis of sarcoidosis was made and the patient was started on steroid therapy. The patient responded well to treatment; hypercalcemia and acute renal failure resolved, and his symptoms improved. Hypercalcemia in sarcoidosis is due to the unregulated synthesis of 1,25-dihydroxyvitamin D3 by macrophages, which in turn leads to increased intestinal absorption of calcium and resorption of calcium from bone. This case illustrates that sarcoidosis can affect men and women of all ages and races, and should be considered in any patient who presents with suggestive signs and symptoms regardless of their gender, age or ethnicity.

**Benjamin Henkle, MD, Joseph Bert, MD; Elie Gertner, MD**

**A new syndrome: “The P5 syndrome”: Panniculitis, Polyarthritis, Palmar fasciitis, Plantar fasciitis, and Pancreatic carcinoma.**

Panniculitis is an uncommon condition that presents with inflammatory nodules or plaques. The palmar fasciitis with polyarthritis syndrome is an uncommon paraneoplastic syndrome seen with different malignancies. We present the occurrence of both presentations together which is highly suggestive of pancreatic cancer. A 56 year old male with a history of degenerative joint disease and reflux disease presented with a one month history of painful nodules on his extremities. Biopsy of a nodule revealed lobular and septal panniculitis with focal fat necrosis and numerous eosinophils. The patient was treated first with antibiotics then with steroids with little improvement. Subsequent outpatient excisional skin biopsy again revealed lobular panniculitis with necrosis. The differential diagnosis from the dermatopathologist included alpha 1 antitrypsin associated panniculitis, pancreatic panniculitis or factitial panniculitis. Several days later the patient developed new symptoms of burning bilateral foot pain that was worse with ambulation and he presented to our hospital. Review of systems was unremarkable except for weight loss of 15 pounds. Examination revealed very painful, erythematous, nodular lesions now on his lower and upper extremities as well as his abdomen. He also had polyarthritis with synovitis in his elbow, MCP, PIP and ankle joints as well as diffuse palmar and plantar fasciitis. The clinical diagnosis of palmar and plantar fasciitis, polyarthritis, and panniculitis likely related
to an underlying malignancy was made. Lipase levels were >40,000 u/l. Computed tomography of the chest, abdomen, and pelvis revealed a mass at the pancreatic head, peripancreatic adenopathy, and hypodense liver lesions. Liver biopsy confirmed pancreatic acinar cell carcinoma. Systemic steroids provided initial relief, but then became ineffective in controlling pain. Chemotherapy with gemcitabine and paclitaxel was started. Panniculitis associated with pancreatic disease is an uncommon disorder seen usually with acute and chronic pancreatitis and occasionally with pancreatic carcinoma, more frequently of the acinar cell type. The palmar fasciitis and polyarthritis syndrome is a rare paraneoplastic syndrome seen with different tumors, occasionally with pancreatic cancer. The occurrence of both syndromes together has not been described before and is highly suggestive, if not pathognomonic, for pancreatic carcinoma. We call this the “PS syndrome”: Panniculitis, Polyarthritis, Palmar fasciitis, Plantar fasciitis, and Pancreatic carcinoma. Clinicians should be aware of this presentation of underlying malignancy.

Andrew Henn, MD, Anya Lukasewycz, MD

Preventing Misadventure with Infection, Stones and Renal Masses. Xanthogranulomatous Pyelonephritis is an uncommon destructive granulomatous process of renal parenchyma associated with long term urinary tract obstruction and infection. This case is an important reminder of the potential consequences of chronic UTI, the increased risk of infection in the setting of nephrolithiasis, and the importance of including Xanthogranulomatous Pyelonephritis in the differential diagnosis when evaluating a renal mass. A 53-year-old woman with previously diagnosed hematuria-loin pain syndrome (12 years prior) presented with 2 months of progressive left flank pain which abruptly worsened on the day of admission. CT scan without contrast at the outside hospital showed a 14.7 cm left sided renal mass concerning for renal cell carcinoma and the patient was transferred for further evaluation. Patient was noted to have a fever of 102 F, tachycardia, and left CVA tenderness. Admission labs showed a white blood cell count of 20.9 K and creatinine of 2.2. The urinalysis showed >100 RBC’s, >100 WBC’s, and many bacteria. Admission MRI revealed a left sided renal mass, bilateral staghorn calculi and aortic lymphadenopathy. Broad spectrum antibiotics were started. Urology was consulted and performed a right sided percutaneous nephrostomy tube placement for maintenance of renal function in the setting of planned lithotripsy of right sided staghorn calculi. A nuclear medicine renal scan with furosemide was completed and showed severely decreased blood flow and function consistent with absent or nearly absent functioning of the left kidney. The right kidney showed mildly decreased blood flow and mild to moderate reduction in function with no signs of obstruction. Right sided nephrolithotomy was performed and stone analysis showed struvite stones. Blood cultures from admission showed Proteus bacteremia. Once infection was stabilized and creatinine optimized, the patient underwent an open left sided radical nephrectomy. Pathology was ultimately consistent with xanthogranulomatous pyelonephritis. The patient’s creatinine stabilized to 2.17 on discharge. In addition to the above evaluation, oncology was consulted on admission given the initial concern for renal
cell carcinoma and finding of peri-aortic lymphadenopathy. This working diagnosis prompted the evaluation for metastatic disease that was halted once the admission MRI provoked consideration of xanthogranulomatous pyelonephritis. This case highlights the potential serious complications of chronic UTI and the risk of non-obstructive nephrolithiasis acting as a nidus for chronic infection. This case also illustrates the classic characteristics of the relatively rare diagnosis, xanthogranulomatous pyelonephritis. Early consideration and recognition of this diagnosis can minimize diagnostic testing and shorten the time in which both patient and physician must face a possible new cancer diagnosis.

Moira Hilscher, MD, James Tabibian MD, Ph.D; Stephanie Hansel MD

An Unusual Bug in the Biliary Tree
Achromobacter xylosoxidans is a gram-negative bacillus with low virulence and a high degree of intrinsic antibiotic resistance which inhabits aqueous and hospital environments. It is emerging as an opportunistic pathogen which causes infection in immunocompromised and cystic fibrosis patients [1-3]. A. xylosoxidans infection generally manifests as bacteremia, infection of indwelling catheter devices, endocarditis, or pneumonia and entails a high mortality rate [2, 4, 5]. This organism has rarely been isolated from the human abdomen [6] and few reports of biliary or hepatic infection were found in the literature, many with poor outcomes [7, 8]. A. xylosoxidans has rarely been reported as a cause of osteomyelitis or discitis [9-11]. We report a rare etiology of biliary infection with subsequent bacteremia and discitis. Case report: A 62 year old man was admitted to our facility with severe back pain. His medical history was significant for diabetes mellitus, necrotizing pancreatitis requiring multiple necrosectomies, Roux en Y pancreatic jejunostomy, cholecystectomy, splenectomy, and retained biliary stent. Laboratory evaluation was remarkable for leukocytosis (21.8 x 10^9) and elevated alkaline phosphatase (543 U/L; upper limit of normal 130 U/L). Liver enzymes were otherwise normal. Blood cultures grew A. xylosoxidans at 24 hours in two out of three bottles. Further evaluation was pursued to identify the source of infection. Abdominal ultrasound revealed dilation of the common bile duct (CBD) to 20 mm without cholelithiasis or sludge. Computerized tomography (CT) scan of the chest/abdomen/pelvis revealed stable pneumobilia and multiple thoracic vertebral body fractures. Positron emission tomography (PET) scan demonstrated nonspecific increased fluorodeoxyglucose (FDG) activity at the area of the vertebral compression deformities as well as increased FDG uptake just inferior to the diaphragm and extending to the dome of the liver. Transesophageal echocardiogram was negative for endocarditis. Due to concern for biliary nidus of infection, endoscopic retrograde cholangiopancreatography (ERCP) was performed. This study revealed grade II duodenal varices and portal hypertensive gastropathy. Stones, sludge, and pus were removed from the CBD, consistent with a biliary nidus of infection with subsequent bacteremia and discitis. He was treated with two weeks of ertapenem and daptomycin and double coverage of A. xylosoxidans bacteremia with continuation of indefinite antimicrobial suppressive therapy.
Ischemic digits pointing to lymphoma

Digital ischemia in the setting of elevated inflammatory markers is often associated with embolic, vasculitic or rheumatologic processes. Laboratory studies and angiogram can be used for initial assessment, although these may not yield a clear diagnosis. Unclear diagnoses present a challenge in definitive management and place patients at risk for amputation.

Case Description: 65 year old male with a history of coronary artery disease, cardiomyopathy, and diabetes mellitus presented to outside hospitals with several months of generalized weakness, diffuse arthralgias in addition to progressive acrocyanosis and necrosis requiring amputations. He was admitted for evaluation of the underlying etiology of his multiple ischemic digits in upper and lower extremities. Exam was notable for dry gangrene of remaining digits. Laboratory studies showed elevated C reactive protein, alkaline phosphatase, white blood cell, platelet, ferritin, lactate dehydrogenase, and fibrinogen. Additional laboratory studies including monoclonal protein studies, complement, anti-nucleic acid, vasculitides, cryoglobulin, bone marrow biopsy and infectious work up were normal. Angiogram demonstrated bilateral distal radial and ulnar artery occlusions and extensive occlusive disease of the small arteries of the digits. PET scan showed multiple hypermetabolic areas including testicle and lymph nodes concerning for metastatic cancer. Ultimately, the patient underwent supraclavicular lymph node biopsy which revealed aggressive B cell lymphoma. He initiated chemotherapy with R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone) and methotrexate, with continuation of treatment upon discharge.

Discussion: This case demonstrates lymphoma that manifests in an unusual manner with acronecrosis requiring multiple amputations. Lymphoma should be considered in the work up of digital ischemia when more common etiologies are not found, when diagnosis remains unclear, or when acronecrosis persists despite therapy. It can occur as a paraneoplastic vasculitis, which tends to affect older adults with equal sex distribution [1,2]. Endothelial dysfunction, hyperviscosity, and sympathetic hyperstimulation can contribute to a hypercoagulable or prothrombotic environment leading to ischemia [1,2]. The combination of digital necrosis and thrombocytosis can be an indication for further evaluation of occult malignancy [2]. Digital ischemia has been most commonly associated with adenocarcinoma, followed by hematologic malignancies such as lymphoma [1]. Therapy should focus on treating underlying malignancy, in addition to proper wound care. Reference: 1. Poszepczynska-Guigne E et al. Paraneoplastic acral vascular syndrome: epidemiologic features, clinical manifestations, and disease sequelae. J Am Acad Dermatol. 2002;47(1):47-52. 2. Le Besnerais et al. Digital ischemia associated with cancer: results from a cohort study. Medicine. 2014;93(10).

Abdominal Actinomycosis

32 y/o old woman with PMH of severe Crohn"s disease complicated by peri-anal fistula and terminal ileitis, medication non-adherence, who initially presented with sub-acute fever, abdominal pain and diarrhea. Treated for Crohn"s flair with prednisone and anti-biotics with initial improvement but within 2 months represented with fever and abdominal pain. CT scan showed
terminal ileitis and small associated fluid collection. Treated medically with anti-biotics and prednisone. She again had initial improvement in symptoms. Plan was for prednisone taper and initiation of DMARD therapy for Crohn’s disease (non-adherent in the past). 2-3 months later, she again relapsed and presented with abdominal pain, fevers, leukocytosis, and diarrhea, found to have multiple large communicating abscesses on imaging with invasion of peri-abdominal muscles and multiple fistulae to inflamed ilium. Two drains were placed, and cultures grew Actinomyces odontylicticus (along with several other organisms). She was treated for Crohn’s flair and 2 weeks of IV Zosyn with subsequent penicillin V therapy. She was followed in ID clinic and GI clinic, got placed on azathioprine, and was doing well on penicillin V with some dose adjustments. Unfortunately, 6 months later she again re-presented to ED with sub-acute abdominal pain, fevers, and leukocytosis. Imaging demonstrated reoccurrence of intra-abdominal abscesses with cultures again growing Actinomyces odontilyticus. Drains were placed and she was re-initiated on IV anti-biotics and transitioned to PO amoxicillin. She is currently doing well on amoxicillin and azathioprine therapy.

An unexpected journey from an expected organism

A 38 year old man presented to the Emergency Department with 5 days of abdominal pain and sore throat but was unable to perform his normal activities, which previously included 12 hours of physical labor daily. Initial examination revealed mild epigastric tenderness but normal mental status exam and cardiopulmonary auscultation. Rapid strep was positive for group A strep. Within 2 hours, he had significant encephalopathy and required emergent lumbar puncture due to concerns of meningitis or encephalitis. Gram positive cocci were growing in his CSF within hours of collection. He subsequently required intubation for airway protection and was hypertensive with SBPs above 200. Upon admission to the Medical ICU, his SBPs were 170s and his cardiopulmonary physical exam was unremarkable. Bedside ultrasound had hyperdynamic LV function and no gross valvular abnormalities. He was initiated on broad spectrum antibiotics for bacterial meningitis. The following morning, patient was discovered to have a new IV/VI diastolic murmur. Emergent formal TTE was performed with acute severe aortic insufficiency with a critical half time and aortic valve mass. A TEE was performed with evidence of aortic valve abscess around the annulus with concern for potential dissection into the right ventricular wall. MRI of brain revealed multiple septic emboli and infarcts. Cardiothoracic surgery was emergently consulted and he had aortic valve and root replacement and tolerated the procedure well. Cultures from the aortic vegetation as well as CSF were ultimately read as Streptococcus pneumoniae. Initially, he was vitally quite stable following the procedure but on post-op day#4 he spiked fevers and was noted to have a new fixed/dilated pupil, found to have intracranial hematoma due to hemorrhagic transformation of a septic embolus in the left frontal region. Neurosurgery followed along and managed with ventriculostomy. He continued to worsen neurologically and ultimately began extensor posturing. Eventually he was completely unresponsive despite intubation without sedating medications. After many discussions, his
family and fiancé elected to withdraw cares and he passed away several weeks later. This case illustrates a rare set of complications from S.pneumoniae, an exceedingly common organism. His presentation was similar to that of the Austrian Syndrome, which is marked by a triad of meningitis, endocarditis, and pneumonia caused by S.pneumoniae. While he was never evaluated for respiratory involvement, he did initially present with streptococcal pharyngitis. In the age of antibiotics, it is important to recognize that life-threatening complications can occur with this organism.

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<th>Jery Inbarasu, MD, Paul Daniels MD</th>
<th>Dermal Contractures Restricting Movement in a Dramatic Presentation of Hidradenitis Suppurativa</th>
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| Often underdiagnosed in clinical practice, hidradenitis suppurativa (HS), also known as acne inversa or Verneuil disease, is a chronic inflammatory skin condition that has an estimated prevalence of up to 4% of the general population. The condition typically affects intertriginous areas and often initially presents as painful, subcutaneous nodules. The etiology is often attributed to occlusion of pilosebaceous follicular ducts and the subsequent rupturing of the follicles. This process may eventually lead to abscess formation with draining sinus tracts, comedones and fibrotic scarring with subsequent dermal contractures in the reepithelialization process. A previous healthy 67-year-old Caucasian male was referred to the emergency department for management of an axillary lesion limiting range of motion in the left shoulder. The patient described a small, initial area of erythema in the axilla that expanded over the course of a year with progressive limitation of movement in the shoulder. Physical exam demonstrated a non-tender 6 inch by 6 inch area of open comedones and extensive keloid tissue formation with draining sinus tracts in the axilla. Shoulder abduction was markedly limited due to pain and scarring with dermal contractures. Additionally, there were open comedones and draining sinus tracts with less significant scarring in the bilateral inguinal folds and perineum. Computed tomography with contrast of the chest revealed a large ulcerative process in the left axilla with cutaneous and subcutaneous soft tissue involvement without significant lymphadenopathy or chest wall extension. The axilla was surgically debrided with removal of purulent necrotic tissue. No evidence of malignancy was identified on frozen section. The patient subsequently underwent placement of a negative pressure wound therapy device in the axilla and participated in physical therapy to improve range of motion. The patient will undergo free flap reconstruction of the left axilla and be considered for TNF alpha inhibitor therapy following reconstruction. Although typically affecting females in the second or third decades of life, hidradenitis suppurativa should be considered in patients providing a history of recurrent, characteristic skin lesions and with involvement of the axilla, inguinal and perineal regions. Severe scarring and dermal contractures from prolonged, active disease can reduced mobility and may even cause lymphatic obstruction. This case illustrates the rare complications of this common illness, and emphasizes the benefits of early identification and treatment in maintaining mobility and quality of life. The Hurley clinical staging system is frequently used to classify patients with hidradenitis suppurativa into three groups based on the...
extensiveness of abscess and sinus tract formation and is used to guide the aggressiveness of therapy. Often patients with perineal involvement or stage III disease will need a multidisciplinary approach involving surgical interventions and hormonal or immunosuppressive medical therapies.

**Kay Ingraham, MD, Jonathan D. Kirsch**

“My-Oh-Ma… It Took My Breath Away”

A 49 year-old, previously healthy woman presented with one day of progressively worsening right-sided body pain and shortness of breath. She noted her pain started while in bed the previous morning, radiating from her right upper quadrant to her chest and worsening with inspiration. She denied fever or leg swelling and denied any recent surgeries, hospitalizations, or traveling. She had no personal or family history of heart disease or blood clots and did not smoke tobacco or take oral contraceptives. The patient had been told she had a fibroid uterus several months ago and reported experiencing heavy menstrual periods for years. On exam, she was tachycardic and tachypneic, taking shallow breaths. Her abdomen was non-tender to palpation although pain was present in her right upper quadrant with inspiration. She had no lower extremity edema. Due to high suspicion for venous thromboembolic disease and widespread pain, a CT scan of her chest, abdomen and pelvis was ordered. It revealed bilateral pulmonary emboli and a right sided pleural effusion. The abdominal and pelvic CT scan revealed a 20.1 x 19.4 x 12.7 cm uterine myoma compressing the inferior vena cava and common iliac veins. A lower extremity venous Doppler ultrasound was negative for deep vein thrombosis. A complete hypercoagulability workup was also negative. The patient was diagnosed with venous thromboembolism due to mass effect from her large uterine myomas. She was treated with enoxaparin and scheduled for a total hysterectomy. LEARNING OBJECTIVES: 1. Recognize an abdominal mass as a potential cause of venous stasis, deep vein thrombosis, and pulmonary embolism. 2. Review the acquired risk factors and inherited thrombophilias leading to venous thromboembolism. DISCUSSION: Venous thromboembolism is a common problem encountered by internists. They are a result of a culmination of Virchow’s triad—venous stasis, vascular endothelial injury, and a hypercoaguable state. When exploring the potential causes of a venous thromboembolism, it is important to take a thorough history before reporting an unprovoked venous thromboembolism. The label of “unprovoked” can lead to longer anticoagulation and further unnecessary, diagnostic workup. As uterine myomas are very common in women over the age of 40, it is important to recognize an enlarged uterus as a potential cause for venous thromboembolism. Definitive treatment for a venous thromboembolism in this case is a total hysterectomy. Venous thromboembolisms are usually classified as being caused by acquired risk factors, inherited thrombophilias or a combination of these. Acquired risk factors for VTE include the following: immobility, hospitalization, surgery, oral contraceptive use, antiphospholipid antibody syndrome, and malignancy. Inherited thrombophilias include Factor V Leiden, Prothrombin, Protein C and S gene mutations as well as Antithrombin deficiency.
| Nicholas Ingraham, MD, Brenton Schneider | **Nontuberculous Mycobacterial Prosthetic Hip Infection: a Diagnostic and Therapeutic Dilemma** Nontuberculous mycobacteria (NTM) are a rare cause of prosthetic joint infections. However, the prevalence of these infections is increasing with the rising use of newer immunosuppressive medications used to treat other diseases. This case report sheds light on a rare complication from immunosuppressive therapies, while highlighting the complexity of diagnosing and treating these insidious infections. The patient is a 79 year old Caucasian male with a history of severe destructive rheumatoid arthritis on several immunomodulating agents, and right hip osteoarthritis s/p total hip arthroplasty 15 years prior with several complex revisions. He presented with several weeks of worsening right hip pain, abdominal pain, and difficulty ambulating. A right hip CT scan revealed peri-prosthetic fluid collections in three distinct sites. Aspirates of the collections were AFB smear positive. After extensively discussing treatment options, with explantation, spacer placement, and reimplantation of hardware presented as standard therapy, limited surgery with chronic antimycobacterial suppression was pursued, as the patient was deemed a poor surgical candidate. Despite several months of antimycobacterial therapy after his I & D procedure, the patient continued to deteriorate, and he and his family eventually opted for hospice care. Based on this case and other cases in the literature, prosthetic joint infections caused by NTM are rare and difficult to treat. Due to the increased prevalence of immunosuppressive therapies and diseases over the past several decades, certain patients are at increased risk of this complication. The insidious course of this disease can often lead to a delay in diagnosis, and cultures can take weeks to grow. The prognosis without definitive surgical management is poor, which complicates treatment for patients with severe comorbidities. |

| Annie Jacobsen, MD | **An Unexpected Cause of Flank Pain** A 30-year-old male presented to the Medicine Clinic with 3 weeks of progressive left flank pain that radiated to the groin. He had no dysuria or hematuria and did not have a history of kidney stones. He had not been recently ill. A native of India, he had immigrated to the United States about 3 months before. He had no significant past medical history. Vital signs on presentation were within normal limits and his cardiac, respiratory, and abdominal exams were normal. Genitourinary exam was negative for swelling, masses or tenderness to palpation. He exhibited mild costovertebral angle tenderness. His sodium was 134 mEq/L, potassium was 3.3 mEq/L, chloride was 96 mEq/L, bicarbonate was 28 mEq/L, blood urea nitrogen was 12 mg/dL, and creatinine was 1.31 mg/dL. Urinalysis was within normal limits, notably without red blood cells. Because symptoms were most consistent with renal colic, computed tomography (CT) scan of the abdomen and pelvis was obtained. This image failed to show renal, ureteral, or bladder calculi, but instead revealed multiple left retroperitoneal masses with mass effect on the left ureter resulting in moderate left hydronephrosis. The distribution and character of the masses was most consistent with lymphoma or tuberculosis. The patient then underwent CT-guided biopsy of the mass which showed malignant cells of undetermined primary. The cells were weakly positive for placental alkaline |
phosphatase, raising the possibility of metastatic seminoma. Testicular ultrasound revealed a hyperechoic focus, 1.5 x 1.2 x 1.5 cm, along the inferior edge of the left testis. This case illustrates the importance of maintaining a wide differential diagnosis for flank pain in a young, healthy male. While most testicular cancers present as a painless mass or swelling, back pain from retroperitoneal metastases is not uncommon and can be present in up to 30% of cases. It is the main symptom at presentation in up to 10% of cases. Testicular ultrasound is an inexpensive, noninvasive test that might have lead to an earlier diagnosis if it was the initial imaging choice. Alternately, if the testicles had been fully imaged by the CT scan, this also may have provided an earlier clue to the primary tumor.

Claire Jansson-Knodell, MD, Joleen Hubbard, M.D.

**First Do No Harm, Secondary Prostate Cancer as a Result of Primary Treatment**
Prostate cancer is a common diagnosis in older men; however, the screening process and treatment decisions are often a subject of controversy in medicine. This case report chronicles a gentleman who was diagnosed with prostate adenocarcinoma treated with brachytherapy who later developed a secondary, locally invasive, and ultimately fatal malignancy. A 57-year-old male with a history of hyperlipidemia, hypertension, and GERD had an elevated routine screening PSA. Biopsy revealed Gleason 4 + 3 adenocarcinoma of the prostate, an intermediate grade lesion. He elected low-dose brachytherapy – radioactive seed implants – alone as treatment. At age 65 the patient developed increased frequency and nocturia, which worsened to the point of requiring intermittent catheterization. BPH was presumed as the etiology and he was treated with Transurethral Resection of the Prostate after failing medical therapy. Pathology showed reactive atypia and squamous metaplasia likely a result of local radiation. Months later he experienced severe pelvic floor pain and a 20-pound weight loss. Pelvic MRI demonstrated soft tissue masses and biopsy revealed invasive squamous cell carcinoma (SCC). Neoadjuvant chemotherapy was completed prior to pelvic exenteration with colostomy and urostomy creation to prevent impending rectal obstruction. Pathology showed an ill-defined 6.5 x 5.2 x 5.0 cm mass of moderately differentiated SCC centered in the left prostatic lobe almost obliterating the prostatic parenchyma and directly invading the rectum, urinary bladder wall, and surrounding soft tissue. Surgical margins were negative; staging was pT4, pN0. Two months after surgery he experienced acute onset severe pelvic pain. Repeat MRI demonstrated multifocal tumor recurrence, with osseous destruction in the left pelvis, and bowel loops encased by recurrent tumor with obstruction imminent. He was hospitalized for pain control and palliative radiation therapy. During his hospital course, he developed a bowel obstruction. He later became febrile to 38.2°C, tachycardic to 103 beats per minute, and his mental status was altered. He had a leukocytosis of 21.4/mm³ with a neutrophil predominance. Broad-spectrum antibiotics were started while cultures were pending. In the interim he developed feculent penile discharge. Blood cultures grew Clostridium Septicum and CT images showed bowel perforation and large areas of necrosis associated with a colo-urethral fistula. Surgery was not an option and
chemotherapy could not be safely administered. Given his lack of treatment options, he chose to go home on hospice. DISCUSSION: This case reinforces the reality and devastation of secondary radiation-induced malignancies. The risk of dying from a secondary treatment-induced malignancy may outweigh the risk of dying from a primary prostatic malignancy. Secondary cancers occur in up to 10% of men with prostate cancer; it is a predictable outcome of radiation treatment and thus treatment discussions should be approached with care and follow-up with diligence.

Mohammad-Ali Jazayeri, MD, Yader Sandoval, M.D., Rosemary A. Quirk, M.D., D.T.M.H., Gautam R. Shroff, MBBS

Recurrence flash pulmonary edema due to dynamic ischemic mitral regurgitation: the complex interplay of papillochordal dysfunction in the setting of preserved left ventricular ejection fraction

Cardiogenic pulmonary edema is a serious condition with an estimated in-hospital mortality of 10-15%. Among its myriad etiologies, dynamic mitral regurgitation (MR) is an underrecognized but potentially devastating mechanism of recurrent pulmonary edema in the context of preserved left ventricular ejection fraction (LVEF). Case Presentation: A 49-year-old male with a history of tobacco dependence and limited healthcare presented with atypical angina and myonecrosis. Emergent coronary angiogram revealed a 100% occlusion of the large co-dominant left circumflex artery, treated with drug-eluting stent, as well as significant stenosis of a diminutive co-dominant right coronary artery. Follow-up transthoracic echocardiogram (TTE) showed an LVEF of 49% with inferolateral akinesis and trace MR. His course was complicated by acute pulmonary edema in the setting of atrial fibrillation. He improved with diuresis and left against medical advice on hospital day four. He was readmitted nine days later with acute respiratory distress and pulmonary edema requiring intubation and mechanical ventilation. He was normotensive on presentation, with an LVEF of 45-50%. Repeat angiogram demonstrated patent of the recent stent, no new lesions, mild MR on LV gram, and normal LV filling pressures. The discordance between his filling pressures and propensity to develop “flash” pulmonary edema raised concern for dynamic MR. Right heart catheterization while weaning antihypertensives revealed significant elevation in pulmonary capillary wedge pressure, and TTE demonstrated load-dependent MR with moderate MR at systolic pressures of 85-90 mmHg and incremental worsening at 105 mmHg. He was treated with aggressive intravenous diuresis and afterload reduction. His course was complicated by cardiogenic shock requiring intraaortic balloon pump support and renal failure requiring dialysis. He remained intubated due to recurrent pulmonary edema, and tenuous hemodynamics made him an exceedingly high risk surgical candidate. Following significant ultrafiltration he was taken to the operating room and underwent salvage mitral valve repair on dialysis and cardiopulmonary bypass. Persistent perioperative hypoxemia and hyperkalemia ultimately led to his demise after return to the intensive care unit. Discussion: The dynamic nature of ischemic MR reflects the complex interactions of left ventricular size, shape, and loading as they impact function of the mitral valve apparatus. Its pathophysiological hallmark is ischemic cardiomyopathy with dyskinesia and ventricular remodeling resulting in lateral and apical displacement of papillary
muscles, annular dilation, and tethering and malcoaptation of the mitral valve leaflets, producing eccentric MR. The posteromedial papillary muscle usually receives blood from the dominant coronary artery only, making it more vulnerable to ischemia/infarction. This case highlights not only the elusive nature of dynamic ischemic MR, requiring a high clinical index of suspicion, but also the considerable challenges of its management. It underscores the importance of functional assessment when this condition is suspected in hopes that early detection can help avoid a catastrophic outcome.

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<th>Adlene Jenita Jebakumar, MD, Amy Holbrook MD, Prabhu Deepak Udayakumar, MD</th>
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<td><strong>Microscopic Polyangiitis presenting as acute foot-drop</strong></td>
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| Microscopic Polyangiitis (MPA) is a small vessel, ANCA vasculitis that typically presents as pulmonary-renal syndrome. It is unusual for MPA to present with mono-neuritis multiplex without pulmonary and renal involvement. An otherwise healthy 53 year-old woman presented to clinic with fatigue and weakness. She developed symptoms of fatigue, numbness and weakness in her hands and feet over the preceeding 6 weeks. She also developed a skin rash extending from her foot to chest for about 1 week. Work-up in clinic including complete blood count, basic metabolic profile, liver function tests, creatine kinase, and lumbar MRI, all of which were unremarkable. Her inflammatory markers were elevated – ESR 43 and CRP 6.25. She progressed to develop right-sided foot drop and presented to emergency department. On examination, she had right foot drop with no sensation on right foot up to the ankle, as well as decreased sensation in left foot. She also had a macular erythematous rash along the dorsum of right foot up to her chest. Neurology was consulted. MRI of cervical and thoracic spine were unremarkable. She underwent lumbar puncture, which was normal. Rheumatology was consulted for concern about vasculitis presenting as mononeuritis multiplex, given a prior history of positive anti-nuclear antibody (ANA). CT of chest did not reveal any pulmonary lesions. She was empirically started on pulse-dose steroids while waiting for skin and nerve biopsies, as her outside records showed positive P- ANCA. Lab results showed normal hbA1c, HIV, hepatitis B, hepatitis C, UA, cryoglobulin, angiotensin converting enzyme, Lyme western blot, paraneoplastic panel, ganglioside antibody, and IgE. Her ANA was positive along with positive P- ANCA and MPO antibody but PR3 antibody was negative. Other tests such as anti-native DNA, rheumatoid factor, SSA, SSB were all negative. Skin biopsy showed small muscular artery within subcutis showing features of active necrotizing arteritis with intraluminal thrombus and negative immunofluorescence. EMG showed features suggestive of mononeuritis multiplex. Peroneal nerve and muscle biopsy showed presence of microvasculopathy likely leading to acute axonal and demyelinating neuropathy with muscle degeneration. Steroids were transitioned to oral prednisone with taper. She also underwent Rituximab infusions as outpatient with complete resolution of her skin lesion as well as significant improvement in her sensory symptoms. Her foot drop continued to persist without any new neurological deficits. This case demonstrates that microscopic polyangiitis can present initially as mononeuritis multiplex without pulmonary-renal involvement. Diagnosis must be confirmed with tissue biopsy since the disease requires long-term immnosuppression.
**ST-elevation from an Upside-Down Stomach**

There exists a long differential for the causes of ST elevation. One of the most life-threatening and time sensitive is myocardial ischemia. However, non-cardiac causes can cause ST elevation and can require just as timely management. **CASE PRESENTATION:** An 80-year-old female presented with acute severe substernal pain and nausea preceded by a history of chronic post-prandial retching. Her past medical history is significant for large paraesophageal hiatal hernia with failed laparoscopic hiatal herniorrhaphy in 2009, dyslipidemia, and hypertension. Electrocardiogram revealed ST-elevation in V1-3 and Troponin-T was elevated. Physical examination was unremarkable. In view of concerns for acute myocardial infarction, she underwent emergency coronary angiography which revealed unobstructed coronary arteries. Intra-procedural fluoroscopy was however notable for a dynamic left-sided intrathoracic mass, with motion dyssynchronous with the cardiac cycle. Subsequent non-contrast computed tomography demonstrated this to be a huge intrathoracic (“upside-down”) stomach, with acute outlet obstruction. Upper endoscopy revealed a twist in the stomach resulting in partial obstruction. Following therapeutic decompression with nasogastric tube placement, the patient underwent definitive open repair and Nissen fundoplication. Pre and postoperative chest X-rays illustrate successful reduction of the intra-thoracic stomach. Paraesophageal hernias are uncommon, comprising only 5% of all hernias that occur through the esophageal hiatus. An intrathoracic stomach occurs when a large portion of the stomach herniates through the hiatus and can result in serious complications, including volvulus, gangrene and perforation. The most common clinical presentation is reflux and post-prandial chest pain. Diagnosis is normally made through fluid levels on a radiograph or with cross sectional imaging. Treatment is surgical if patients have symptoms. If obstruction is present, emergent open or laparoscopic reduction and repair are indicated. **DISCUSSION:** ST elevation is seen in myocardial infarction but also occurs in the setting of many other conditions, including gastrointestinal pathology such as acute pancreatitis. This case serves to broaden our differential for ST elevations in patients with known hiatal hernias.

**Polycythemia Vera Stroke**

A 55 year old man with a past medical history of tobacco abuse, laryngeal squamous cell cancer status post radiation, chronic back pain and alcoholism presented to the ED 1 day following discharge from hip replacement with acute onset of shortness of breath, confusion and combative. In the ED, his BP was 181/94, HR 120, temperature 99.7°F breathing 100% on room air but was noted to be in respiratory distress. CBC was normal (Hgb 15 g/dL), Na of 129, ethanol level of 0.004 g/dL, elevated lactate of 4.2 mmol/L and sinus tachycardia (rate 117) on EKG. He was sedated, intubated and transferred to the ICU. Etiology of altered mental status was felt most likely related to alcohol withdrawal but a head/chest/abdomen/pelvis CT revealed ischemic infarction of the bilateral posterior parietal, occipital lobes and basal ganglia as well as splenic infarctions. Lumbar puncture obtained and negative. Infarcts were felt likely embolic but MRA, TEE, lower
extremity Doppler were all negative and there was no atrial fibrillation. Comprehensive hypercoagulability workup was negative. His mental status improved throughout his stay, he was discharged home (declined transition care) after 7 days with aspirin, atorvastatin, and metoprolol. On 7/19 his mother brought him to the ED with confusion, right lower extremity weakness, and right pronator drift. Ethanol was undetectable, Sodium was 130, and hemoglobin was 18 g/dL. Head CT was repeated with prior infarcts noted but interval increased size in the left frontal lobe and right caudate. He was admitted and on day 2 his hemoglobin was noted to be 19.2, erythropoietin level obtained to rule out secondary erythrocytosis was normal. Phlebotomy was instituted (goal hematocrit < 45%) and JAK-2 V617F mutation analysis was positive. The patient still has significant cognitive deficits but has reportedly improved. He’s living with his parents and getting outpatient therapies. Polycythemia Vera is a chronic myeloproliferative disorder of erythrocyte production (hgb > 18.5 g/dL in males and > 16.5 g/dL in females). It can occur in any ethnicity and has no gender preference and occurs at any age although median age at diagnosis is 60. Incidence is 0.6-1.6 per million people. Classically, presentation includes pruritis, erythromelalgia, transient vision disturbances, gout, splenomegaly, arterial or venous thrombus, but is most commonly found upon asymptomatic screening. Although elevated hemoglobin is required for the diagnosis, one should consider PV in the differential of CVA despite a normal hemoglobin, especially if recent surgical blood loss could lower hemoglobin into the normal reference range.

Brianna Johnson-Rabbett, MD, Ameer Khowaja

**SIRS post zolendronic acid infusion**

Bisphosphonates are widely used primarily in the treatment of osteoporosis and generally tolerated without significant adverse events though mild acute phase reactions are common with administration of intravenous agents. Acute phase reactions may include fever, musculoskeletal complaints, gastrointestinal symptoms, eye inflammation, and general complaints including fatigue. A 63 year old woman with a relevant PMH of DM2 and HTN developed fever, headache and myalgias about 8 hours after zolendronic acid infusion. Approximately 24hrs post infusion, the patient was brought into the ED by ambulance with progressive weakness and confusion. In the ED, pt was found to be tachycardic, hypertensive, and febrile with a non-focal neuro exam. A lactic acidosis was noted. CT head was negative for acute pathology. LP was performed given concern for meningitis and antibiotics were initiated. A dose of decadron was also administered and infectious workup was concerning for both meningitis and bacteremia. Pt initially appeared to improve but then developed acute hypoxemic respiratory failure requiring intubation and cardiogenic shock requiring pressors. High dose steroids were restarted and pt stabilized. Infectious workup was ultimately found to be negative for infectious source. Pt had an extended hospital course given time on the ventilator as well as acute kidney injury requiring dialysis, persistent encephalopathy and hemoptyisis. She was discharged to rehab breathing independently, off dialysis, and with improving mental status on a continued slow steroid taper and in later clinic follow up mental status had returned to baseline. Of note, this patient had previously
been noted to have side effects of arthralgias/myalgias with initial and one subsequent administration of alendronate in the past though the most recent previous dose was tolerated without incident. Although mild acute phase reactions have been found to occur in approximately 40 % of pts administered zoledronic acid, as demonstrated by this case it is possible that SIRS that may occur and be incorrectly attributed to an infectious source. Given that there is evidence that appropriate treatment for this SIRS reaction is steroids as demonstrated by this patient’s recovery after steroid administration, it is important to have a high index of suspicion for an adverse reaction attributable to IV bisphosphonates when patients present post administration with SIRS.

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<th>Daniel Johnsrud, MD, Tamara Buechler, MD</th>
<th>As If Meth Wasn’t Already Bad Enough</th>
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| A 26 year old man presented to the emergency department with an acute worsening of pleuritic chest pain which had been present for the past 5 days. He also reported associated exertional dyspnea. Vital signs were significant for mild tachycardia and initial physical exam was unrevealing. Electrocardiogram showed concern for right heart strain and a chest CT with contrast was obtained to evaluate for pulmonary embolism. Surprisingly, the study revealed pneumomediastinum. He was admitted to the general medicine service for pain control as well as continued observation. Pain was managed with acetaminophen and tramadol and patient’s vitals remained normal and stable. Pleuritic pain had significantly diminished by the next day and patient was discharged with advisement to present to the nearest emergency department with any increasing problems breathing. Further history revealed that the patient had one week earlier engaged in a 3 day period of methamphetamine use consisting of smoking, ingesting and nasal insufflation. Patient denied holding inhalation or any Valsalva type maneuver while administering the drug. He denied regular methamphetamine use noting that this three day period was only his second overall episode of usage. He notably also reported an underlying history of cigarette smoking with a 4 pack year history as well as current usage. He additionally reported that his occupation was as a construction worker – more specifically laying asphalt. This had chronically placed him in contact with both dust and fumes and he did not use any form of mask or respiratory protection while on the job. Upon dismissal, it was strongly suggested that the patient should avoid methamphetamine use in the future. Smoking cessation was also advised as well as the suggestion that he enquire with his employer regarding the necessity of respiratory protection. Discussion: Pneumomediastinum is a rare complication of illicit drug use regardless of substance type. While it has more commonly been reported secondary to cocaine use, two recently published case reports describe pneumomediastinum following mephedrone inhalation, an illicit stimulant which is similar to methamphetamine. Both describe a similar history with symptoms developing roughly 2 or 3 days following substance use with a benign course. However, it is unclear to what extent methamphetamine use contributed to development of pneumomediastinum in our patient. With the current prevalence of methamphetamine use internists, emergency medicine physicians and radiologists should be aware of this association. Clinical decisions to
obtain advanced imaging and subsequently pursue hospital admission may be influenced in patients reporting recent inhalation of methamphetamine.

Magdalena Kappelman, MD, Sara Erickson, MD

**Bleach and the brain: both react poorly to ammonia (the catastrophic effects of a late initial presentation of a urea cycle disorder)**

Up to 50 percent of initial presentations of urea cycle disorders occur outside of the neonatal period. Adult onset presentations are becoming more recognized causes of altered mental status in patients with severe hyperammonemia unrelated to liver disease. If recognized early, up to 80 percent of patients will survive severe hyperammonemia if ammonia scavengers or hemodialysis are initiated promptly. Unfortunately, in adult presentations, there are often co-existing medical conditions that can precipitate a catabolic crisis and distract the clinician away from the underlying decompensated urea cycle disorder. For example, there are case reports describing initial presentation of urea cycle disorders in adults with gastrointestinal bleeding, pancreatitis, recent administration of steroids, post-gastric bypass surgery, and septic shock. This case report describes a late initial presentation of a urea cycle disorder in an adult, and the devastating consequences of severe hyperammonemia. Case: The patient was a 60-year-old woman with fibromyalgia who presented to an outside hospital after being found unresponsive with seizure-like activity at home by her son eight hours after she complained of not feeling well over the phone. Emergency medical services found the patient with an undetectable glucose level and a Glasgow coma scale score of 3. She was intubated on scene, brought to the outside hospital, started on empiric therapy for bacterial meningitis, and transferred to a tertiary care facility. The initial head computed tomography done at the outside hospital was normal. On admission to the tertiary care facility, she was hypotensive, requiring pressors, as well as hypothermic and hypoglycemic. An ammonia level was 400 µmol/L, increasing to 999 µmol/L over four hours. Her liver function tests were normal and a valproic acid level was negative. She was started on IV glucose infusion, arginine, carnitine, sodium benzoate, and emergency hemodialysis was initiated. Despite a rapid decrease in her ammonia level, the patient had a further decline in her neurologic function, a CT head confirmed progressive herniation, and her family decided to withdraw support. Confirmatory lab results returned post-mortem confirming the diagnosis of late initial presentation of a urea cycle disorder, suspected to be precipitated by septic shock. Discussion: Urea cycle disorders are uncommon, but late initial presentations do occur, and it is essential for internists and intensivists to be able to diagnose patients with these disorders rapidly in order to provide expeditious, life-saving treatment. This case highlights the confounding medical comorbidities that can lead to a catabolic state and precipitate a urea cycle disorder crisis. It also serves to review an algorithm for diagnosis and management of an adult presentation of a urea cycle disorder.

Paul Karagiannis, MD

**Villains don't take Vacation**

A 66 year old previously healthy female presented to Urgent Care with complaints of several days of malaise and chills after recent travel to
Florida, and was treated empirically for influenza. Symptoms persisted and worsened. In the emergency room the patient was found to be febrile, tachycardic, hypotensive and requiring 2 liters of oxygen to maintain saturations. Examination was remarkable for basilar crackles and ecchymoses over the right buttock, a chest roentgenogram revealed a questionable right lobe infiltrate. Labs revealed a microcytic anemia, thrombocytopenia, hyponatremia, significant metabolic acidosis and a modest mixed hepatocellular/cholestatic injury pattern. The patient was resuscitated with saline and ceftriaxone and azithromycin started for empiric community acquired pneumonia after blood cultures were drawn. Given ongoing hypotension despite fluid administration and hematoma at the sites of intravenous line placement, labs were resent, which revealed a lactate of 24, INR of 10 and a fibrinogen of 60. Plasma was urgently administered, but unfortunately the patient developed worsening hypoxemic respiratory failure requiring intubation and was transferred to the University. Antibiotics were broadened, femoral access was obtained and labs redemonstrated disseminated intravascular coagulation and profound hyperlactemia, alongside leukoerythroblastic smear with elevated lactate dehydrogenase, uric acid and reticulocytosis. Blood cultures returned positive for gram positive cocci and the patient was treated aggressively for septic shock. Despite rapid resolution of shock physiology, the patient demonstrated worsening anion gap metabolic acidosis and kidney injury, alongside florid DIC and evidence of tumor lysis. Noncontrast computed tomography revealed hepatosplenomegaly, infiltrates and effusions and mild mediastinal lymphadenopathy. Hematology was consulted, who started prednisone and rasburicase for a presumed malignancy. An urgent bone marrow biopsy was with normal trilineage hematopoiesis and no evidence of hematophagocytosis, and flow cytometry was without evidence of aberrant myeloid or lymphoid antigen expression but with a mildly increased NK cell population. Three days after transfer the patient remained febrile but normotensive but intubated and critically ill with florid DIC, worsening cholestasis and an unmeasurably-high lactic acid. Endobronchial and endoscopic ultrasound and biopsy of several nodes were unrevealing. Given the gravity of the situation, CHOP was administered for a presumed cryptic aggressive lymphoma after temporary dialysis access was obtained given the high risk of tumor lysis. Consideration was given for possible HLH and empiric etoposide and dexamethasone, dosed-reduced for renal and hepatic injury, but was deferred. Ultimately the decision was made to pursue liver biopsy despite the coagulopathy, to determine a diagnosis, which revealed the causative entity. NK Cell Lymphomas are dangerous aggressive malignancies with a predilection for unusual presentations, but remain rare thankfully. However this entity must remain in the differential in the setting of cryptic lymphomas.

**Faraz nasim Kazmi, MD, Amina Adil, Umama Saleem Adil,**

**Acute Kidney Injury: Is there more to the story?**

A 51 year old lady with presented to the hospital 3-4 weeks of ongoing vomiting and diarrhea. On admission she was noted to have acute kidney injury which was suspected to be due to dehydration and hypovolemia. Work revealed a bland urinalysis and no sign of post renal
disease. Her creatinine did not significantly improve with aggressive fluid resuscitation. Renal ultrasound did not show any hydronephrosis but revealed enlarged kidneys bilaterally (17cm) with exaggerated corticomedullary differentiation. She was also noted to have a 1.5 grams per day of proteinuria. A nephrology consultation was obtained and she underwent a renal biopsy which revealed Burkitt’s lymphoma. A PET CT was obtained which showed wall thickening of the stomach and duodenum consistent lymphoma with which would explain the patient’s diarrhea. Interestingly, there were no discrete set of lymph nodes involved. No CNS or bone marrow involvement was noted. She was subsequently started on chemotherapy and has just completed cycle one of chemotherapy. Burkitt’s lymphoma can present in an atypical pattern as seen with this case. The patient presented with GI and renal involvement with Burkitt’s lymphoma. Am important clue to the diagnosis in this case were the enlarged kidneys noted on imaging which prompted further workup. Further workup is pivotal with such a presentation since it may be a sign of a much more concerning process even in the absence of AKI.

### Bug Story - Strongy and Snaily

A 43-year-old previously healthy man presented to primary care clinic for acute onset left lower quadrant pain associated with low grade fever. He denied any diarrhea, hematochezia, melena, nausea or vomiting. Past medical history was unremarkable, he took no medications, and had no allergies. His family history was unremarkable. He lived with his wife in St. Paul, Minnesota. He had immigrated from Ethiopia two years ago, and moved here under sponsorship from his wife. He drank beer occasionally, smoked 8 to 10 cigarettes per day, and denied any other drug use. On exam, his vitals were within normal limits. Head, neck, oral, cardiovascular, and pulmonary exams were unremarkable. No skin rash were noted. Bowel sounds were active and normal, no splenomegaly or hepatomegaly was noted. Left lower quadrant tenderness on palpation was present without rebound tenderness. On labs, BMP was unremarkable, CBC with mildly elevated white count with normal differential. Clinical diagnosis of diverticulitis was suspected, and was treated empirically with ciprofloxacin and metronidazole. Patient had no improvement and returned to clinic a few days later. CT with IV-contrast revealed soft tissue thickening around the left colon with mural thickening, most consistent with colitis. Stool studies were sent which showed Strongyloides larva. He was also screened for schistosomiasis, IgG was positive. Patient was not immunocompromised. He was treated with oral ivermectin as well as praziquantel with resolution of symptoms. Discussion: In the United States, strongyloidiasis (Strongyloides stercoralis) and schistosomiasis (Genus Schistosoma) are most commonly seen in immigrant populations from endemic regions or in travelers with exposure to these regions. These parasites can have chronic infectious course, and can have various clinical manifestations. Chronic strongyloidiasis may present as abdominal pain, postprandial fullness, heartburn, constipation and intermittent diarrhea. Because asymptomatic strongyloides infection may persist for decades after initial infection, change in immune status associated with conditions such as the
administration of immunosuppressive drugs may result in hyperinfection syndrome which has high mortality. Similarly, chronic schistosomiasis may present as abdominal pain, hepatomegaly, hematuria, and urinary difficulties. It may cause granulomatous reactions which manifest as colonic polyps, portal hypertension, cystitis with risk of progression to bladder cancer, and glomerulonephritis. Therefore, differential-diagnosis for abdominal pain for patients from endemic regions should include parasitic infection in addition to other common etiologies, regardless of the duration of residence in the United States. Although eosinophilia is a common finding in patients with chronic parasitic infection, it is an unreliable way to rule out these infections. Patients who have immigrated from endemic region, especially those who have not been pretreated or undergone new arrivals screening test (unlike refugee population who typically have these done) should be screened and treated, even if asymptomatic.

Bryan Kelly, MD, Christopher Stephenson M.D.; Deanne Kashiwagi M.D.

Cefepime: a Cause of Myoclonus and Encephalopathy

Cefepime neurotoxicity is an adverse reaction of cefepime use with symptoms including encephalopathy, myoclonus, seizures, and coma. A 60 year old man with a history of chronic kidney disease, aortic valve prosthesis, and Streptococcus mutans endocarditis with recent pacemaker infection treated with cefepime presented with myoclonus and encephalopathy. He had previously been treated with ceftriaxone, but was switched to cefepime due to rising alkaline phosphatase. On the final day of his antibiotic therapy, he presented with decreased urine output, full body myoclonus, generalized weakness, and difficulty with word finding and enunciation. His creatinine was elevated at 4.1 mg/dL, up from his baseline of 1.9 mg/dL, and his BUN was elevated at 74 mg/dL. BUN had previously been elevated to 87 mg/dL a month prior to admission during which he was asymptomatic. He was admitted to the general medicine service for further management of his neurological symptoms and concern for cefepime neurotoxicity. He continued to have adequate urine output and his BUN remained stable, however his myoclonus persisted. By hospital day two, his mental status deteriorated, he became euphoric and disinhibited with visual hallucinations overnight. By hospital day three, he trended toward somnolence. EEG was obtained which showed diffuse slow wave abnormalities and no epileptogenic activity. Nephrology opted to pursue hemodialysis due to concern for cefepime induced neurotoxicity. He underwent hemodialysis on hospital day three, and following this therapy, had improvement in his encephalopathy and myoclonus. Another session of hemodialysis was performed on hospital day four with resolution of myoclonus and encephalopathy. Further evaluation of his acute kidney injury demonstrated mixed glomerulosclerosis and severe acute tubular necrosis, and he remained on intermittent hemodialysis for two weeks as his renal function slowly improved. Cefepime is a 4th generation cephalosporin that is excreted 85% unchanged by the kidneys, and requires altered dosing in those with impaired renal function. Patients with underlying chronic kidney disease or acute renal failure may be predisposed to cefepime neurotoxicity, and may present with a variety of symptoms including confusion, disorientation, hallucinations, agitation, myoclonus,
convulsions, non-convulsive status epilepticus and coma. Discontinuation of cefepime has been reported to reverse neurotoxicity, but if there is no improvement or if symptoms worsen, trial of hemodialysis may offer benefit.

| Edward Krajicek, MD, Dr. Rekha Mankad | Streptococcal STEMI: A case of infectious ACS |

Chest pain is an exceedingly common patient complaint resulting in approximately 6 million Emergency Department visits each year with acute coronary syndrome (ACS) making up approximately 12-15% of those cases (1). ACS is the clinical manifestation of acute myocardial ischemia and is most often secondary to coronary artery stenosis or thrombosis by atherosclerotic plaque accumulation or rupture. Less frequently it can be due to embolic phenomena. This is the case of an embolic transmural myocardial infarction secondary to septic emboli from a valvular vegetation. A 60 year old woman with a history of nonalcoholic steatohepatitis (NASH) cirrhosis complicated by portal hypertension with esophageal varices, DMII, and hypertension presented to the hospital after a transient episode of altered mental status. She noted several months of feeling unwell with nausea, vomiting, abdominal pain, fatigue, and worsening dyspnea on exertion. Upon presentation she was tachycardic but otherwise vitally stable. Her physical examination was pertinent for a new IV/VI systolic ejection murmur. A transthoracic echocardiogram visualized a vegetation on the aortic valve with mild aortic regurgitation. Blood cultures grew Strep salivarius confirming a diagnosis of endocarditis by Duke Criteria. Intravenous antibiotic therapy was tailored based on susceptibilities. She did well and was discharged with IV antibiotics and continued to do well as an outpatient. Three weeks after discharge she developed acute onset of chest pain with EKG findings consistent with an inferior ST-elevation myocardial infarction (STEMI). She underwent emergent coronary angiogram which showed minimal coronary artery disease outside of a 100% occlusion of her right coronary artery. Subsequently a followup same-day emergent thrombectomy was performed along with balloon angioplasty at the embolic site. The procedure was well tolerated and the clinical situation stabilized after the intervention. Pathologic examination of the embolic specimen showed “numerous Gram-positive cocci, consistent with previous blood cultures, admixed with a neutrophil-rich fibrin thrombus” consistent with a septic embolus. She subsequently underwent aortic valve replacement without any significant postoperative complications. This case involves two relatively common pathologies linked by a rare shared presentation. Ischemic heart disease represents a major epidemiologic burden both in this country and around the world. However, this is overwhelmingly due to complications of atherosclerotic vascular disease; embolic disease is much less frequent. In fact, only 4-7% of acute myocardial infarctions have been attributed to non-atherosclerotic factors (2). Furthermore, infective endocarditis, while not pervasive, is by no means rare and septic emboli are a feared complication. While similar cases have been reported in the literature (3,4), this case represents a rare clinical circumstance at the intersection of two relatively common pathologic entities and illustrates that endocarditis can continue to have drastic consequences even while
Occult colorectal adenocarcinoma presenting as Clostridium septicum bacteremia

Clostridium septicum is a rare infection commonly associated with colorectal and hematologic malignancies. It is known to cause myonecrosis at sites distant to initial infection. Given its virulence, particularly related to toxin formation, it can quickly be fatal. Case presentation: A 61-year-old male with history of non-insulin dependent diabetes and asthma presented to the Emergency Department (ED) with two days of worsening abdominal pain, one day of constipation, and oliguria. On review of systems, he endorsed a forty pound weight loss over the previous six months, which he had attributed to improved control of his diabetes. Vital signs were significant for an initial blood pressure of 103/68 and sinus tachycardia of 116; other vital signs were normal. Physical exam revealed a firm, diffusely tender abdomen, tenderness of the right shoulder and crepitus of the left buttock. His torso, extremities, and groin were covered with a coalescing erythematous maculopapular rash. Laboratory evaluation was most remarkable for an anion gap of 22 with lactate of 9.9 mmol/L, BUN 56 mg/dL, and creatinine 2.2 mg/dL. A non-contrast CT abdomen pelvis showed pneumatosis of the cecum and ascending colon, portal venous gas, free air within the peritoneum and pelvic soft tissues, and possible psoas abscess. There was also air in the left common femoral vein, prompting CT of the chest to evaluate for air embolism, which showed emphysema of the right shoulder without abscess formation. He was empirically started on vancomycin, meropenem, and clindamycin. He underwent emergent laparotomy, right hemicolectomy, and end-ileostomy. Blood cultures grew Clostridium septicum and pathology from the right colon eventually showed adenocarcinoma. Post-operatively, he developed worsening renal failure, necessitating intermittent hemodialysis, but otherwise he did well. Despite initial concern for myonecrosis of his shoulder and buttock, both improved markedly with antibiotics, so surgical intervention was avoided. Discussion: Clostridium septicum accounts for only 1% of all reported clostridial infections. It is thought that this bacteria spreads to the bloodstream at sites of mucosal injury and is often associated with colorectal malignancy. It can then cause myonecrosis at sites distant to the initial insult. With a 60% mortality rate, early antibiotics are important and surgical source control are vital. C septicum is nearly uniformly susceptible to penicillins, though clindamycin is an important adjunct as it inhibits bacterial toxin production. As in this patient, it is important to maintain a high level of suspicion for occult malignancy, as C septicum bacteremia may be the first clue to presence of a malignancy.

Lactobacillus endocarditis and septic arthritis as identified by 16s ribosomal gene sequencing

Lactobacillus is a Gram positive bacteria commonly found in the oral cavity, gastrointestinal tract and vaginal flora; Lactobacillus has rarely been implicated in endocarditis, and more rarely in septic arthritis. A 51 year old patient with type II diabetes and chronic kidney disease was
admitted with swelling of his left shoulder with associated fevers and leukocytosis; synovial aspirate was inflammatory but cultures showed no bacterial growth. He was noted on echocardiogram to have a VSD with an echogenic mass along the muscular septum consistent with a vegetation, meeting Duke Criteria for endocarditis. Blood cultures grew Lactobacillus jensenii initially thought to be a contaminant as Lactobacillus is a rare cause of endocarditis, and an even rarer cause of septic arthritis. However, synovial aspirate 16s ribosomal PCR returned positive for Lactobacillus, confirming this as the likely offending pathogen. The patient was treated successfully with a course of Penicillin G, with decreasing size of his cardiac vegetation and negative subsequent blood cultures. This case demonstrates Lactobacillus as an interesting and relatively rare pathogen implicated in both septic arthritis and endocarditis as confirmed by 16s ribosomal gene sequencing, a novel tool to identify bacterial isolates.

Jean Lenz, MD, Jennifer Kleinman Sween MD

Gentamicin beads: Benign treatment of joint infections or potentially toxic therapy?

An 84-year-old female with a past history of atrial fibrillation, type 2 diabetes, chronic kidney disease stage III and congestive heart failure presented eighteen days post cephalomedullary nailing of an intertrochanteric hip fracture with hypoxic and hypercapnic respiratory failure, agitation, and confusion. She was found to have purulent drainage from her hip incisions and was started on vancomycin and aztreonam. She underwent irrigation and debridement of a superficial wound infection with implantation of fifteen gentamicin-polymethylmethacrylate (PMMA) beads, which were subsequently removed three days later during a repeat irrigation and debridement procedure. She did have transient hypotension during the second procedure and was fluid resuscitated. Post-procedurally she received aggressive loop diuretic therapy for volume overload. In the following days she subsequently experienced progressive oliguria and increasing creatinine levels from a baseline of 1.2 to a peak of 3.7. Urine studies were consistent with acute tubular necrosis. A serum gentamicin level was found to be 0.6 mcg/ml (normal <0.4 mcg/ml) three days following removal of the beads. Ultimately her acute tubular necrosis and renal failure was felt to be multifactorial, related to transient hypotension, loop diuretics, and nephrotoxicity due to gentamicin and recent contrast dye. Her family opted to forgo hemodialysis and she expired one week after discharge. Discussion: Gentamicin-PMMA beads have been commonly used in the treatment and prevention of orthopedic infections since they were introduced in the 1970s. Initial pharmacokinetic studies suggested local application of beads allowed for high concentration of antibiotic at the site of infection without systemic absorption and the risk of toxicity. Despite widespread use, however, a recent systematic review found that no prospective studies have proved gentamicin-PMMA beads to be more effective than parenteral antibiotics. Moreover, there is growing concern that there is indeed significant systemic absorption of gentamicin that can lead to toxicity. A recent prospective study of patients who received the beads for infected hip joints found 91% of patients in the study had detectable serum levels of gentamicin, and levels greater than 0.4 mcg/ml were
associated with nephrotoxicity. Conclusion: Gentamicin-PMMA beads are a commonly used therapy for orthopedic wound infections due to their perceived ability to provide high local concentration of antibiotic without systemic toxicity. As seen in this patient, however, detectable gentamicin serum levels can be found after exposure to gentamicin-PMMA beads. It is important to consider the potential adverse effects such as nephrotoxicity prior to implanting the beads, particularly in elderly patients with comorbidities and decreased renal function.

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<th>Clarence Li, MD, Yogesh N. V. Reddy, MBBS, Crystal Bonnichsen, MD</th>
<th>Fat Embolism Syndrome: A Bread and Butter Postsurgical Complication</th>
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| Small fat emboli occur in many patients with long bone fractures, and are usually asymptomatic. Rarely, these emboli cause multisystem dysfunction, referred to as fat embolism syndrome. Diagnosis remains challenging given the syndrome’s rarity, variability of clinical presentation, and nonspecific imaging and laboratory findings. A 62 year old woman presented to the emergency department after a mechanical fall onto her left hip. She had been in her usual state of health earlier that day, but after the fall she experienced intractable leg pain and was unable to bear weight on her left hip. She denied any chest pain, dyspnea, palpitations, light-headedness, or dizziness prior to the event. Her initial physical exam revealed evidence of severe left hip tenderness and pain with motion. X ray of the left hip revealed a left intertrochanteric hip fracture, and she underwent prompt surgical internal fixation. Overnight, the patient became acutely short of breath and became hypoxic, somnolent, hypotensive, and tachycardic. Reexamination showed a right ventricular heave on precordial palpation with a non-displaced point of maximal impulse, elevated jugular venous pressure, diffuse bilateral crackles on pulmonary examination, and cool extremities with a weakly palpable pulse. Electrolyte panel, CBC, and EKG were unrevealing. A mild troponin elevation of 0.02 was noted. Chest x-ray showed bilateral pulmonary infiltrates without pleural effusion. CT of the chest showed findings consistent with pulmonary edema without evidence of pulmonary embolism. The patient’s respiratory status continued to decline, and she was intubated and transferred to the ICU. An echocardiogram showed severe right ventricular dysfunction, acute severe tricuspid regurgitation, and a hyperdynamic left ventricle with an ejection fraction of 70%. A Swan-Gantz catheter was placed, which showed findings consistent with cardiogenic shock with a normal pulmonary capillary wedge pressure, suggesting acute respiratory distress syndrome as the cause of the infiltrates. There was a concern for superimposed pneumonia, and a bronchoalveolar lavage was performed, which showed 100% lipid laden macrophages. Ultimately, in the context of the patient’s very recent surgical history, hemodynamic profile, imaging findings, and bronchoalveolar lavage results, the diagnosis of fat embolism syndrome was made. The patient continued to receive supportive care, and her respiratory status and right ventricular function gradually recovered. The diagnosis of fat embolism syndrome remains challenging. Classically, the triad of presenting symptoms is hypoxemia, neurologic abnormality, and petechial rash in the setting of recent trauma or surgery, but this is not
present in all patients. This case highlights importance of prompt supportive efforts and escalation of care in reducing morbidity and mortality from the condition, which can progress rapidly. Additionally, the case illustrates how interconnected physiologic clues can aid directly in making a diagnosis in the absence of pathognomonic findings.

Lucy Lin, MD, Kathleen Lane, MD; Chetan Shenoy, MBBS

Holiday Heart Syndrome... or Something More Sinister?

Atrial fibrillation (AF), the most common type of cardiac arrhythmia in adults, is rarely seen in young healthy individuals. “Holiday heart syndrome” was first described in 1978 as AF noted in healthy men after binge drinking of alcohol during the holiday season. A 28-year-old male body-builder with no significant medical history presented to his primary care physician with three days of fatigue, lightheadedness, shortness of breath, and palpitations that started after partying and binge drinking with his friends. An electrocardiogram revealed AF, which was presumed to be secondary to his binge drinking. Given his young age and prior health, he was prescribed oral metoprolol as an outpatient and scheduled to see a cardiologist. At his cardiology appointment two days later, he was still symptomatic, and an electrocardiogram showed AF with rapid ventricular response in the 140-150s, frequent premature ventricular contractions (PVCs), and brief runs of nonsustained ventricular tachycardia. An echocardiogram showed extreme beat-to-beat variability of systolic function with moderately reduced left ventricular ejection fraction. Given his tachycardia, frequent PVCs and moderately reduced left ventricular ejection fraction, he was hospitalized. He was started on a heparin drip and an intravenous esmolol drip for rate control after failing to respond to metoprolol and digoxin. With the esmolol drip, he developed symptomatic hypotension and his ventricular rate remained high. He then had a transesophageal echocardiogram that ruled out intracardiac thrombus, followed immediately by direct current cardioversion with restoration of normal sinus rhythm. He was discharged with a recommendation to avoid binge drinking. He followed up with cardiology a few days later and had a cardiac magnetic resonance imaging (MRI) to evaluate the possible reduced left ventricular function. The MRI showed extensive left ventricular subepicardial hyperenhancement with associated edema, consistent with acute myocarditis. Further inquiry revealed a one-week history of upper respiratory symptoms prior to the start of his presenting symptoms. This case illustrates the potential for clinicians to be led astray by cognitive bias. While the initial presentation of AF in a 28-year-old healthy male after binge drinking suggested holiday heart syndrome, there were clues in his presentation and clinical course to suggest something more serious: frequent PVCs, runs of nonsustained ventricular tachycardia, moderately reduced left ventricular function, failure to respond to metoprolol and digoxin, and symptomatic hypotension to intravenous esmolol. Clinical reasoning relies heavily on pattern recognition of elements within illness scripts. This allows for rapid diagnosis of clinical presentations that match preformed illness scripts. However, if clues emerge that do not fit the working diagnosis, it is important to methodically search for additional explanations to
avoid premature closure. When cognitive biases such as premature closure interfere with proper diagnostic reasoning, patients may be misdiagnosed and undergo inappropriate medical treatment.

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<th>Susan Lou, MD</th>
<th><strong>A Case of Heyde’s Syndrome</strong></th>
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<td>Heyde’s Syndrome is a syndrome of gastrointestinal bleeding secondary to angiodysplasia in the presence of aortic stenosis, named after the physician, Dr. Edward Heyde, who first noted the association in 1958.</td>
<td>Case: A 68-year-old man was admitted for 1 week of fatigue, dyspnea on exertion, and melena. His past medical history was significant for heart failure with preserved ejection fraction, atrial fibrillation on warfarin, obstructive sleep apnea, history of cerebral vascular accident, iron deficiency anemia requiring frequent iron transfusions, and severe aortic stenosis. He was found to have acute on chronic anemia and stabilized with transfusions of packed red blood cells. Esophagogastroduodenoscopy and colonoscopy were negative for bleeding. Outpatient capsule endoscopy demonstrated small submucosal hemorrhages in the small bowel. Discussion: The patient was diagnosed with Heyde’s Syndrome based on his severe aortic stenosis and submucosal hemorrhages (angiodysplasia). The gold standard for diagnosis is gel electrophoresis, in which these patients would have absent large molecular weight von Willebrand factors from the SDS-agarose electrophoresis plate. The proposed mechanism of bleeding is two fold: 1) decreased GI perfusion secondary to severe AS leading to hypoxia-induced dilation of the blood vessels, thus hastening the development of fixed vasodilation and genesis of angiodysplasia, 2) degeneration of vWF multimers via high shear stress across the stenotic aortic valve, leading to acquired von Willebrand’s disease (Type 2AvWF disease). VWF is most active in vascular beds with high shear stress, including angiodysplasias, and deficiency of vWF increases the bleeding risk from these lesions. The treatment of Heyde’s syndrome is replacement of the stenotic aortic valve, with the majority of GI bleeds resolved or significantly reduced. However, in refractory cases, there are also successful case reports with octreotide.</td>
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<th>Lan Luu, MD</th>
<th><strong>It's Not Just a Clot!</strong></th>
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<td>Recurrent arterial thrombosis is a serious clinical diagnosis that can affect many organ systems. Patients can present with an array of signs and symptoms that can mimic other disease processes that may not prompt clinicians to pursue further work up. It is also essential to evaluate the potential causes of recurrent arterial thrombosis for long-term management. This vignette describes a 48-year-old Saudi Arabian man with past medical history significant for myocardial infarction status post stent placement 8 years ago, left sided stroke 3 years ago, and recent diagnosis of irritable bowel syndrome who presented to a local hospital with acute on chronic lower abdominal pain. Upon further history gathering from the patient, he also had four months of progressive leg weakness and low back pain, trouble with his vision for the last week and episodes of unexplained syncope for the last few years. Of note, he has not been taking his cardiac medications for many years. Examination showed an ill appearing man with mild left lower quadrant abdominal and left flank tenderness, faint femoral pulses bilaterally and non-palpable dorsalis pedis and posterior tibial pulses.</td>
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bilaterally. He also had visual field deficits in the left lower quadrants and left facial droop (known deficit). Abdominal CT scan showed an acute left renal infarct and an occlusive thrombus in the infra-renal aorta with extensive collaterals suggesting that this is a chronic thrombus. Patient’s exam, history, and imaging findings prompted further work up for suspected vasculopathy and hypercoagulable state. Significant work up revealed an echocardiogram with reduced EF (35-40%) with left ventricular thrombus present, ESR 43 (Ref 0-5 mm/hr), CRP 88.3 (Ref 0-8.0 mg/L), RPR negative, Beta-2 glycoprotein antibodies negative, ANA 1:40, ANCA negative, dsDNA negative, Smith ENA antibody negative, cardiolipin antibody negative, and lupus anticoagulant positive (in the setting of heparin use). MRI brain was also done that revealed bilateral occipital subacute infarcts and MRA head and neck was unremarkable. Although this patient was positive for lupus anticoagulant, it was likely a contaminant from the patient being on heparin. Etiology of arterial thrombus in this patient is unknown at this time. He was treated with high intensity heparin and transitioned to warfarin prior to being discharged. This patient will require follow up with ophthalmology, cardiology, neurology, hematology and vascular surgery to further address his complications. This case illustrates the complexity of arterial thrombosis and early recognition of the signs and symptoms could lead to effective management and prevention of further complications. Effective care coordination by a primary care provider will also be essential in long-term management and outcome for this patient.

Thomas Malikowski, MD, Rajiv Gulati, M.D., Ph.D.

Wellen’s syndrome: The impending ‘widow maker’
Wellen’s syndrome describes specific ECG abnormalities that signify impending cardiac disaster in a patient with intermittent chest pain. Characteristic findings include steep T-wave inversions in leads V2-V3 or biphasic T-waves in leads V2-V3. These subtle ECG changes correlate with severe proximal left anterior descending coronary artery stenosis and impending anterior myocardial infarction. Patients may be asymptomatic at the time of evaluation, and clinicians must be vigilant to recognize such a presentation as a cardiac emergency. Case Description: A 40-year-old Caucasian male with no prior medical history presented to the emergency department with intermittent chest pain. He characterized the pain as a pressure-like sensation and had experienced three episodes over the last two weeks. He reported no exacerbating factors. Prior to presentation, he had been playing golf with friends when he developed similar symptoms lasting one hour. He denied nausea, vomiting, shortness of breath, and diaphoresis. He reported he was a former smoker with a 20-pack year history and had a family history of coronary artery disease. On arrival to the emergency department, his symptoms had resolved. Vitals signs were normal, and physical exam was unremarkable. CBC and electrolytes were within normal limits. Troponin T levels were negative with no significant change over 6 hours. ECG showed biphasic T-waves in leads V2-V3. He was admitted to the ischemic cardiology service. Upon transfer to the cardiology floor, he developed severe stabbing chest pain that radiated to his left arm and neck. He underwent urgent coronary angiography and was found to have severe stenosis of the proximal left anterior...
### Discussion
This clinical vignette highlights a classic case of Wellen’s syndrome. It is imperative for clinicians to recognize the importance of this condition. The majority of patients with intermittent chest pain and either steep T-wave inversions in leads V2-V3 or biphasic T-waves in leads V2-V3 will develop life threatening anterior myocardial infarction within days. Given this risk, patients with Wellen’s syndrome should not receive stress testing and should proceed directly to coronary angiography.

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### Francesca Mazzulla, MD

**Severe pulmonary hypertension resolved after treatment of idiopathic myelofibrosis**

A 76-year-old female with primary myelofibrosis complicated by splenomegaly and refractory anemia requiring multiple transfusions presented with increasing oxygen requirements. Work up for her hypoxic resulted in a diagnosis of pulmonary arterial hypertension. The patient did not tolerate medical therapy for idiopathic myelofibrosis and empiric treatment for pulmonary microvascular infiltration of hematopoetic tissue with low-level radiation yielded no improvement of symptoms, including continued severe splenomegaly, anemia, and hypoxia. Subsequently, the patient started IV Flolan therapy. Treatment of her myelofibrosis with Ruxolitinib, a JAK2 inhibitor, reduced the patient’s splenomegaly and normalized her pulmonary arterial pressures. These data suggest aberrant Janus kinase (JAK) signaling may also mediate pulmonary hypertension through aberrant activity of nitric oxide (NO) produced through oxidative stress with upregulation of NADPH oxidase expression tissue ischemia, and as a result of activation of the inflammatory cascade and cytokine levels such as IL-4, IL-6, IL-8, TNF-α, and GM-CSF. JAK2 inhibitors such as Ruxolitinib may reduce this activity, and this pathway may provide a new therapeutic target for PH.

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### Isaac Meier, MD, Jawad Kiani, M.D.; Jacob Jentzer, M.D.; Richard Daly

**Lifesaving diagnosis of STEMI complication by contrast-enhanced echocardiogram**

A 65-year-old gentleman with a 60 pack-year smoking history but no prior cardiac disease or other documented major cardiovascular risk factors presented to the emergency room with persistent anterior chest discomfort of two days duration, associated with nausea, dyspnea, and orthopnea. Initial ECG showed ST elevation, Q-waves, and inverted T-waves in the inferior leads, so the patient was transferred emergently to our catheterization laboratory. Coronary angiography revealed total occlusion of the distal right coronary artery (RCA) and posterior descending artery (PDA) by thrombus. Thrombectomy was performed, opening the proximal and mid- PDA. A drug-eluting stent was deployed in the mid-RCA. The distal PDA and the right posterolateral artery remained totally occluded after percutaneous coronary intervention. The final angiogram showed TIMI-II flow consistent with distal no-reflow phenomenon. Following catheterization, the patient was admitted to the Cardiac Intensive Care Unit where he reported persistent chest pain. Repeat ECG revealed diffuse ST elevation consistent with pericarditis, which was treated with colchicine. He
developed complete heart block which later converted to atrial fibrillation, prompting initiation of heparin. His transthoracic echocardiogram (TTE) revealed worsening biventricular systolic function, extension of regional wall motion abnormalities, and a new small pericardial effusion. By hospital day two, the patient's chest pain had completely resolved. On the third night, he had recurrent chest pain and hypotension. Urgent TTE revealed an enlarging pericardial effusion with echogenic components, consistent with coagulum. His clinical status stabilized with fluid resuscitation and dopamine. The next morning he was asymptomatic and clinically stable. Repeat TTE with micro-bubble contrast demonstrated delayed appearance of contrast in the posterolateral pericardial space confirming the diagnosis of myocardial rupture. He was evaluated by cardiovascular surgery and taken urgently for repair. Intraoperative transesophageal echocardiogram confirmed a narrow communication from the basal inferior left ventricular wall to the pericardial space. Blood and clot were evacuated from the pericardium. No active bleeding was identified during the procedure. An epicardial patch was placed and secured with BioGlue. The remainder of the patient's hospital course was uncomplicated. He was discharged from the hospital in stable condition on postoperative day eight. Discussion: This case demonstrates the typical presentation of ventricular free wall rupture, a well-known and feared complication of myocardial infarction. The patient's delayed presentation, poor reperfusion, and initial ECG findings suggested a completed infarct at risk for mechanical complications. Contrast-enhanced echocardiography can be performed at bedside to help distinguish myocardial rupture requiring emergent surgical intervention from other causes of pericardial effusion. In this case, high clinical suspicion and use of contrast-enhanced echocardiography led to early detection and treatment of an often fatal complication. Confirming the diagnosis prior to complete rupture allowed for off pump, low risk surgery with epicardial patch.

David Melling, MD, Mohammad-Ali Jazayeri, Gautam R. Shroff, Domenico Calcaterra

A Case of Papillary Fibroelastoma: Small Tumor, Big Complications

Intro: Papillary fibroelastomas (PFEs) are rare, benign, cardiac neoplasms which can result in significant complications such as embolic stroke. Case description: A 48-year-old female with a past medical history of tobacco use, hypertension and diabetes presented with left leg weakness which she first noticed that morning. She was asymptomatic the night before. Upon arrival to the emergency department, the patient had a score of four on the NIH stroke scale. Tissue plasminogen activator was not administered as onset of symptoms was not clearly within the therapeutic window. Brain MRI demonstrated infarct involving multiple vascular distributions suggestive of embolic etiology. Transthoracic echocardiogram (TTE) did not reveal an embolic source. Transesophageal echocardiogram (TEE) was delayed by several days as the patient required extraction of numerous loose teeth before the procedure could safely be performed. During this period of time, the patient unfortunately developed new neurologic deficits, and repeat brain MRI confirmed new areas of infarct. When TEE was eventually performed, it showed a mobile, pedunculated mass on the systemic aspect of the aortic valve.
measuring 0.7 x 0.6 cm. The characteristics of this mass on TEE were most consistent with PFE. In light of this information, cardiothoracic surgery was consulted and the patient was started on therapeutic anticoagulation with heparin. She then underwent excision of the aortic valve mass while on cardiopulmonary bypass. Final pathology was consistent with PFE. The patient ultimately suffered significant neurologic deficits affecting her speech, swallowing, cognition and movement. Discussion: The prevalence of primary cardiac tumors ranges from 0.0017-0.28%. PFEs are the second most common type of primary cardiac tumor after myxomas. PFEs are benign tumors that most commonly involve the mitral and aortic valves. It is said that PFEs resemble a sea anemone due to their characteristic frond-like papillary tissue. PFEs can be clinically silent or they can cause complications such as stroke and myocardial infarction. It is unclear whether emboli are the result of the fragile papillary fronds themselves or thrombi that form on the surface of the tumor. Treatment of symptomatic PFEs is surgical excision. No consensus exists regarding management of asymptomatic patients. Echocardiography is part of standard evaluation in patients with cryptogenic stroke. This case demonstrates one of the advantages of TEE over TTE in detecting cardiogenic sources of thromboemboli. Moreover, it highlights the importance of a thorough investigation for a source of embolism including the carotid arteries, intracardiac structures, and the aortic arch. TEE may provide critically important information in this regard, and despite lack of consensus regarding its routine use, should be considered when an embolic source remains elusive.

Aimee Merino, MD

Hemophagocytic Lymphohistiocytosis, A rare cause of cholangitis. A 72 year old woman with no significant medical history presented to the emergency department with intermittent abdominal pain of two weeks duration and new-onset jaundice. She had significant cholestasis with minimal elevation of her liver enzymes. She became febrile and had leukocytosis. An ERCP was performed and evacuated purulent material from the bile duct; she was diagnosed with cholangitis. Despite decompression of the biliary tree and broad-spectrum antibiotics, her liver function tests continued to worsen and her white blood cell and platelet counts began to fall. Her white blood cell count eventually reached an undetectable level (<0.1). The patient was noted to have blood oozing from her oral mucosa and fibrinogen levels were low. A peripheral blood smear showed marked leukopenia, thrombocytopenia; and normochromic, normocytic anemia with occasional spherocytes. She had one blood culture that grew coagulase-negative Staphylococcus that was believed to be a contaminant. In light of her pancytopenia, it was clear that this was not a routine case of cholangitis and further work-up was initiated. A bone marrow biopsy was obtained and showed abundant hemophagocytic macrophages and histiocytic-predominant aggregates. Flow cytometric analysis performed on the bone marrow aspirate showed rare to absent B cells, increased CD4:CD8 T cell ratio, and rare to absent natural killer cells. Further laboratory testing showed a high ferritin, high triglycerides, and high soluble CD25 (IL-2 receptor). Based on the morphologic and laboratory findings, the patient was diagnosed with hemophagocytic
Lymphohistiocytosis (HLH). HLH is a disease caused by inappropriate activation of the immune system, uncontrolled activity of cytotoxic lymphocytes and histiocytes, and over-secretion of pro-inflammatory cytokines. It is a rare and potentially fatal disease. It occurs in familial forms with known genetic mutations, or may be induced by malignancy, infection, or rheumatologic conditions. A significant percentage of HLH cases, especially in adults, are idiopathic. It is unclear whether the one coagulase-negative Staphylococcus blood culture that the patient had on admission was a contaminant or a bacteremia that initiated the immune system activation. All testing for genetic, malignant, and rheumatologic causes were negative. After diagnosis the patient received treatment according to the HLH 2004 protocol with cyclosporine, etoposide, and dexamethasone. She survived the illness and was discharged. While HLH is uncommon and may not be immediately obvious, it should always be considered in patients presenting with biliary or hepatic dysfunction, especially if their disease worsens or is accompanied by cytopenias. Liver dysfunction is a common presentation of adult-onset HLH and the histiocytes can be found in hepatic and biliary tissue. Prompt diagnosis and treatment of the condition is necessary to improve patient survival.

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<th>Istiaq Mian, MD</th>
<th>A Role for Pediatric Chemotherapy in Adult T cell Lymphoblastic Leukemia</th>
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<td>Introduction The differential for an anterior mediastinal mass includes thymoma, germ cell tumor, lymphoma and thyroid tissue, often referred to as the “terrible T’s.” Thymoma tends to be the most common and these masses are often not detected until a workup for an unrelated symptom occurs. There are instances in which more than one etiology contributes to the clinical presentation. Case A 35 year-old woman with a history of tobacco use presented to the ED in July 2015 with chest pain and dyspnea after moving to a new house. She believed her pain was related her recent physical activity. Chest X-ray revealed a large left pleural effusion and follow-up CT showed a massive fat and calcium-containing anterior mediastinal mass with almost complete collapse of the left lung with rightward shift. Chest tube is placed and four liters of fluid is drained. Mediastinal mass biopsy suggests diagnosis of T cell lymphoblastic lymphoma and lymphocyte-rich type B1 thymoma. Bone marrow biopsy shows hypercellularity with 43% blast cells. She is started on a pediatric regimen of chemotherapy and PET scan 4 weeks later shows reduction in mediastinal mass size and resolution of pleural effusion. Discussion A mass lesion with &lt;25% bone marrow blasts defines T cell lymphoma. If &gt;25% bone marrow blasts, the neoplasm is classified as T cell acute lymphoblastic leukemia (ALL). In a patient with both T cell ALL and thymoma, preference is to treat the lymphoma given its aggressive nature in patients between ages 16-39. In retrospective studies, patients younger than 39 years old have better rates of 5-year event-free survival with pediatric protocols than with adult protocol treatment regimens.</td>
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<th>Cara Moen, MD</th>
<th>Vasonatremia</th>
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<td>Vasopressin is a commonly used vasopressor in the ICU setting. Despite its popularity, hyponatremia is a rarely seen complication. Case</td>
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Description: 63 year old woman with a past medical history significant for mechanical aortic valve chronically anticoagulated with warfarin, diabetes mellitus type 2, and hypothyroidism presented with acute onset right-sided weakness and expressive aphasia. She was found to have an acute left MCA infarct and was taken emergently to interventional radiology for mechanical thrombectomy. Ultimately, she was found to have coagulase negative staphylococcus bacteremia and native mitral valve endocarditis, the latter thought likely the source of emboli. Neurology recommended that the systolic blood pressure be maintained >130mmHg, thus the patient was started on norepinephrine and vasopressin. Shortly following initiation of vasopressors, the patient’s sodium trended down from normal (nadir 124 over approximately 18 hours) and urine output decreased. Vasopressin was thought to be the likely cause of acute hyponatremia, thus it was discontinued. Urine output dramatically increased and sodium rose to normal within hours following discontinuation of vasopressin. Discussion: Exogenous vasopressin works through two receptors deemed V1 and V2. Activation of V1 receptors causes vasoconstriction of vascular smooth muscles. V2 receptors are found in the renal collecting duct and activation exhibits antidiuretic hormone effects, causing passive free water reabsorption. Despite its antidiuretic hormone effects, hyponatremia is rarely seen as a result of vasopressin use. This case demonstrates the importance of considering exogenous vasopressin as a cause of hyponatremia, specifically when decreased urine output is associated with onset of hyponatremia. Urine output is expected to rise with discontinuation of vasopressin, but should normalize following resolution of hyponatremia.

Naeem Moulki, MD, David Ewart

**Pheochromocytoma causing recurrent reversible cardiomyopathy**

Cardiovascular system involvement in pheochromocytoma includes hypertension, tachycardia, hypertensive cardiomyopathy, and rarely, a dilated cardiomyopathy resembling Takotsubo cardiomyopathy and attributed to catecholamine excess. It has been reported that the cardiomyopathy might be reversible following removal of the tumor. Here is a case of recurrent reversible cardiomyopathy in the setting of a pheochromocytoma. A previously healthy, 58 year old man presented with chest pain, elevated troponin, and cardiogenic shock. Left heart catheterization showed non-obstructive coronary artery disease with severe global hypokinesia of the left ventricle and hypercontractile function of the basal segments as well as a small area of the apex. The suspicion at that time was for myocarditis or Takotsubo-variant cardiomyopathy. An echocardiogram 1 month later demonstrated recovery of systolic function. In the following 5 years, the patient was admitted 2 times with sepsis secondary to urinary tract infection, both times he had elevated cardiac markers but with normal LVEF on echocardiography. 6 years after the initial presentation, the patient was admitted again with chest pain, elevated troponin and depressed LVEF, which normalized during the same hospitalization. In the following few months, the patient reported multiple elevated blood pressure readings, and ultimately, he was admitted for hypertensive emergency with systolic blood pressure in the range of 200 mmHg. This was associated with chest pain, elevated troponin, and severely depressed
LVEF on echocardiogram. An abdominal CT scan showed a large right-sided adrenal mass (5 cm) and urinary catecholamines were dramatically elevated. He successfully underwent laparoscopic adrenalectomy, with normalized post-operative urinary catecholamines. The patient is due to get an evaluation of his LVEF within 3 months after surgery. This case illustrates recurrent myocardial damage (as demonstrated by the multiple episodes of troponin elevation), as well as recurrent yet reversible depression in LVEF. This would be best explained by the finding of the catecholamine-secreting tumor. Even though this tumor is uncommon, it should be in the clinician’s mind as a potentially lethal differential diagnosis for any unexplained non-ischemic cardiomyopathy.

**Pravesh Napaul, MD**

**Plasma cell leukemia: An aggressive variant of multiple myeloma**

Plasma cell leukemia (PCL), is a rare and aggressive plasma cell proliferative disorder. It needs to be recognized promptly and induction therapy started in an effort to minimize the risk of early death. A 65-year-old woman with a past medical history significant for iron deficiency anemia and lymphedema presented to the emergency room with altered mental status. She had split her medical care between out-of-state providers and Minnesota, where she was mostly receiving lymphedema treatment. On presentation, her labs were remarkable for a hemoglobin of 4.9, a leukocytosis of 13,500 with 25% plasma cells, creatinine of 8.4, calcium level of 16.9, total protein of 10 and uric acid of 19.7. Her CT/MRI scan of the head showed multiple lytic lesions throughout the calvarium. Her beta-2 microglobulin was >18, Ig A 4760 mg and free kappa light chain at 4150. The morphologic, flow cytometric, and cytogenetic results on the peripheral smear eventually confirmed plasma cell leukemia. A bone marrow biopsy was not performed owing to the high number of circulating plasma cells. The patient was started on pulse dose steroids and bortezomib for her PCL but also required apheresis and dialysis. She had an excellent response with resolution of circulating plasma cells on repeat smear on hospital day 4. Her mental status cleared as her calcium level normalized. She was eventually discharged on hospital day 14 on dialysis with planned bortezomib treatment. She was unfortunately lost to follow up. Plasma cell leukemia accounts for less than 0.2% all leukemia cases cases and has an incidence of 0.2–0.3 cases per million people. PCL can be further subdivided into primary PCL or secondary PCL. The latter is due to leukemic transformation of relapsed or refractory disease in patients with multiple myeloma. Given her long standing anemia, the patient likely had secondary PCL but this remains unclear. Expectedly, data on treatment regimens for PCL are sparse. However, with the advent of autologous stem cell transplant, bortezomib and immunomodulatory drugs, more treatment options are now available, although the prognosis remains very poor.

**Warda Niaz, MD**

**Envenomation by Protobothrops mangshanesis**

Introduction: Protobothrops mangshanensis is an endangered species of green pit viper native to Mangshan mountain range, of the Hunan province in China. Only one reported case of envenomation exists in the literature from this species. Case Description: A 33 year old presented to the emergency department after being bitten on the right forearm by a
female Chinese green pit viper Protobothrops mangshanesis which was part of a breeding pair that he owned. Mild edema was noted at site of the bite along with two puncture marks but no systemic signs of envenomation were noted. He was hemodynamically stable and admitted for observation for signs of compartment syndrome. Initial coagulation and laboratory profile including; INR, prothrombin time, partial thromboplastin time, platelets and D-dimer were unremarkable. Fibrinogen levels decreased initially but reached a steady state. He was discharged due to clinical stability. 3 days after envenomation the patient returned with new bruising on his left arm and laboratory studies at this time showed undetectable fibrinogen levels with elevated prothrombin time. Patient was advised for admission but refused at the time. He then presented on day 4, after the bite, with new bruising at bridge of his nose, repeat coagulation studies showed immeasurably prolonged prothombin time, partial thromboplastin time and thrombin time. He was treated with 3 vials of green pit viper anti-venom (Trimeresurus ablbolabrus), and kept in ICU for observation. Lab studies improved the next day and within 5 days were in normal limits. Discussion: This case demonstrates delayed coagulopathy with envenomation by Protobothrops mangshanesis. Despite being asymptomatic on initial presentation, the delayed progressive derangement in coagulation studies posed a great risk for a life-threatening bleed. Therapy using green pit viper anti-venom was effective in reversing the hemotoxicity.

Hannah Nordhues, MD, Kelly Pennington, Darlene Nelson

A Question of Thrombus or Tumor: A Case of Pulmonary Artery Intimal Sarcoma Misdiagnosed as Massive Pulmonary Embolism

Introduction: Pulmonary artery intimal sarcoma is a rare tumor with poor prognosis. It is often identified as filling defect on computed tomography angiography (CTA) leading to frequent misdiagnosis as acute or chronic pulmonary embolism. Here, we present a case of pulmonary artery sarcoma misidentified as a massive pulmonary embolism. Case Presentation: A previously healthy 24 year-old mother presented to an outside emergency department with progressive shortness of breath and syncope in the setting of recently diagnosed pulmonary embolism. Three weeks prior to presentation, she was admitted for shortness of breath, pleuritic chest pain, and hemoptysis. She was diagnosed with unprovoked bilateral pulmonary emboli and started on a heparin bridge to warfarin. Following dismissal, she maintained a therapeutic INR; however, her symptoms progressed culminating in two syncopal episodes prompting re-presentation to her local emergency department. CTA of the chest demonstrated worsening bilateral pulmonary artery filling defects in the main pulmonary artery and left pulmonary artery with multiple distal defects in both lower lobes. Echocardiography revealed a severely dilated right ventricle with right ventricular systolic pressure of 108 mmHg. She was transferred to our intensive care unit for worsening “pulmonary emboli” and pulmonary hypertension while on therapeutic anticoagulation. Initial physical examination revealed a tachycardic (117 bpm), obese female breathing comfortably on 4L/min nasal cannula oxygen. No lower extremity swelling or erythema was appreciated. Lungs were clear to auscultation bilaterally. The remaining physical
examination was normal. Laboratory studies were remarkable for leukocytosis, supra-therapeutic INR (4.8), elevated NT-Pro BNP (6105 pg/mL), and negative troponin. Special coagulation profile was notable for Factor V Leiden heterozygosity. Upper and lower extremity duplex ultrasound was negative for thrombosis. Similarly, inferior vena cava ultrasonography was negative for thrombus. Cardiac surgery, vascular medicine, and interventional radiology were consulted for possible thromboendarterectomy versus clot removal with AngioVac; however, given the chronicity, it was decided to pursue catheter directed thrombolysis. On hospital day three, she underwent catheter directed thrombolysis without any improvement in clot burden. Consequently the underlying malignancy was considered. Unfortunately she developed progressive respiratory failure and circulatory collapse requiring intubation. She had a PEA arrest and expired on hospital day 4. Postmortem evaluation revealed, pulmonary artery intimal sarcoma arising from the left side of the main pulmonary artery with multiple tumor emboli with associated pulmonary infarcts. Discussion: Although pulmonary artery intimal sarcoma is a rare diagnosis, practitioners need to be aware of this possibility when a patient presents with presumed thromboembolism not responsive to anticoagulation or thrombolysis. Other clues to possible intimal sarcoma may include the following: few or no risk factors for thromboembolism, high sedimentation rate, and nodular parenchymal infiltrates on CT. Early recognition can lead to avoidance of unnecessary thrombolysis, appropriate surgery, chemoradiation, and prolonged survival.

Ben Nordhues, MD

Too hot then too cold, an unusual case of fevers and limb ischemia

Introduction: Polyarteritis nodosa (PAN) is a rare vasculitis typically impacting medium to small muscular arteries that is often preceded by vague systemic complaints. Delays in diagnosis may lead to preventable morbidity and mortality. We present a case of PAN in a young man with limb ischemia. Case Description: A previously healthy 23 year old man was evaluated for a one month history of intermittent fevers up to 39.4° C, nausea, myalgias, malaise, chills, conjunctivitis, neck pain, a 10 pound weight loss, and paresthesia of the skin. A head CT and lumbar puncture were within normal limits. He was diagnosed with a suspected viral infection and discharged. Over the next week his constitutional symptoms worsened and he was treated empirically with doxycycline for a presumed tick-borne illness. Despite treatment he developed non-specific migratory arthralgias without clinical evidence of inflammation. Abnormal laboratory testing included an elevated ESR (29 mm/hr) and ferritin (766 mcg/L) as well as thrombocytosis (784x103/µL). Additional laboratory evaluation including anti-phospholipid antibodies, ANCA antibodies, C3/C4, ANA, rheumatoid factor, viral hepatitis panel, Monospot test, QuantiFERON, HIV, West Nile virus, flow cytometry, and Colorado Tick Fever antibodies all returned normal. A transesophageal echocardiogram and blood cultures were also normal. One month after onset he began to experience paresthesias and progressive pain in his feet. Physical examination revealed absent pedal pulses. He was evaluated with an abdominal CT aortogram with runoff, notable for decreased posterior
tibial flow on the right and absent arterial flow distal to the mid-calf on the left. A CTA of the chest was negative for evidence of a large vessel vasculitis. He was started on a heparin drip and pulse dose IV corticosteroids with rapid improvement in his constitutional symptoms. He was subsequently evaluated with lower extremity angiography, notable for smooth tapering within multiple small and mid-sized arteries as well as multiple distal arterial occlusions confirming the diagnosis of PAN. Two days after initiating heparin and pulse dose steroids a Doppler assessment revealed return of pedal pulses and his pain slowly improved. He was started on cyclophosphamide and transitioned to maintenance mycophenolate mofetil. A follow up MRI 6 months later revealed no evidence of active vasculitis. Discussion: Although rare, PAN often presents with vague constitutional symptoms. PAN has no diagnostic laboratory test and delays in diagnosis may lead to significant morbidity. PAN can be associated with hepatitis B, hepatitis C, and hairy cell leukemia but is most often idiopathic. Diagnosis of PAN is typically made with biopsy of affected lesions, but can be made through careful history, physical examination, and classic angiographic findings. These include aneurysms with irregular constriction like beads on a rosary (“rosary sign”) in larger vessels as well as occlusions of distal penetrating arteries.

Mark Norton, MD, Wells Askew, M.D.

Hemopericardium Post Myocardial Infarction: Sometimes Angiography Alone Is Not Enough.

The differential diagnosis for a hemopericardium is relatively limited and most commonly includes malignancy, complications of myocardial infarction (MI) – including ventricular free wall rupture and percutaneous intervention – aortic dissection, and blunt force trauma. While the causes are few, the proficiency of making the diagnosis is paramount, as hemopericardium can be rapidly fatal. This is especially true in the setting of a ventricular free wall rupture in the post-MI setting. Therefore, understanding the efficacy of the various diagnostic tools available, particularly coronary angiography, is necessary, however in addition, recognizing their shortcomings is at times even more important. We present the case of a 65-year-old female with no known medical comorbidities who presented with acute onset chest pain with radiation to the back, and hypotension requiring vasopressor support. Initial ECG was significant for ST elevation in the high lateral leads, and CT angiogram of the chest showed a hyper-dense pericardial effusion concerning for hemopericardium. Emergent coronary angiogram was performed, however no occlusive culprit lesion within the coronary vasculature could be identified, and no intervention was performed. Follow up echocardiogram and cardiac MRI later demonstrated findings consistent with an anterior wall infarction with dense pericardial effusion and tamponade physiology. Pericardiocentesis with drain placement was performed and resulted in sanguineous output. With unclear etiology of the hemopericardium in the setting of echo and cardiac MR consistent with infarction, cardiac angiogram studies were re-reviewed. It was noted that there was the complete absence of an anterior diagonal branch, which was thought to be due to a complete occlusion of the ostium feeding this diagonal branch. This occlusive pattern created a flush wall along the left
anterior descending artery that created the appearance that no diagonal branch existed. This flush occlusion explained the STEMI pattern on ECG, as well as the findings on Echo and Cardiac MR. This MI lead to a micro-perforation of the anterior ventricular wall, which caused the hemopericardium. The size of this perforation was presumably small, and fortunately this self-resolved with no need for further intervention. The patient made a full recovery. Ventricular wall rupture or perforation is a well-known complication of myocardial infarction. In the setting of NSTEMI or STEMI, coronary angiography is the gold standard for diagnosis, as it is highly sensitive and specific for identifying vessel occlusions. However, this case highlights the potential limitations of coronary angiography, and underscores not only the importance of understanding coronary anatomy when interpreting coronary angiography, but also features the other imaging modalities that can be used to aid in the diagnosis of a potential flush occlusion MI such as echocardiography or cardiac MR.

Patrick Odens, MD

He's Cold and on a Hold

The causes for severe hypothermia mostly consist of infectious, CNS, and endocrinologic etiologies, but patients on long term anti-psychotics can also develop this, though it is a diagnosis of exclusion. A 72 year old male presented to the Emergency Department after he was found to be somnolent with a GCS score of 9 and hypothermic with a rectal temperature of 89 degrees Fahrenheit. He had a past medical history most significant for paranoid schizophrenia requiring daily olanzapine and “as needed” haldol. He resided in a nursing home due to an inability to care for himself as a result of his long-standing psychiatric illness, and had a court appointed guardian. His other admission vitals and the remainder of his exam were normal. Initial laboratory workup, including electrolytes, glucose, kidney and liver function tests, urinalysis, urine drug screen, and creatine kinase were all normal except for mild acute kidney injury, mild hyperkalemia, and moderate thrombocytopenia. A CT head, chest x-ray, and an EKG were all normal. Blood and urine cultures were drawn, though there were no signs of infection evident. He was closely monitored in the ICU given concern for airway protection, and further workup was undertaken. An ABG showed respiratory acidosis with a CO2 of 48, and TSH, cortisol, lactate, thiamine, ammonia, INR, peripheral smear testing was all normal. An MRI/MRA brain stroke protocol and LP were also normal. Video EEG showed diffuse slowing but no seizure activity. He was re-warmed with a bare hugger, and his chronic psychiatric medications were held. Psychiatry was consulted, and came to the conclusion that this patient’s initial presentation was consistent with malignant hypothermia that was likely caused by his anti-psychotics. He was successfully rewarmed, was able to maintain his temperature and able to protect his airway, but exhibited very little volitional activity after stabilization. All culture and PCR results from his lumbar puncture, blood, and urine later returned negative. After much further discussion with the legal guardian, nursing home staff, and psychiatry, the patient was made comfort cares and discharged back to his nursing home with hospice. This patient’s presentation showcased a rare, though serious, complication of long term use of commonly prescribed anti-psychotic
Pratik Patel, MD  

**A Case of Hypertrophic Obstructive Cardiomyopathy (HOCM)**  
Introduction: HOCM has a relatively high prevalence in the general population. Internists should familiarize themselves with HOCM as they can help identify this condition in asymptomatic patients. Here we present a HOCM patient with high sudden cardiac death (SCD) risk features who underwent an implantable cardioverter-defibrillator device (ICD) placement and surgical septal myectomy.  

Case: A thirty one year old man with PMH of HOCM was admitted to our institution for a planned surgical septal myectomy. He was symptomatic from HOCM, namely dyspnea on exertion, brief chest pain episodes and presyncopal episodes. Prior to admission, workup from outpatient setting included a transthoracic echo which showed EF of 67%, left ventricular outflow tract (LVOT) obstruction (LVOT) gradient of 66mm Hg and systolic anterior motion (SAM) of mitral valve leaflet with mild mitral regurgitation and a cardiac MRI which showed reverse curve subtype, 22mm maximal thickness in mid-septum, apical pouch and mild patchy delayed gadolinium enhancement with focal enhancement in apical pouch. Holter showed 5 beats of non-sustained ventricular tachycardia (NSVT) with rate of 120 associated with chest pain. Post-surgical echocardiogram showed SAM but no significant LVOT gradient. Due to probable benefit for primary prevention of SCD due to presence of NSVT and probable SCD risk factors like delayed gadolinium enhancement and apical pouch, he underwent ICD placement. His symptoms had improved at discharge.  

Discussion: HOCM is relatively common in general population (1 in 500 adults) since it’s an autosomal dominant condition with high penetrance. The main pathophysiology in HOCM is dynamic left ventricular outflow (LVOT) obstruction. Its clinical presentation ranges from asymptomatic to chest pain, heart failure, arrhythmias and even SCD. An internist may suspect HOCM in a young asymptomatic patient with a classic HOCM murmur or presence of LV hypertrophy on ECG in the absence of cardiac hypertrophy from hypertension, aortic stenosis or athlete’s heart. The diagnosis of HOCM is readily made based on echocardiogram finding of >15mm LV wall thickness in such individuals. Management of HOCM varies from observation in asymptomatic patients to beta blocker therapy to reduce LVOT obstruction to surgical septal myectomy in patients with persistent symptoms on medical therapy. It’s also important to identify HOCM patients with certain high SCD risk features like history of ventricular tachycardia/cardiac arrest, family history of SCD in a 1st degree relative and non-sustained ventricular tachycardia (like our patient) as ICD placement in these individuals will reduce risk for life threatening ventricular arrhythmias and SCD. Conclusion: Internists should suspect HOCM in asymptomatic patients with classic HOCM murmur or who have LV hypertrophy on ECG in the absence of hypertension, aortic stenosis or athlete’s heart. A referral to a cardiologist should be made once a diagnosis of HOCM is suspected.

Rachael Patterson, MD,  
Mandip KC  

**Esophageal dysphagia: think outside the tube.**  
Esophageal dysphagia is a relatively frequent complaint encountered by internists and is most commonly caused by intrinsic esophageal or...
peptic disease. However, rarely esophageal dysphagia is caused by extrinsic compression from mediastinal abnormalities and a thorough history and work-up is indicated in these clinical scenarios. A 66 y/o M with history of gastroesophageal reflux disease, tobacco use of >50 pack-years, and chronic obstructive pulmonary disease presented to the emergency department for a one-week history of dysphagia. It began with solids and had to progressed to liquids and was associated with a fifteen pound weight loss. The patient initially indicated his throat as the site of impacted food and oropharyngeal dysphagia was presumed. A CT neck soft tissue was performed demonstrating normal esophageal anatomy but did reveal a pulmonary nodule. Patient was transferred to another facility for expedited work-up due to the rapid progression of his symptoms and inability to consume anything but thin liquids. On further history patient revealed he had recently ingested a tetracycline antibiotic and prednisone due to presumed COPD exacerbation. Gastroenterology was consulted for endoscopy within the context of presumed pill esophagitis and patient was placed on PPI with a subjective improvement in symptoms. During endoscopy the patient was noted to have an area of stenosis in the mid-esophagus with no mucosal changes. The stenosis was widened with endoscope but not stented. A mucosal biopsy was taken which came back positive for chronic inflammatory changes but negative for malignancy. Due to patient’s history of weight loss, tobacco history, and previous radiographic findings of pulmonary nodules a CT chest was performed at that time and showed a large posterior mediastinal mass encasing the esophagus and other vital structures, several pulmonary nodules bilaterally, and a questionable finding of a lesion within the pancreas. The patient was informed of these findings and the necessity of a biopsy and the patient opted for further work-up as an outpatient. A week and a half later the mediastinal mass was biopsied utilizing endoscopic ultrasound and pathology returned positive for a pancreatic cancer metastasis. This case of rapidly progressing mechanical esophageal dysphagia as an atypical presentation of pancreatic cancer demonstrates the importance of obtaining thorough history and recognizing premature closure heuristics in clinical practice in order to optimize work-up and treatment for patients.

Kelly Pennington, MD, Melissa Myers, Abinash Virk

Utterly Obvious: A Case of Listeria monocytogenes Endograft Infection Presenting as Failure to Thrive

Introduction: Listerialiosis is serious foodborne illness caused by Listeria monocytogenes, most commonly affecting immunocompromised hosts, pregnant women, neonates, and the elderly. Manifestations generally include meningitis, rhombencephalitis, and bacteremia; however, focal infections (i.e. native valve endocarditis, prosthetic joint infections, and perianal abscess) have been reported. Prosthetic endograft infection alone is an extremely rare event with substantial morbidity and mortality. Causative organisms usually include Staphylococcus aureus, Enterococcus, Streptococcus, and Escherichia coli. Here, we present a case of aortic endograft infection secondary to Listeria monocytogenes. Case Presentation: A 76 year-old dairy farmer with a past medical history significant for abdominal aortic aneurysm repair with Dacron graft in 2010, renal cell carcinoma with right nephrectomy, and mild
mitral stenosis presented to the emergency department with a nine-month history of progressive weakness, functional decline, low back pain, and 40 pound weight loss. Physical examination showed an afebrile obese male with a systolic ejection murmur radiating to the carotids and right upper quadrant abdominal tenderness upon deep palpation. No midline spinal tenderness, rashes, or peripheral stigmata of endocarditis were appreciated. Other systemic examination was normal. Laboratory studies revealed mild normocytic anemia, leukocytosis with neutrophilia, hyperbilirubinemia (Direct Bilirubin=2.5 mg/dL) with mild transaminitis, and stage I acute kidney injury. Computed tomography (CT) scan of the abdomen was remarkable for prominent portacaval, gastrohepatic, upper mesenteric root and para-aortic lymph nodes with an intact aortic graft without stranding or inflammation. His c-reactive protein was notably elevated at 124 mg/L (reference range < 8). Blood cultures returned positive for Listeria monocytogenes at 16 hours in four bottles drawn from two peripheral sites. Ampicillin was initiated, but repeat blood culture remained positive at 24 hours. Transesophageal echocardiogram was negative for vegetations. Secondary to his persistent low back pain and concern for low grade endograft infection, positron emission tomography (PET CT) was obtained and revealed increased FDG uptake around graft in the distal aorta. He was deemed high risk for graft removal surgery and elected to undergo 6 weeks of ampicillin therapy followed by chronic suppression therapy. Discussion: Prosthetic graft infection with Listeria monocytogenes is a rare but potentially fatal complication. To date, eight cases of Listeria prosthetic graft infection, two cases representing aortic endograft infection, have been reported worldwide. Although rare, practitioners need to be alerted to the ability of Listeria to cause focal infections including graft infections. Moreover, endograft infection needs to be on the differential diagnosis when patients with a history of endograft placement present with failure to thrive and back pain.

Heather Phillips, MD  
Double Trouble: Adverse Effects Complicate an Upsetting Diagnosis  
A 49 year old male presented to the ED with personality changes and headache. Brain MRI demonstrated multiple ring-enhancing lesions with surrounding vasogenic edema. Pathology from an excisional biopsy specimen demonstrated toxoplasmosis. The patient reported a history of sexual encounters with other men. His last sexual activity had been seven years prior. His last HIV test was in the 1990s. HIV testing returned positive. A diagnosis of AIDS was made. Therapy was initiated with sulfadiazine and pyrimethamine for CNS toxoplasmosis and azithromycin for MAC prophylaxis; initiation of HAART was delayed to prevent IRIS. He was discharged with plans to follow up with this institution’s HIV clinic. Unfortunately, he required two subsequent admissions over the next two weeks. The first occurred because his roommates had ongoing concerns about his abnormal behavior and did not think he should be at home (they were unaware of his diagnosis). With assistance from social work, he identified some friends and family with whom he felt comfortable sharing his diagnosis and who could help in his care. The second readmission occurred because, in his words, “I feel like shit.” He was weak and fatigued, with unilateral flank
pain and hematuria. He was found to have AKI and renal stones suspicious for sulfadiazine nephrotoxicity. Sulfadiazine therapy was changed to clindamycin, and his symptoms and AKI resolved. This case highlights two important issues for physicians caring for HIV-positive patients. First, despite several decades of progress in the treatment of patients with HIV, it remains a very stigmatizing diagnosis. This leads to delayed diagnosis and treatment and to patient isolation and fear. Physicians can be important advocates for their patients in identifying resources they need to live with HIV. Second, some of the opportunistic infections associated with HIV/AIDS are best treated with medications that are no longer in common use and thus less familiar to general internists. Sulfadiazine was first developed in the 1930s when antimicrobial options were quite limited. With the advent of the penicillins, it fell by the wayside until the AIDS epidemic forced its return. Sulfadiazine crystalluria was a well-known adverse effect which was all but forgotten until the 1980s. Sulfadiazine and its metabolites are renally excreted and poorly soluble in urine, so they may precipitate and form stones. Up to 28% of patients on the drug develop AKI and nephrolithiasis, usually after prolonged use but occasionally after only a few days of treatment. Diagnosis is supported by identifying sulfadiazine crystals in the urine sediment. These are recognized by their “shocks of wheat” appearance. Prevention involves avoiding dehydration, and treatment involves medication discontinuation, aggressive hydration, and management of stones to relieve obstruction. Depending on the severity of nephrotoxicity, therapy may be reintroduced at a later date.

### Primary CNS-restricted acute lymphoblastic B-cell leukemia presenting as peripheral polyneuropathy

**INTRODUCTION:** Adult acute lymphoblastic leukemia (ALL) accounts for 15-20% of all cases of leukemia. Primary central nervous system (CNS) involvement by ALL in addition to the classic peripheral disease is seen in less than 10% of these cases. Alongside with ALL, primary CNS lymphoma is also infrequent, representing 1-2% of non-Hodgkin’s lymphomas. Acute lymphoblastic B-cell leukemia/lymphoma is a rare precursor lymphoid neoplasm with the majority of cases occurring in children and young adults. The distinction between lymphoblastic B-cell leukemia and lymphoma is merely topographic. Both terms represent the same entity and are treated as the same. **CASE REPORT:** 58 year-old woman, with history of Graves disease and rotator cuff arthritis, presented for evaluation following a 1-month course of progressive lower and upper extremity weakness. She initially complained of bilateral leg weakness, with preservation of sensation and reflexes, in combination with mild right hand paresthesia. MRI-spine showed diffuse degenerative disease, spondylolysis of L3/L4 and chronic L1 compression. Her symptoms progressed and she underwent decompressive spinal fusion with partial recovery of lower extremity strength. Nevertheless, symptoms recurred with a steady decline in weakness of bilateral upper and lower extremities, now accompanied by new-onset binocular diplopia. Diagnostic lumbar puncture revealed an increased cell count, predominantly atypical lymphocytes with 28% of blasts. Immunophenotype was consistent with CD-20/BCR-ABL.
negative acute B-cell ALL. Interestingly, further work-up demonstrated a normocellular bone marrow with no peripheral involvement on the complete blood count. PET-CT showed increased tracer activity in the thoracolumbar and sacral regions as well as right C5 nerve root. She was initially treated with multiple cycles of methotrexate and cytarabine intrathecally alternating with systemic Hyper-CVAD. There was an initial clinical response and clearing of the CSF, however, MRI spine still showed persistent leptomeningeal involvement. For that reason, a new approach with cranio-spinal irradiation was recommended, followed by improvement of imaging studies, showing only minimal residual disease. She returned a few months later with recurrent upper extremity weakness and oculomotor nerve paralysis, receiving a five-day cycle of fludarabine followed by intrathecal cytarabine infusions. CSF is now again clear of malignancy and symptoms continue to improve. DISCUSSION: A thorough review of the literature showed only one similar case of primary and exclusive CNS involvement by acute lymphoblastic B-cell lymphoma. However, our case is unique for the primary leptomeningeal involvement without clear evidence of a CNS mass in addition to her late age of onset and absence of peripheral disease. Furthermore, despite its rarity, the case highlights important features on the initial management and differential diagnosis of peripheral polyneuropathy. Lastly, it outlines the different therapeutic approaches to malignant CNS involvement by hematologic neoplasms, reinforcing the importance of local and systemic chemotherapy as well as the role of cranio-spinal irradiation.

Hoda Pourhassan, MD

Bisphosphonate Induced Cytokine Storm

Introduction: Zoledronic acid is in the bisphosphonate class of medications and works by slowing bone breakdown, increasing bone density, and decreasing calcium release into the blood stream. It is commonly utilized in multiple areas of internal medicine including prevention or treatment of osteoporosis, treatment of Paget's disease of bone, treatment of hypercalcemia of cancer, and is used along with cancer chemotherapy to treat bone damage caused by multiple myeloma or by bone metastases secondary to malignancy.

Case Description: A 62 year old female with HTN, DMII, and osteoporosis was admitted through the emergency department with altered mental status and fever. She was in her usual state of health the day prior when she underwent intravenous zoledronic acid administration. She was initially treated with broad-spectrum antibiotics and decadron for possible meningitis. Broad infectious workup was ultimately negative and she continued treatment with antibiotics empirically. On the second day of admission, she acutely decompensated with high fevers, cardiogenic shock causing respiratory failure from pulmonary edema and acute renal failure. She required multiple pressors, dobutamine and was restarted on high dose steroids. Her hospital course was complicated by oliguric AKI requiring short-term dialysis, hemoptysis, and persistent encephalopathy. All of these improved on extended steroid course.

Notable history was previous adverse reactions to her osteoporosis medication. She was treated with alendronate months prior and experienced arthralgias and confusion, which were eventually attributed to UTI. Then again experienced arthralgias/myalgias with
second dose two weeks later. The arthralgias improved with steroid injection. A later re-trial of alendronate did not reproduce similar symptoms. Through diligent history taking and the collaboration of consultant teams including infectious disease, cardiology and rheumatology, it was deemed that patient most likely had a mixed cardiogenic (non-Takotsubo stress cardiomyopathy) and distributive (cytokine storm) shock secondary to severe inflammatory response to zoledronic acid infusion. Discussion: Although an “Acute Phase Response (APR)” has been described following zoledronic acid infusion (these include fever, swelling and pain in joints, gastrointestinal symptoms, eye inflammation and generalized complaints such as edema and fatigue), there has not been literature to link this medication to severe inflammatory response or systemic shock. There is significant literature describing the mechanisms of cytokine release elicited following Zoledronic acid infusion, particularly in the case of commonly observed fever. It would perhaps be feasible that a case of distributive shock secondary to cytokine storm could lead to the clinical picture we observe here, particularly given her clinical history of APR following previous bisphosphonate exposure. This case is particularly important given the broad and common use of bisphosphonate therapy in both general and specialized areas of internal medicine.

Carina Preskill, MD, Sara Negrotto, MD, Mark L. Wieland, MD

Nephrotic syndrome presenting as a varicocele
Case: A 44 year old man with no significant past medical history presented to his primary care provider following five days of a dull, aching discomfort in his left testicle radiating to his left lower abdomen. This was associated with swelling of the left testicle. The discomfort was not exacerbated or relieved by any position. Physical exam revealed enlargement of the left scrotum with a bag of worms consistency and mild tenderness. There was no inguinal hernia. He also had mild left lower quadrant abdominal tenderness to deep palpation, but no peritoneal signs. Scrotal ultrasound revealed a Grade 3 large left varicocele. A CT of the abdomen and pelvis with contrast was obtained to exclude secondary causes of a new varicocele. This revealed bilateral renal vein thromboses, near occlusive on the left, with extension into the inferior vena cava. Labs were notable for a creatinine of 1.3 (GFR 60 ml/min) with an unknown baseline, normal electrolytes, and hypoalbuminemia (2.6 g/dL). A 24-hour urine protein was elevated (6.2 grams/24 hours), and urinalysis showed occasional fatty casts but no RBCs. Urine and serum protein electrophoresis showed no monoclonal protein. Lipid testing revealed elevated total cholesterol, triglycerides, and LDL, significantly increased from several years prior. Given concern for nephrotic syndrome, he was tested for potential secondary causes. HbA1c, ANA, anti-dsDNA, Hepatitis serologies, HIV, and ANCA were all normal. Renal biopsy was deferred given the need for anticoagulation. The phospholipid A2 receptor antibody, however, was positive, which is consistent with primary membranous nephropathy. Therefore, the patient was initiated on cyclosporine. He was treated with warfarin anticoagulation for a three-month course. Follow-up ultrasound revealed resolution of the bilateral renal vein thromboses. The proteinuria also improved following initiation of cyclosporine. Discussion: This case illustrates
the importance of identifying secondary causes of a large, new, or otherwise atypical varicocele. Varicoceles are common, occurring in 15 to 20 percent of post-pubertal males. When the presentation is atypical, for example when the pain radiates to the abdomen, the varicocele is very large, or it does not decompress with recumbency, further investigation is warranted to identify a potential obstructing process, such as a thrombus or mass. A CT scan with contrast is recommended. The finding of renal vein thrombosis is also unusual in ambulatory individuals without an underlying malignancy or nephrotic syndrome, and mandates further work-up. In this case if the urine protein level had not been assessed, the membranous nephropathy would likely have been missed, and the patient would not have received the necessary treatment.

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<th>Robert Pueringer, MD, Mohammad-Ali Jazayeri, M.D., Bradley A. Bart, M.D., Nicholas S. Vogenthaler, M.D., M.P.H.</th>
<th>Combination of ceftaroline with vancomycin in the treatment of MRSA bacteremia and endocarditis</th>
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<td>MRSA blood stream infections account for approximately 10% of nosocomial blood stream infections and have high morbidity and mortality rates. MRSA endocarditis mortality rates approach 30 - 40%. To date, vancomycin and daptomycin have been the standard anti-infective therapies for complicated MRSA bacteremia. Treatment failures and poor outcomes are common with both agents, prompting investigation of alternative therapies. Case Presentation: A 22-year-old woman with active intravenous drug use was admitted with altered mental status, septic shock, and severe respiratory distress requiring intubation and mechanical ventilation. Her evaluation was remarkable for multiple cutaneous abscesses, persistently positive MRSA blood cultures, and CT evidence of numerous cavitary pulmonary lesions. Transthoracic echocardiogram showed a large tricuspid valve vegetation, and transesophageal echocardiogram confirmed an additional mitral valve vegetation. She was initially managed with intravenous vancomycin but had continued positive blood cultures. On hospital day 6 (HD6), a fifth-generation cephalosporin, ceftaroline, was added. Frequency of positive cultures decreased and by HD10 consistent negative blood cultures were observed. On HD14, she underwent tricuspid and mitral valve debridement and repair. On HD17, she developed worsening neutropenia and a diffuse rash which resolved with discontinuation of ceftaroline and filgrastim administration. She was discharged to a long-term acute care facility on HD39 with a plan to complete eight weeks of intravenous vancomycin therapy. At follow-up approximately 3 months from presentation, she was neurologically intact and independently attending to her activities of daily living, though limited by exertional intolerance and evidence of severe mitral stenosis. Discussion: In the treatment of MRSA bacteremia, no other regimen has proven to be clearly superior to vancomycin in achieving clinical cure or sterilizing blood cultures. Alternative treatment options for vancomycin-resistant or daptomycin non-susceptible strains have little data available to support their use in bacteremia or endocarditis. In this case, we utilized ceftaroline in concert with vancomycin due to demonstrated in vitro bactericidal activity against MRSA, minimal potential for drug-drug interaction, and limited evidence suggesting in vivo synergism with vancomycin. This</td>
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case illustrates the potential utility of ceftaroline in complicated cases of MRSA bacteremia and endocarditis unresponsive to vancomycin therapy, as well as a potential complication.

<p>| Jie Qu, MD, Katharine Price MD | <strong>Esthesioneuroblastoma presenting as psychotic depression: the importance of a differential diagnosis</strong> Esthesioneuroblastoma is a rare neoplasm originating from the olfactory neuroepithelium that classically presents with anosmia. This case describes an unusual presentation of esthesioneuroblastoma and a complicated clinical course underscoring the importance of a complete history and the need for a differential diagnosis.  <strong>Case Description:</strong> A 57-year-old man, previously a successful vice president at a sales company, presented in 2014 with severe depression and functional decline, for which he lost his job. Despite antidepressant therapy the patient worsened and was admitted for depression with psychosis. In May 2015, MRI of the head demonstrated a mass in the nasal cavity extending through the cribriform plate into bilateral sphenoid and ethmoid sinuses and into the anterior cranial fossa. Biopsy revealed esthesioneuroblastoma. In retrospect, the patient’s family recalled symptoms of anosmia and chronic sinusitis. High-dose dexamethasone was subsequently started with initial improvement followed by a rapid clinical decline. In June 2015, the patient presented to Mayo Clinic for multidisciplinary evaluation and treatment. At the time, his performance status had declined such that he was somnolent, unable to answer questions or ambulate independently, and had a Mini-Mental State Examination score of 7 (out of 30). He was not felt to be a candidate for radiation or chemotherapy; surgery was being considered although the patient’s family was advised to think about supportive care only. He was sent to the emergency room on 6/23 due to his declining mental status, which was presumed to be related to his tumor. Bloodwork revealed several metabolic derangements including: glucose 1027mg/dl, anion gap 23, osmolarity 337, beta-hydroxybutyrate 5.1, HbA1c 9.7%, hemoglobin 18.2, hematocrit 54.7, leukocytes 10.8, platelets 45, sodium 128, and potassium 6.3. He was admitted to the ICU for insulin therapy and a steroid taper for steroid induced diabetes. An abdominal CT showed free intraperitoneal air, and he underwent exploratory laparotomy and sigmoid resection for a bowel perforation. During surgery, the liver was grossly cirrhotic; biopsy showed cirrhosis secondary to NASH. With treatment of his underlying medical co-morbidities, the patient recovered cognitively and was discharged to a rehabilitation center. He returned on 8/6 and underwent bifrontal craniotomy and craniofacial resection for a Hyams grade 2 of 4 esthesioneuroblastoma. At his last follow-up, he was alert and oriented, ambulating independently, and being considered for adjuvant radiotherapy. <strong>Discussion:</strong> In this case, initial diagnosis of esthesioneuroblastoma was delayed as the patient’s symptoms were attributed to refractory depression with psychosis without imaging of the head. Once the diagnosis was established, his continued decline was attributed to the tumor, when multiple underlying medical co-morbidities were present, an oversight that could have denied the patient curative therapy. This case demonstrates the importance of a differential diagnosis throughout a patient’s clinical course. |</p>
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<th>Nasreen Quadri, MD</th>
<th>From Foreign Lands</th>
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<td>A 26-year-old male arrived from a refugee camp in Thailand five days prior with complaints of generalized myalgias, subjective fevers, decreased appetite and hemoptysis beginning at time of arrival in the US. The patient denied weight loss, night sweats or known sick contacts. The patient was previously healthy, but did visit the emergency room two days prior for similar complaints, at which time he was discharged with Tylenol, Zofran and one week follow-up in primary clinic. Labs on initial visit were significant for leukopenia, thrombocytopenia and elevated liver enzymes. Infectious work-up for tuberculosis, malaria, hepatitis, varicella zoster and HIV resulted negative. On return to the ED, his leukopenia, thrombocytopenia and elevated transaminases had worsened. Physical exam revealed a mildly-ill appearing, non-toxic male without any focal findings. He was admitted to the hospital for further work up. His acute symptoms of fever and myalgias improved over the course of 1-2 days after supportive care with intravenous fluids and Zofran. Upon second visit to the ED, clinical suspicion for dengue fever increased especially in the setting of a newly arrived refugee. Thus, dengue antibody was ordered, but the patient was discharged home prior to the dengue fever antibody resulting with a plan to recheck labs and follow up with his primary care provider. A week after discharge, thrombocytopenia had resolved and transaminases were trending down, although it was not until recheck three months later that all blood work normalized. This case is an example of a constellation of signs and symptoms presenting in a newly arrived refugee with limited prior medical care. Scenarios like this one are very common in many large US cities that have become a haven for refugees from different parts of the world. Infection is often high on the differential for patients arriving from abroad, but the extensive list of infectious diseases that are location-specific may not be readily available in the medical arsenal of individuals practicing medicine in the United States. For dengue fever, other infectious etiologies to consider are malaria, chikungunya, rickettsial infections and leptospirosis. This case provides commentary on when a patient should be observed in the hospital or discharged with close follow-up. Taking into account a patient’s language limitation, difficulty with transportation and lack of medical literacy to acknowledge significantly worsening symptoms to seek care should be mentioned. The decision is largely influenced by potential complications of a disease process and the fatal nature of those complications if missed. Complications of dengue fever include spontaneous bleeding, shock, liver failure, myocardial dysfunction and CNS dysfunction. Our patient did not exhibit any concerns for severe complications of dengue fever, but hospitalization for monitoring was essential given his social situation and potential for clinical deterioration.</td>
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<th>James Regan, MD, Sirtaz Adatya, Daniel Schnobrich, Andrew Olson</th>
<th>POCUS as a Tool to Estimate PCWP</th>
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<td>Background: Prior research has shown that point-of-care ultrasound (POCUS) may predict the presence or absence of pulmonary edema (a cause of lung water) but there has been only a limited correlation with pulmonary artery wedge pressure (PCWP). To our knowledge, no study has examined combining lung ultrasound findings with other ultrasound</td>
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findings to create an accurate means of non-invasive assessment of PCWP. Hypothesis: POCUS may be used to define a non-invasive estimation of PCWP. Methods: Prospective exploratory case series of 16 subjects undergoing right heart catheterization. The examiner was blinded to the results of the catheterization or prior testing at the time of exam. Each subject underwent a standard cardiopulmonary physical exam with POCUS of the internal jugular vein (IJ), lung fields, heart and inferior vena cava (IVC). The peak of the IJ’s pulsation was measured as the height above the right atrium in the standard fashion. Eight lung fields were examined for the presence of B lines, pleural effusion, and A lines. Significant lung water was defined as two or more lung fields with either B line predominance or pleural effusions. The examiner evaluated the four standard cardiac views solely for reduced versus preserved ejection fraction (EF). The IVC was examined both for diameter and variation with respiration. Right heart pressures were obtained within 3 hours of the physical exam. Results: Of the 16 subjects analyzed, 9 subjects had a markedly elevated PCWP (> 18 mm Hg) and 7 subjects had a PCWP <18 mm Hg. Overall, lung water predicted an elevated PCWP with a sensitivity of 78% (7/9) and specificity of 71% (5/7). In subjects with reduced EF, lung water was highly sensitive (100%, 4/4), but less specific (50%, 1/2). In subjects with preserved EF, lung water had similar sensitivities and specificities for predicting PCWP (sensitivity 66% or 4/6; specificity 80% or 4/5). Conclusions: POCUS may be useful in predicting PCWP. Combining lung ultrasound with other ultrasound findings may increase the diagnostic accuracy of this modality in estimating PCWP. In subjects with reduced EF, it appears that lung ultrasound is highly sensitive but more work is necessary to determine specificity. Further work is necessary to validate these findings and determine if a combination of other US and physical examination findings can create an accurate, non-invasive estimate of PCWP.

Kimberly Rehberg, MD

No colon, no rectum, still a problem: Ungrounded confidence in patients with FAP who undergo prophylactic colectomy

Gardner syndrome, a variant of the rare autosomal dominant disease familial adenomatous polyposis (FAP), is characterized by a germline mutation in the tumor suppressor gene APC that leads to a constellation of findings including intestinal polyposis and extra-intestinal growths. The disease’s key feature is the development of up to thousands of colonic adenomatous polyps that lead to colorectal cancer if untreated in virtually 100% of cases. In their late teen years, patients often choose to undergo prophylactic colonic surgery to prevent colorectal malignancy. There are several available and accepted surgical options, most commonly including ileorectal anastomosis, restorative proctocolectomy with ileal pouch-anal anastomosis, proctocolectomy with ileostomy, and proctocolectomy with continent-ileostomy. Although the first two options may arguably provide a better quality of life, the risk of developing future colon cancer is higher. There are no formal guidelines to screen for the development of colorectal adenocarcinoma following prophylactic colectomy, however annual surveillance by endoscopy of the terminal ileum, anastomosis, anal transition zone, and any remaining rectal tissue is recommended. These
patients remain at a higher risk of developing a malignancy and may be lost to follow up given the unfortunately false hope of no colon, no rectum, no problem. For this case I present a 48 year old female patient with a history of Gardner syndrome who underwent a prophylactic total proctocolectomy with end ileostomy at age 19 at an outside institution for primary prevention of colorectal cancer. Her disease was characterized additionally by a number of extracolonic manifestations, including papillary thyroid carcinoma and a suspicious periampullary lesion, both which have been described in literature as extracolonic malignancies associated with Gardner syndrome. She presented to the hospital with several months of increased ileostomy output, nausea and vomiting that lead to poor oral intake, and diffuse weakness. In the emergency department, she was found to have an acute kidney injury and various electrolyte abnormalities. Given her AKI, she underwent a renal ultrasound which incidentally revealed innumerable hepatic lesions suspicious for metastatic malignancy. A follow up CT abdomen/pelvis chased by a focused MRI of the liver confirmed the presence of a likely metastatic malignancy involving the liver, lungs, and spine. An ultrasound-guided liver biopsy was performed with final tissue histopathology diagnosing a metastatic colorectal adenocarcinoma. This case represents a patient with Gardner syndrome in which both the patient and the patient’s providers held an ungrounded confidence of no colon, no rectum, no problem, regarding development of colorectal cancer in the setting of a prophylactic surgery. She had not undergone surveillance endoscopy and ultimately developed a widely metastatic colorectal adenocarcinoma with poor prognosis.

Steven Richmond, MD

The periphery of success: A case highlighting advances and shortcomings in HLH diagnosis and management.

Hemophagocytic lymphohistiocytosis (HLH) is a syndrome of severe and sustained activation of the mononuclear phagocytic system. In adults, the syndrome most often occurs in the setting of infection, malignancy or rheumatic disease. Diagnostic approach and recognition of the syndrome has improved, however treatment algorithms are not standardized and outcomes are still poor. A 60-year-old male presented to the ED with progressively worsening right shoulder pain, light-headedness, and loss of balance incurring multiple falls. Past medical history was positive for diffuse large B-cell lymphoma treated with 5/6 R-CHOP chemotherapy treatments. Social history revealed a 50 pack-year smoking history and consumption of 12 beers per day. CBC obtained in the ED revealed a hemoglobin of 5.9g/dL, MCV of 114.2 fL and a platelet count of 70,000/uL. Further workup of the bicytopenia revealed hyperferritinemia, low haptoglobin, and elevated LDH. Interestingly, hemophagocytosis was seen on a peripheral smear which prompted evaluation for HLH. Bone marrow biopsy was performed which further demonstrated hemophagocytosis. CT of chest/abdomen/pelvis revealed marked splenomegaly without lymphadenopathy. The patient also demonstrated an elevated soluble CD25 count which qualified as the fifth necessary criteria for the diagnosis of HLH as defined by HLH-2004. The next step in management was to determine the etiology of the systemic
inflammatory response. Infectious and rheumatologic workups were negative. Given the patient’s history of lymphoma, malignancy associated HLH was the preferred diagnosis. Flow cytometry performed on peripheral blood, bone marrow aspirate, and CSF were all negative. MRI of head and neck were obtained after the patient developed worsening axial instability. Imaging revealed small lesions in the frontal lobe and cervical spinal cord consistent with a lymphomatous process. Intrathecal methotrexate and hydrocortisone were given which improvement of neurologic status over the next few days. PET-CT revealed increased uptake in the spleen, a sub-carinal lymph node, and an obturator lymph node. Due to technical difficulty and provider availability, the decision was made to biopsy the spleen. Shortly after the procedure the patient developed hypotension and bradycardia which progressed to pulseless electrical activity. Resuscitation efforts were unsuccessful and the patient died before evaluation for splenic hemorrhage could be performed. Autopsy revealed iatrogenic laceration of the spleen with massive intra-abdominal hemorrhage. Diffuse large B-cell lymphoma was present in the spleen, spinal cord, right frontal lobe, and aforementioned lymph nodes. This case demonstrates the value of established criteria for the diagnosis of HLH as the team quickly procured the necessary clinical and laboratory information following the rare presentation of peripheral hemophagocytosis. Unfortunately, this case also highlights shortcomings in the management of HLH as data did not exist to guide the team in initiation of chemotherapy without confirmed tissue diagnosis or even less researched approaches such as splenectomy.

Camille Robichaux, MD

For the Man Who Has Everything

Much of the cognitive effort involved in hospital-based nephrology is spent establishing the cause of acute kidney injury (AKI). Often, identifying the source does not lead to changes in management, but occasionally a surprising cause of AKI can lead to dramatic differences in treatment and prognosis. In this case of a 38 year old man with multiple potential causes of AKI including HIV on HAART therapy, aggressive B cell lymphoma, recent administration of O-DHAP, episodic hypotension, fever with suspected diverticulitis, empiric treatment of fever with intravenous vancomycin, and administration of contrast dye in the past 48 hours, finding the cause of AKI was not only daunting, but critical. When observing steep daily rises in creatinine, it can feel unnerving to trust the physical exam rather than treat a patient based on lab values. This patient’s dramatically elevated creatinine but lack of similarly elevated BUN, uremic symptoms, or severe electrolyte abnormalities led us to the eventual diagnosis of dolutegravir-induced decreased tubular secretion of creatinine, with only a minimally decreased glomerular filtration rate (GFR). Trusting our daily physical exam prevented the unnecessary initiation of hemodialysis. Managing the patient, not the lab value, allowed our team to administer the proper treatment--reassurance--for the man who has everything.

Andrew Rosenbaum, MD, Ian McPhail, MD

A Rare Cutaneous Manifestation of Inflammatory Bowel Disease

A 39 year old female presented to the Wound Clinic with lower extremity ulcerations. Her past medical history was notable for the diagnosis of hidradenitis suppurativa, type II diabetes mellitus, and a
recent diagnosis of inflammatory bowel disease. She described an eight month history of progressive painful ulcerations on bilateral lower extremities and lower abdomen (Figures 1-3). She denied constitutional symptoms. Serologic workup for autoimmune and fungal disease was negative. Vascular workup was negative for arterial or venous pathology. An initial biopsy at an outside facility revealed intradermal abscesses and cultures of the tissue were sterile. A working diagnosis of pyoderma gangrenosum was made. She was initiated dapsone and prednisone therapy at 60 mg, with initial response, which was eventually tapered to 20 mg. She was also started on topical immunosuppressive therapy (clobetasol and tacrolimus) and diligently dressed the wounds with Medihoney, but lesions continued to progress. The patient then underwent incisional biopsy of one ulcer. Pathology revealed non-specific inflammation, including lymphocytic infiltration of the dermis and fat necrosis. Cultures were sterile. Given that the biopsy was performed in the context of prednisone and dapsone therapy, there was concern that pathologic features were masked. Therefore, dapsone was stopped and prednisone dose was tapered to 10 mg. Repeat biopsy was obtained roughly one month later. This revealed ulceration with pseudoepitheliomatous hyperplasia and mixed suppurative and granulomatous inflammation. In the setting of negative cultures and fungal and mycobacterial studies, the diagnosis of metastatic Crohn’s disease was made. With this diagnosis in addition to the underlying inflammatory bowel disease, the patient was then initiated on infliximab at 5 mg/kg. Prednisone was continued through the initiation of infliximab. The patient experienced considerable improvement in the ulcerations over several months (Figure 4). This case describes metastatic Crohn’s disease, which is a rare dermatologic manifestation of the underlying inflammatory bowel disease. Clinically, manifestations of the disease are variable. Erythematous plaques and nodules may be the initial presentation, though it may also manifest as inflammatory papules. Because Crohn’s disease itself has several cutaneous associations, including erythema nodosum, pyoderma gangrenosum, and erythema multiforme, metastatic Crohn’s should be considered in the differential diagnosis of cutaneous ulceration, especially when response to therapy is not as expected.

Darin Ruanpeng, MD, Chris Zacharias Thomas, Jutarat Sangtian MD, Kyuhyun Wang MD

Acquired Brugada ECG pattern from hyperkalemia

Acute ST elevation myocardial infarction (STEMI) is an emergency since early reperfusion therapy provides greater benefit. Besides STEMI, there are other causes of ST-segment elevation. The ECG in fig 1 shows ST elevation (10mm in V2) in V1-3 but this is not STEMI. The findings are typical of Brugada ECG pattern. However, the T waves are narrow-based, tented and pointed, typical of hyperkalemia (the serum K was 6.4mmol/L). The ECG findings can be called an acquired Brugada ECG pattern due to hyperkalemia. What’s Brugada syndrome? It is a congenitally defective sodium channel causing ST elevation limited to V1-2. There is an increased chance of nocturnal death. The elevated ST segment begins from the top of R wave ending in an inverted T wave. Hyperkalemia disables the sodium channel causing Brugada-like ECG pattern, which is what we are seeing here. Other conditions such as high fever, Na channel blockers, cocaine, ethylene glycol, etc. can also
disable sodium channel, causing the same EKG pattern. This ECG is from a 26 year old white male with history of alcohol abuse and heroin injection who presented to the emergency room with profound weakness. Physical exam was unremarkable except for painful proximal lower extremities weakness. He was found to have rhabdomyolysis, acute kidney injury and hyperkalemia (CK 52213 U/L, Cr 3.7 mg/dL and K 6.4 mmol/L). He has no chest pain or palpitation. Emergency coronary angiogram revealed no coronary artery disease. Repeat EKG after potassium normalized was normal (Figure2). Physicians should be familiar with ST elevation in conditions other than STEMI.

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<td>Angeline Sabol, MD</td>
<td>Aortic bioprosthetic valve thrombosis and antiphospholipid syndrome – a sticky situation</td>
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Introduction

Thrombosis of a bioprosthetic valve in antiphospholipid syndrome (APS) presents a therapeutic dilemma for which there is a lack of clinical guidance. Because of this, extensive discussion with the patient regarding risks and benefits remains an extremely important part of patient care. Case report: A 33-year-old woman was admitted after an echocardiogram performed for recurrent transient ischemic attack (TIA) showed severe bioprosthetic aortic valve obstruction [mean gradient (MG), 69 mmHg; aortic valve area, 0.5 cm²]. She had undergone aortic valve replacement for severe aortic regurgitation due to Libman-Sacks endocarditis 6 months prior. Her past history was significant for systemic lupus erythematosus and APS on chronic anticoagulation with dalteparin, prior difficulty maintaining a therapeutic INR despite high warfarin doses (35-40 mg daily), and a possible TIA while on therapeutic weight-based Lovenox dosing (68 kg; 100 mg daily). Intravenous unfractionated heparin was initiated after admission with titration to anti-Xa levels (0.7 and 1.2). An echo-Doppler study performed 6 days after admission demonstrated an aortic prosthesis MG of 57 mmHg. She was discharged on a higher dose dalteparin (1.25 times previous dose). She was readmitted 4 days later with NYHA class III/IV symptoms. Repeat echo-Doppler showed an aortic prosthesis MG of 71 mmHg. She was treated with thrombolysis, resulting in mild symptom improvement and reduction of aortic valve MG to 39 mm Hg. After much discussion about options, Warfarin was restarted with dosing adjusted per chromogenic factor X and factor II levels, as it seemed the best option given the patient’s history.

Discussion

This case highlights the difficult and complex decision making process in management of patients with aortic bioprosthetic valve thrombosis in the setting of APS. This is a rare presentation of aortic valve involvement in which there are no established guidelines to direct therapy. Other reports have looked at techniques to treat aortic valve thrombus, including thrombolytics and video-assisted thrombolysis (Carrier, et. Al), however none have looked at home-going therapeutic options. Multidisciplinary approach and shared decision-making is important in uncharted waters, especially as risk of bleed must be considered in the setting of risk of recurrent thrombosis.

References: 1.Carrier, M; Pellerin, M; Dagenais, F; Perrault, L P; Petitclerc, R; Pelletier, L C. Videoassisted thrombectomy of mechanical prosthetic heart valves. Journal of Heart Valve Disease. 8(4):404-6, 1999 July.
Smarika Sapkota, MD

Groans, moans and psychic overtones

89 year old male was admitted to the hospital for evaluation of confusion, constipation and fatigue for several days. His past history was remarkable for hypertension, CAD, Stage III CKD and dementia. Medications included clopidogrel, metoprolol, losartan, pantoprazole and tamsulosin. On exam, his vitals were normal, was somnolent, with abdominal tenderness on upper quadrants. On labs, he was noted to have elevated calcium levels to 14 mg/dL, and creatinine of 3.4 mg/dL. Further evaluation showed normal PTH, phosphorus and normal urinary calcium excretion. PTH-rp was normal, SPEP was negative and no monoclonal bands detected in urine or serum. Skeletal survey showed no focal osseous lesions. He had low 25(OH)-vitamin D, and high 1,25-(OH)-vitamin D. Abdominal-CT, chest-X-ray and bone marrow biopsy were unrevealing. However, a PET-scan showed extensive disease within the abdomen and pelvis with rectal wall involvement. A thoracolumbar lymph node was biopsied and that was positive for diffuse large B cell lymphoma. The prognosis was deemed to be poor due to advanced stage of lymphoma. Patient continued to slowly deteriorate, therefore he was transitioned to comfort cares. Discussion: Primary hyperparathyroidism and malignancy accounts for most causes of hypercalcemia. Primary hyperparathyroidism is usually asymptomatic and calcium levels are generally less than 12 mg/dL. However in malignancy, patients are usually acutely ill with neurological symptoms and calcium is greater than 12mg/dl. PTH levels should be checked next, with elevated or normal PTH level indicating either primary hyperparathyroidism if normal creatinine, low phosphorus; tertiary hyperparathyroidism if elevated serum creatinine, elevated phosphate level; or Familial hypocalciuric hypercalcemia (with normal creatinine, phosphate and Urine-calcium-to-creatinine-ratio<0.01). Whereas, with suppressed PTH level, malignancy has to be worked up with SPEP and PTH-related-protein. 25-OH-Vitamin-D level should be checked next. If this is high, vitamin D intoxication is likely; if normal or low, then 1,25-OH-Vitamin-D levels should be checked. If 1,25-OH-Vitamin-D is low or normal, then drugs or other endocrine disorders should be considered. But if high as in this case, then sarcoid, granulomatous disease or lymphoma should be considered as diagnosis and the cause for hypercalcemia. There may be several mechanisms by which lymphoma cells may cause hypercalcemia. First, by destruction of bones by malignant cells though in our case the skeletal survey was negative for osseous involvement. Second, ectopic secretion of parathyroid hormones or PTH-related-protein by tumor tissue (again, normal in our case). In lymphoma as well as granulomatous diseases, ectopic 1-alpha- hydroxylation of 25-OH- vitamin D results in increased extra-renal levels of 1,25-OH-Vitamin-D which is a possible mechanism in this case given his high calcitriol and low 25-OH-vitamin-D. In our patient PTH level was not fully suppressed despite with markedly elevated calcium level; this suggests some degree of autonomous parathyroid function unrelated to his presentation.

Julie Schaefer, MD, Greg Siwek, MD

ARDS in the ICU: A Zebra Worth Knowing

A 34 year-old previously healthy woman presents to the ED in severe respiratory distress with a one week history of high fevers, malaise,
cough, and myalgias. She was seen the day prior at Urgent Care with
dyspnea and fever and started on doxycycline for presumed tick-borne
illness. She arrived to the outside hospital in severe respiratory distress
requiring intubation, and was transferred to our facility. Upon further
review of history obtained from family, she had been vacationing in
Montana one month prior to admission, and slept outside one night.
She did not recall any bites after that night, nor did she recall any
recent rodent exposure. She works one day per week at a veterinary
clinic as a tech, where she works only with dogs and cats. Physical
exam revealed very coarse breath sounds bilaterally. She was febrile,
tachycardic and tachypneic. Initial laboratory findings included
thrombocytopenia, elevated liver enzymes, and moderately elevated
procalcitonin. Imaging was consistent with severe ARDS. The
differential diagnosis for this patient was broad. It included viral
illnesses such as influenza, adenovirus, parainfluenza,
metapneumovirus, coronavirus. Tickborne illnesses such as Lyme,
anaplasma, babesia, erlichia, and rickettsia were considered. Fungal
infections such as blastomycosis and histoplasmosis were also
considered. Hantavirus was a concern given her travel history and
severe respiratory symptoms. Over the next several hours, she
remained febrile, tachycardic, and progressively hypotensive despite
several vasopressors. She developed oliguric acute kidney injury, and it
became increasingly difficult to maintain adequate oxygenation.
Unfortunately, approximately 20 hours after admission, despite empiric
antibiotic treatment, prone positioning, and maximal supportive
measures, she passed away. Given the patient’s sudden severe illness
and rapid decline, samples of blood, sputum, and urine were sent to
the Minnesota Department of Health for the Severe Unexplained Illness
Program for further testing. Additional testing was done by the CDC due
to concern for Hantavirus. Ultimately, the patient was found to have
Hantavirus based upon a markedly elevated Hantavirus IgM done at the
CDC. Transmission of Hantavirus is via inhalation of aerosolized feces,
urine, or saliva of infected rodents. Hantavirus pulmonary syndrome is
characterized by mild flu-like symptoms, followed by rapidly
progressive respiratory distress. Treatment is supportive and comprised
of cardiovascular, respiratory, and renal function support.
Interestingly, this patient had minimal exposure history. She had no
known exposure to rodents, though we suspect she was exposed while
sleeping outside in Montana. This case illustrates a rare but rapidly
fatal cause of ARDS. Although rare, suspicion of Hantavirus in an
otherwise healthy patient with sudden onset respiratory failure, fevers,
thrombocytopenia and a relevant exposure history is key, and transfer
of care to a facility that can provide maximal supportive measures,
including ECMO, can be critical for survival.

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<th>Michael Schnaus, MD</th>
<th><strong>Hypercapnic Respiratory Failure- Expanding the Differential Diagnosis</strong></th>
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<td><strong>Introduction:</strong></td>
<td>Hypercapnic respiratory failure is defined by the body’s failure to exchange carbon dioxide for oxygen in the lungs. The differential diagnosis of hypercapnic respiratory failure is extensive, and often the primary diagnosis is obvious, such as those patients with COPD exacerbations. However, sometimes identifying the correct diagnosis of hypercapnic respiratory failure requires expansion of the</td>
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differential diagnosis to include less common, but important pathophysiology. The Case: The patient was an elderly Caucasian veteran in his sixties who presented to the VA hospital, Pulmonology clinic, for evaluation of a multiple month history of worsening shortness of breath, weakness, and generalized fatigue. He had a past medical history of COPD (mild per most recent pulmonary function tests), and diastolic heart failure. The patient was evaluated in the office where he was found to be hypoxic, and had a chest x-ray that showed a newfound “collapse” of the right middle lobe. The patient was subsequently admitted to the internal medicine service for further evaluation. During his admission, he was initially treated for a COPD exacerbation, in addition to being gently diuresed, as he appeared mildly hypervolemic. The collapse of the patient’s right middle lobe of the lung cleared a few days after admission, and was thought to be secondary to mucus plugging. The patient clinically improved, and was titrated off oxygen. However, as the patient was nearing discharge he became more somnolent and started slurring his speech. Arterial blood gas analysis performed during this episode showed substantial hypercapnia, and the patient was placed on BiPAP with significant clinical improvement. The etiology of his hypercapnic respiratory failure remained a mystery. Given the patient’s sub-acute presentation in addition to a primary complaint of generalized fatigue and weakness, the differential diagnosis was expanded to include neuromuscular causes. To assess respiratory muscle strength, we tested the patient’s negative inspiratory force (NIF), which was significantly diminished. Upon further questioning, the patient noted that he felt his hand strength had been significantly diminishing, and he had dropped out of his choir because his voice had become too weak to continue singing. Neurology was consulted, noting subtle but widespread fasciculations and generalized muscle weakness. Finally, an EMG was performed confirming the diagnosis of amyotrophic lateral sclerosis (ALS).

Discussion and Take Home Points: The differential diagnosis of hypercapnic respiratory failure is extensive. It is important to consider neuromuscular causes of hypercapnic respiratory failure, such as ALS, when working up patients with respiratory failure. There are a number of tools, such as assessing vital capacity with spirometry and measuring negative inspiratory force that assist with diagnosing respiratory muscle weakness, and can assist in the diagnosis of neuromuscular hypercapnic respiratory failure.

Carla Schultz, MD, Wendy Miller, MD

Crying Over Raw Milk: A Painful Presentation of Brucellosis

Introduction: Brucellosis can present as a broad variety of non-specific symptoms. Patients who are at risk for brucellosis often have risk factors for several other uncommon, insidious infectious diseases. The presence of epididymitis should increase suspicion for brucellosis when a patient has risk factors for several non-specific febrile illnesses. Case Presentation: A 32-year-old man established care with a doctor because of four weeks of weight loss, fatigue, and nightly fevers. These symptoms began six weeks after visiting Somalia. As a more recent complaint, he also suffered from left testicular pain for several days. An outside provider had prescribed a course of antibiotics at the onset of the testicular pain and given the patient a diagnosis of epididymitis. The
antibiotics had mildly improved his nightly fevers. The physical exam revealed a cachectic man with left testicular epididymal edema and exquisite tenderness. Because the patient had symptom improvement with antibiotics, investigations focused on searching for an infectious source of illness. Additional history revealed that the patient had consumed unpasteurized camel milk every day during his recent trip to Somalia. A Brucella antibody titer was obtained which was markedly elevated (1:640). After receiving the appropriate treatment for brucellosis, the patient’s symptoms fully resolved. Discussion: This case illustrates an unusual presentation of brucellosis that included epididymitis. Epididymitis occurs in ten percent of men with brucellosis. Brucellosis should be included in the differential when a patient presents with testicular pain and has recent travel to an area where unpasteurized milk is consumed. Such a specific, localized complaint can aid in narrowing an initially broader differential for febrile illness. This patient also provides an example of the importance of providing education to patients about the dangers of unpasteurized food before they travel abroad to visit friends and relatives.

Juliette Segranes, MD,
Dr. Eddie L. Greene

Alcoholic Hyponatremia Masquerading As A STEMI?
Introduction: ST segment elevation myocardial infarctions (STEMI) are medical emergencies requiring immediate intervention. Percutaneous coronary intervention (PCI) performed within 90 minutes of presentation is the preferred treatment option and reduces morbidity and mortality.1 We present a patient with chronic alcoholism and severe hyponatremia who had an electrocardiogram (EKG) demonstrating changes consistent with a STEMI in the setting of alcoholic myocarditis. Initial Presentation: A 47 year old female with a past medical history significant for a remote history of gastric bypass surgery, active excessive alcohol consumption, and accompanying decreased nutritional intake presented to the emergency department (ED) with nausea, vomiting, as well as chest and abdominal pain. An EKG was obtained and demonstrated a STEMI in the inferior leads. The patient was transferred for PCI and underwent coronary angiography which revealed normal coronary arteries. Prior to angiography the patient had a tonic-clonic seizure and was found to have severe hyponatremia at 105 meq/L. She was treated with hypertonic saline and her seizures abated. Her serum sodium was corrected slowly over the next several days to prevent central pontine myelinolysis (CPM). Subsequent EKG changes and regional wall motion abnormalities on echocardiogram were consistent with alcoholic myocarditis. The severe hyponatremia was secondary to chronic low solute intake related to alcoholism, decreased nutritional intake, and recent large volumes of free water ingestion.2 Discussion: Most STEMIs identified on EKG are true medical emergencies requiring immediate intervention. On rare occasions patients will have normal coronary arteries leading to a search for alternative diagnoses. Our patient had accompanying severe hyponatremia and required hypertonic saline therapy to treat seizures. The therapy for hyponatremia depends on the cause. Basic principles include using hypertonic saline in symptomatic individuals with tonic-clonic seizures. When correcting the serum sodium, the goal is to initially increase by 2-3 meq/L if symptoms are present. Subsequent
goals are to limit increases in serum sodium to less than 6-8 meq/L per
day to reduce the likelihood of potential neurologic sequelae including
CPM, especially in the higher risk patients with underlying alcoholism.
References 1. O’Gara, PT et al. 2013 ACCF/AHA Guideline for the
Management of ST-Elevation Myocardial Infarction: A Report of the
American College of Cardiology Foundation/American Heart Association
e425. 2. Thaler, SM et al. “Beer potomania” in non-beer drinkers:

Conor Senecal, MD,
Donna Miller M.D.

Cryptic Liver Mass as a Cause of SIRS
Introduction: The differential diagnosis of liver lesions is strongly
influenced by clinical history and radiographic appearance; these can be
misleading, which reinforces the importance of maintaining a broad list
of potential etiologies. Case Description: A 42 year old previously
healthy male transferred from an outside hospital where he presented
with acute onset right sided abdominal pain, leukocytosis, and a
microcytic anemia. History revealed the patient worked as an
international photographer, traveled to the Middle East, Africa,
Australia and Mexico, and enjoyed eating raw meat and seafood. He
had previously been treated for malaria, Lyme disease, and multiple
episodes of diarrheal illness. Labs were notable for WBC: 18.5, Hg: 11.8,
AST: 431, ALT:187; blood cultures and serologies for entamoeba
histolytica and echinococcus granulosus were ordered. Initial CT of the
abdomen showed an 8.5 cm heterogeneous solid and cystic mass
located in the caudate lobe of the liver. Soon after admission, he
developed a fever (38.6 C). Mild abdominal pain, fever and leukocytosis
persisted for many days. Vital signs remained otherwise stable. A dual-
phase repeat CT scan demonstrated interval enlargement of the mass
to 9.9 cm and new hemoperitoneum. With centripetal enhancement on
delayed phases, radiology’s interpretation suggested an underlying
giant cavernous hemangioma that had bled. Our differential diagnosis
included hemangioma, neoplasm, bacterial abscess, amoebic abscess,
and hydatid cyst. SIRS and heterogeneous CT appearance suggested
possible abscess. Travel and exposure history, microcytic anemia, and
history of colitis raised concern for amoebic abscess. We started
cefepime and metronidazole as empiric coverage of pyogenic and
amebic abscess. We considered diagnostic biopsy, but with possible
echinococcal infection and review of CT appearance with infectious
diseases, the potential risk of anaphylaxis and disseminated infection
ouweighed the benefit. SIRS criteria persisted despite antimicrobial
treatment. Blood cultures had no growth. Serologies returned negative
for amoebic or echinococcal antibodies. Since repeat imaging results
suggested hemangioma, hepatic angiogram was pursued to
characterize lesion blood flow; this revealed flow from the left hepatic
artery without dominant vessel, and the mass could not be definitively
categorized. With multi-disciplinary medical subspecialty and surgical
input, a decision was made to proceed with surgical removal. The
patient tolerated the procedure well and was discharged 4 days
following surgery. Final pathology revealed an inflammatory type
hepatic adenoma. Discussion: Hepatic adenomas are uncommon benign epithelial liver tumors that develop in an otherwise normal liver, typical risk factors include female gender and oral contraceptive use. Inflammatory adenomas are the most common subgroup and can produce a clinical presentation of SIRS that may mimic infectious etiologies. They are also radiographically challenging due to the frequent complication of bleeding (approximately 30% in inflammatory subgroup), which causes a heterogenous appearance that can mimic multiple liver lesion etiologies.

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<tr>
<th>Jon Senkler, DO, Gretchen Crary, MD</th>
<th>Type B lactic acidosis due to mitochondrial dysfunction secondary to metformin and lamivudine</th>
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<td>Type B lactic acidosis due to mitochondrial dysfunction secondary to metformin and lamivudine. Jon Senkler, DO†, Gretchen Crary MD¥ Dept. of Internal Medicine†, Dept. of Laboratory Medicine and Pathology¥, Hennepin County Medical Center, Minneapolis, MN Both metformin and nucleoside reverse transcriptase inhibitors (NRTIs) can potentially cause lactic acidosis. The exact mechanism of their effect is unclear, but NRTIs may inhibit DNA polymerase-γ which interferes with mitochondrial DNA synthesis. One of the more severe outcomes is lactic acidosis. A 54 year old women with past medical history of HIV and type 2 diabetes presented with nausea, vomiting, diarrhea, and low back pain. She was hypotensive with an initial blood pressure of 60/40 and on labs had a profound acidosis with a pH of 6.7, anion gap of 27, lactate of &gt;14.8 and bicarbonate of 4. She was subsequently intubated and required three vasopressors, IV fluids, several amps of bicarbonate, and hydrocortisone. Emergent dialysis followed by continuous renal replacement therapy (CRRT) corrected the acidosis. Following labs and infectious workup were unrevealing as to the etiology of the acidosis. Thus it was concluded, that although rare, she was suffering from mitochondrial dysfunction due to metformin and lamivudine. This case illustrates the potential for lactic acidosis due to mitochondrial dysfunction in the setting of metformin and lamivudine. Both metformin and lamivudine are associated with lactic acidosis however a patient on both medications resulting in type B lactic acidosis has not been previously described. Prompt recognition of metformin or lamivudine when prescribing may prevent devastating metabolic acidosis. Further research is needed to determine if both of these medications act synergistically or are independent risk factors.</td>
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<th>Shemal Shah, MD</th>
<th>The Kidney or the Brain? The Heart is to Blame</th>
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<td>Renal infarction is an infrequently encountered diagnosis with a less than 1% reported incidence. The most common etiologies are either thromboembolic phenomenon or intrinsic renal artery injury, with the mainstay of treatment being anticoagulation barring any contraindications. A 48 year old Saudi Arabian visitor accompanied by a translator presented to the hospital, initially complaining of severe left flank pain with CT showing an acute left renal infarct and a chronic infrarenal aortic thrombus. Anticoagulation was initiated but on further interview he admitted to a plethora of other complaints suggestive of vascular pathology such as prior MI and stroke, lower extremity claudication, postprandial abdominal pain, weak erections, and occasional darkening of his vision with a current vision deficit that</td>
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began one week ago. Examination revealed a right homonymous upper quadrant anopia, concerning for a left occipital stroke, likely embolic in nature. The conundrum was whether to anticoagulate in order to prevent another embolic event to the remaining kidney or to hold anticoagulation given the possibility of hemorrhagic transformation of a recent stroke. The decision was made to continue anticoagulation while an MRI with diffusion weighted sequence was obtained. It revealed bilateral acute occipital strokes with a punctate right occipital hemorrhage that was deemed small enough to warrant continued anticoagulation. The following day, an echocardiogram revealed a left ventricular thrombus, the likely source for the embolic events and thus it mandated anticoagulation. This case illustrates the difficulty in clinical decision making encountered when faced with continuing anticoagulation in the setting of acute embolic stroke of unknown etiology, since it is well-known that embolic strokes have a higher tendency to undergo hemorrhagic transformation in the acute phase, especially if the patient is anticoagulated. In this case, without knowledge of the ventricular thrombus, the decision was difficult but ultimately anticoagulation was continued in order to prevent further thromboembolic events.

Korosh Sharain, MD, Vincent Rajkumar

A Curious Case of Cold Toes

CASE: A 65-year-old man with hypertension, hyperlipidemia, and gout presented to the emergency department with worsening bilateral foot pain and black toes. He described 8/10 foot pain which began one month prior to presentation that was treated with NSAIDS and gabapentin without significant relief. Over the subsequent weeks he developed blue discoloration of the tips of his toes which eventually turned black. He described worsening pain in the cold for which he would place blankets on his feet. He denied any preceding trauma, fevers, night sweats, or weight loss. On presentation, he was afebrile, blood pressure was 191/115 mmHg and heart rate was 110 bpm. His exam was notable for 2+ bilateral lower extremity edema to the mid-leg, nonpalpable dorsalis pedis pulses, livedo reticularis and dry gangrene of the distal toes bilaterally. Labs were significant for hgb of 9.0 g/dL, WBC of 13.7x10(9)/L, creatinine 2.3 mg/dL (baseline 0.9), ESR 140 mm/1-hr, and CRP 71 mg/L. Urinalysis had RBCs without casts or dysmorphic cells and predicted a 24-hr protein of 6.4g. He was initially evaluated with lower extremity ultrasound and Dopplers, and ankle-brachial indices which were normal. Vasculitis evaluation with ANCA’s, ANA, and HCV were negative, and a DIC panel was unrevealing. An echocardiogram did not demonstrate a possible embolic source. A peripheral blood smear was performed to evaluate his anemia which demonstrated rouleaux formation; therefore, suspicion arose for a paraproteinemia. Serum protein electrophoresis and immunofixation demonstrated a monoclonal gammopathy in the IgG region with a kappa/lambda free light chain ratio of 241. Cryoglobulins were also present at 15%. A bone survey demonstrated a left femoral neck lytic lesion. A subsequent bone marrow biopsy demonstrated 80% involvement by plasma cells. Therefore, he was diagnosed to have multiple myeloma with type I cryoglobulinemia and light chain cast nephropathy. He was treated with plasmapheresis along with
cyclophosphamide, bortezomib, and dexamethasone. His cryoglobulins disappeared after two treatments of plasmapheresis. He also eventually underwent stem cell transplant for his multiple myeloma and ultimately required amputation of his right second toe. **DISCUSSION:** This case highlights the importance of understanding the differential diagnosis of distal extremity gangrene. Common causes of distal extremity gangrene includes arterial occlusion from atherosclerotic disease or embolic phenomenon, severe venous occlusion, vasculitis, or infectious causes. However, cryoglobulinemia must be considered when venous and arterial studies are unrevealing. Cryoglobulins are serum immune-globulins that precipitate at temperatures <37°C and can dissolve at warmer temperatures. A history of worsening pain with cold temperatures should heighten clinical suspicion. Cryoglobulinemia can be associated with plasma cell dyscrasias such as multiple myeloma, HCV, mycoplasma pneumoniae, and autoimmune diseases such as lupus and rheumatoid arthritis. Management includes removal of the cryoglobulins with plasmapheresis and treatment of the underlying cause.

**Parvati Singh, MD**

**Double Edged Sword of Therapeutics: Drug Induced Steatohepatitis**

The etiology of hepatitis can be difficult to determine during a patient encounter due to the multitude of causes that can lead to liver injury. This difficulty was seen with this patient, a 28 year old female with a past medical history of HIV, polysubstance abuse, depression, and s/p cholecystectomy. She presented to the hospital with one week history of right upper quadrant abdominal pain, nausea, vomiting, jaundice, productive cough, pleuritic chest pain, and a fever of 103.3°F. The patient’s HIV was well controlled as her CD4 >1060 and HIV RNA < 48. Her HIV was treated with emtricitabine-tenofovir, darunavir ethanolate, and ritonavir; depression with amitriptyline; and abdominal pain with acetaminophen. It was also noted that the patient has been abstaining from alcohol for the past two years and last used heroin one month prior to hospital presentation. Relevant labs showed elevated LFTs (Alk Phos 289, AST, 73, ALT 43, and Total Bilirubin 6.6), leukocytosis, elevated lactate, negative blood cultures, negative viral hepatitis panel, non-toxic acetaminophen levels, negative CMV, and negative EBV. A left basilar opacity, indicating possible pneumonia was seen on chest X-ray and treated with antibiotics. Due to the cholestatic pattern to the liver enzymes, multiple imaging modalities were utilized to narrow down the differential. Information collected from abdominal CT, US, MRI, and MRCP included hepatomegaly, diffuse steatosis, mild splenomegaly, patent portal and hepatic vasculature, and no calculi in the pancreatic or biliary ducts. An ERCP showed a normal cholangiogram and nothing in the biliary tree; a sphincterotomy was also performed. Based on the information collected, the long differential of hepatitis (alcohol, viral, heroin, acetaminophen, AIDS cholangiopathy, sepsis, cholangitis, etc.) was narrowed down to drug induced steatohepatitis. The possible culprits included amitriptyline and Truvada (emtricitabine-tenofovir). Truvada was the most likely etiology of this acute hepatitis presentation because this medication is associated with hepatomegaly with steatosis and lactic acidosis, as seen in this patient. Truvada and amitriptyline were held and LFTs improved. In conclusion, many medications in addition to their therapeutic benefit can also be causes of liver injury.
Antiretroviral medications such as Truvada is included in this iatrogenic list. This case illustrates the importance of considering antiretroviral therapy in the differential when a HIV patient presents with acute hepatitis. It may also be useful to consider whether there is a need to monitor liver function in patients on antiretroviral therapy.

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<th>Bonnie Sohn, MD</th>
<th>Are you sure it’s Histo?</th>
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<td>Consider fungal infection when immunosuppressed patients respond poorly to antibacterial medications for fever and productive cough.</td>
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<td>Case: A 59 year old woman from Minnesota with a history of rheumatoid arthritis (on tofacitinib, methotrexate, prednisone, and prophylactic valacyclovir) presented to clinic in Mid-April with a week of persistent cough, yellow sputum, and oral ulcers. Vitals were stable and exam noted tongue lesions but clear lungs. She was treated with azithromycin, inhaled fluticasone, and increased valacyclovir. Two weeks later, she returned with constant non-productive cough, worsening oral ulcers, fever, chills, and confusion. She was afebrile, had thick green coating on tongue lesions, and a normal neurologic examination. Anti-HSV-IgM was negative. CBC was normal. Brain MRI had no acute pathology. Valacyclovir was increased further and tofacitinib and methotrexate were held. Five days later, she presented to the ED with acutely worsening respiratory symptoms and new rash. Vitals were T 98.5 F, PR 121, RR 20, BP 136/90, SpO2 94% on RA, and 10 pound weight loss. Exam showed flushed skin, punctate lateral tongue lesions with white coating, multiple erythematous macules and blanching papules on extremities and abdomen, and clear lungs with occasional crackles. CBC, lactate, and BNP were normal. BMP suggested dehydration. D-dimer was elevated at 2.42. Chest CT showed a large hiatal hernia but no acute infiltrates. Infectious and rheumatologic workup were initially negative except for CRP of 12. On Day 4 of admission, Histoplasma test revealed (+) serum antibody, (+) mycelial phase 1:256 (+ if &gt; 1:32), (+) H&amp;M bands (if both + suggests active histoplasmosis), (+) serum blood antigen 9.41, and (+) urine antigen 21.10 (+ if &gt; 0.50). Skin biopsy was negative for vasculitis. GMS stained tongue biopsy showed yeasts with morphologic differential of Histoplasma vs Candida. Patient was started on itraconazole but developed new hypoxia the following day. CT showed faint patchy ground-glass opacities throughout the lung. Immune reconstitution like inflammatory syndrome vs aspiration pneumonitis in the setting of a large hiatal hernia was favored over pulmonary histoplasmosis. On hospital Day 11, she improved and was discharged on oxygen. In June, at clinic, exam noted reduced oxygen requirement and weight gain. In Mid-July, she was able to undergo a laparoscopic repair of the hiatal hernia without complications. Discussion: Histoplasmosis is the most prevalent endemic mycosis but usually self limited. Our patient, on a newer biologic immunomodulator, on the other hand, was at great risk for disseminated histoplasmosis, which manifested as fever, cough, oral ulcers, and erythema nodosum. It can also involve the gastrointestinal tract, adrenal glands, central nervous system, and the heart. Tofacitinib concomitantly used with methotrexate appears to have significantly increased our patient’s risk for opportunistic infection when compared to older biologic agents.</td>
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Ertapenem is a long-acting, lipophilic carbapenem that is predominantly cleared through the kidneys. The spectrum of carbapenem neurotoxicity is unclear with most literature characterized by adverse seizure development. Emerging case reports, however, have revealed an association between ertapenem and acute renal failure resulting in hallucinations, aphasia and movement disorders. A 56 year old gentleman presented to our institution with one week of increasing confusion and gait instability with progressive development of vivid debilitating hallucinations, transient aphasia and athetosis. He had a past medical history significant for Stage IIIa squamous cell carcinoma of the right lung status post chemoradiotherapy, bilobectomy complicated by polymicrobial empyema and acute kidney injury one month prior to presentation. The infection resolved and kidney injury persisted (eGFR 38) with transition to ertapenem 1g IV daily in the outpatient setting twelve days prior to presentation. Over the following week, he experienced progressive gait instability characterized by shuffling gait and imbalance with recurrent mechanical falls and interval development of confusion, prompting presentation to our institution. On admission he demonstrated waxing and waning level of consciousness and alertness with intermittent unintelligible speech, in addition to residual kidney injury. Ertapenem was discontinued on presentation secondary to concern for developing encephalopathy. Over the next 3 days, he displayed a highly variable level of consciousness. He presented a spectrum of speech primarily characterized by babbling incomprehensible phrases, mumbled sentences and recurrent iterations about visual hallucinations involving humans and animals. He was intermittently able to respond to verbal commands, appearing frustrated with limited comprehension. Concurrently, he exhibited persistent insomnia with athetosis and myoclonus, worsened in the evening. Extensive infectious and neurological work-up were unrevealing. EEG was significant for moderate degree of diffuse slowing superimposed on excess beta-activity. On day 4 of hospitalization, he displayed a fairly rapid improvement in speech, attention and voluntary movements, subjectively relating it to an emergence from a dream-like state. At that time, he was able to largely recall the prior four days in vivid detail noting four distinct rotating visual hallucinations fixated on various human and animal impostors intermixed with reality, resulting in a highly disturbing and frustrating experience for the patient. The primary intervention was ertapenem cessation resulting in subjective and objective resolution of symptoms. This case demonstrates the importance of considering the pharmacokinetics of emerging medications and the relationship to adverse drug events. Ertapenem is a novel carbapenem that is seeing increased utilization with the convenience of once daily dosing. However, its long half-life and volume of distribution also predisposes to drug accumulation in the setting of decreased clearance. Timely recognition and intervention are key to avoiding harmful sequelae. As utilization increases, vigilant post-marketing surveillance and thoughtful attention to pharmacokinetics will help define at-risk populations.
| Paolo Strati, MD, Tony Y Chon | **Atypical Presentation of a Common Disease of the Elderly**
Delirium, an acute decline in attention and cognition, is a common, life-threatening, and potentially preventable clinical syndrome among persons who are 65 years of age or older. Infections, metabolic abnormalities and medications are considered common causes, but some rare reversible etiologies are sometimes missed. The patient is a 76 year-old female who was admitted to the hospital with ongoing difficulties with delirium. Past medical history was noted for hypothyroidism currently on replacement therapy and ascending thoracic aorta aneurysm repaired surgically 6 months prior to admission to the hospital. One month prior to admission, she became frankly psychotic with inappropriate behavior and visual hallucinations. Outside hospital evaluation included an electroencephalogram (EEG) demonstrating diffuse slowing of brain waves suggestive of an underlying metabolic abnormality. MRI of the brain, sampling of the cerebral spinal fluid (CSF) and laboratory evaluations were unremarkable, and no specific metabolic or infectious cause could be identified. On admission, vital signs were normal and neurological examination was non-revealing as to the cause of her subacute delirium. Repeated lumbar puncture showed elevated proteins, and repeated laboratory evaluation showed mildly elevated Erythrocyte Sedimentation Rate (ESR) (38 mm/hr) with normal C-reactive protein (CRP) level. Given the patient’s advanced age, a Positron Emission Tomography (PET) scan was requested to rule out for paraneoplastic autoimmune encephalitis: this revealed FDG-avidity of the aortic root and branches, suspicious for vasculitis. Review of the surgical sample from the aorta obtained 6 months before retrospectively showed lymphoplasmacytic infiltrate, consistent with giant cell arteritis (GCA). Patient was treated with boluses of methylprednisolone followed by maintenance with oral prednisone. This resulted in gradual improvement and complete resolution of psychiatric symptoms. Giant cell arteritis is the most common systemic vasculitis affecting elderly patients in Western countries. The classic presentation of GCA with headache and visual symptoms is well recognized, but it is also important to make the diagnosis when patients present with atypical symptoms such as those of our patient. Although atypical symptoms are rare, recognizing and treating patients with atypical presentations can lead to a substantial decrease in morbidity. |

| Jacob Sundberg, MD | **Listen to your patient, he’s telling you the diagnosis” … except when he has receptive aphasia: an interesting case of subacute bacterial endocarditis**
The yearly incidence of infective endocarditis in the United States population is approximately 15 in 100,000. In addition to being uncommon, it is a difficult diagnosis to make due to the variation of clinical presentations in any given individual. In this case, a 65 year-old male was found in bed after missing two days of work. He was alert and conscious, but was too weak to get out of bed. He was brought to an outside facility where the only history that could be obtained from the patient was a history of recurrent urinary tract infections and a recent urinary tract procedure. At the outside hospital, his physical exam was notable for tachycardia, tachypnea, aphasia, right-sided weakness, and |
bilateral lower extremity edema. Labs were remarkable for a leukocytosis, anemia, acute kidney injury, and a troponin elevation. EKG showed normal sinus rhythm with old septal Q waves. He was transferred to the VA Medical Center for management of NSTEMI. CT of his head was obtained upon arrival and a subacute cerebral infarct was noted with secondary petechial hemorrhage. At this point, an echocardiogram was obtained to work-up causes of his ischemic stroke. Large vegetations were found on both the aortic and mitral valves. Blood cultures from the outside hospital grew Enterococcus, the same organism that had caused this patient to have chronic bacterial prostatitis both before and after his transurethral resection of the prostate just several months prior. Despite initiating antibiotics, the patient decompensated. Cardiothoracic surgery deemed that the patient would have required a double-valve replacement, however he was a poor surgical candidate. The patient was transferred to comfort cares at the wishes of his family and died on hospital day 18. There were several take home points from this case. First, the patient’s recent medical issues and primary care visits may have provided crucial information that could have led to an earlier diagnosis. The patient had been seen by his primary care provider just weeks prior to presentation with complaints of fatigue, myalgias, and lower extremity swelling. This emphasizes the importance of obtaining a good history from the patient, family, and/or electronic medical records. Also, it is important not to anchor oneself to the diagnosis provided by previous providers. This patient was transferred for NSTEMI management, however his troponin elevation was not due to an acute coronary syndrome and this anchoring bias may have led to a delay in antimicrobial therapy for his subacute bacterial endocarditis.

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<th>Dharma Sunjaya, MD, Matthew Koster, Thomas Osborn</th>
<th>Clotting, Bleeding, and Stenting – A Case of Chest Pain Complicated by Lupus and Antiphospholipid Syndrome</th>
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| Introduction: Systemic Lupus Erythematosus (SLE) is an autoimmune condition with widespread organ involvement. Cardiac manifestations can include inflammation of peri-, myo-, and endocardial layers as well as an increased risk for accelerated coronary atherosclerosis. Antiphospholipid syndrome (APLS), a prothrombotic condition affecting both venous and arterial vessels, is frequently associated with SLE and can result in pulmonary embolism or alveolar hemorrhage. The diagnosis and management of pleuritic chest pain in the setting of known SLE and APLS can be challenging. Case Description: A 61 year-old female with history of SLE on warfarin for secondary APLS complicated by recurrent venous thromboembolism and stroke was transferred to our hospital for management of acute pleuritic chest pain and hypoxic respiratory distress. On arrival, the patient was hypotensive and hypoxemic requiring transient vasopressor and non-invasive ventilatory pressure support. Chest pain resolved soon after initiation of ventilatory assistance. Physical examination noted bilateral lower lung field inspiratory crackles, normal cardiac auscultation and a non-distended jugular venous pulse. Unilateral right lower extremity swelling was present and an acute deep vein thrombosis was found on ultrasonography, prompting heparin infusion. Laboratory values demonstrated a mild normocytic anemia at 10.9 g/dL, modestly
elevated C-reactive protein (13 mg/L) and a significantly elevated troponin level (1.8 ng/mL). Electrocardiogram revealed 0.5 mm ST segment depressions in leads V4-V6. Transthoracic echocardiogram (TTE) showed a left ventricular ejection fraction (LVEF) of 59% and normal regional wall motion. Chest CT demonstrated diffuse ground glass opacities and intravenous antibiotics were empirically initiated. The patient’s respiratory status precipitously declined requiring intubation. Bronchoscopy with alveolar lavage showed progressive bloody return indicating diffuse alveolar hemorrhage (DAH) and pulse dose intravenous methylprednisolone was started. Despite resolution of DAH within 24 hours, troponins remained elevated and pleuritic chest pain recurred. A repeat TTE disclosed a 15% decrease in LVEF and development of global ventricular akinesis. Coronary angiogram found severe multi-vessel coronary atherosclerosis including 90% stenosis of the proximal left main. Although coronary artery bypass grafting is the preferred intervention for coronary reperfusion in left main and multi-vessel disease, our patient was deemed too high of an operative risk. Complex angioplasty with placement of five drug-eluting stents led to immediate resolution of chest pain, hemodynamic stability, and a discharge 72 hours later in good condition. Lesson: This case highlights several important lessons. APLS is a prothrombotic state that can manifest as a bleeding diathesis, such as DAH, requiring steroids and anticoagulation. Patients with SLE have an accelerated rate of atherosclerosis, developing acute coronary syndrome often in the absence of conventional cardiovascular risk factors. Patients with SLE and active APLS have extremely high risk of intra and postoperative morbidity and mortality associated with cardiovascular surgery and complex percutaneous intervention may be reasonable in such cases.

Nicholas Tan, MD, John C. Morris III, MD

Hashimoto’s Thyroiditis in the Setting of Autoimmune Retinopathy

Autoimmune retinopathy is a rare immunologic disorder characterized by progressive vision loss in the presence of anti-retinal antibodies. Its association with other autoimmune diseases such as Hashimoto’s thyroiditis has not been well-studied. Case Description: A 34-year old previously healthy man presented with a 5-year history of increasingly foggy vision in his right eye. Visual tests revealed a para-central scotoma in the right eye; best corrected visual acuity was 20/100 (20/20 in the left eye). Head MRI did not identify abnormalities in the optic nerve, optic tract, or optic chiasm; no intracranial mass or hemorrhage was observed. Electoretinogram demonstrated markedly depressed scotopic (rod) and photopic (cone) responses in the right eye; the left eye appeared normal. Further laboratory investigation revealed the presence of anti-retinal and anti-optic nerve antibodies. In addition, immunohistochemistry testing was positive for staining of the photoreceptor cell layer, outer nuclear layer, ganglion cells, and nerve fiber layer within the retina. He was therefore diagnosed with autoimmune retinopathy and plans for further workup and treatment were made. The patient underwent CT scans of the chest and abdomen/pelvis which were negative for occult malignancies; testicular ultrasound was also normal. His paraneoplastic panel returned negative. On a return visit two weeks later, he reported a weight gain of 10kg and decreased energy levels for the past 3 to 4 years. His vital
signs were within normal limits; BMI was 30. His physical exam was remarkable for a diffusely enlarged, non-tender thyroid gland (about 40g). Thyroid function tests were ordered: thyroid stimulating hormone was 14.1 and free thyroxine was 0.8. A diagnosis of Hashimoto’s thyroiditis was made and he was started on levothyroxine replacement therapy. Of note, the patient described a strong family history of autoimmune disorders including multiple sclerosis, hypothyroidism, and Raynaud’s phenomenon. Interestingly, his cousin was also previously diagnosed with autoimmune retinopathy as well as hypothyroidism and insulin-dependent diabetes mellitus. Discussion: Autoimmune retinopathy frequently occurs in the setting of a malignancy, the most common being small-cell lung cancer, gynecologic carcinomas (breast and ovary), and melanoma. There is little epidemiological data on autoimmune retinopathy, although women are twice as likely to be affected as compared to men. One case series of autoimmune retinopathy patients also described a particularly high prevalence of autoimmune disease history, both personal and family. This case highlights the diagnosis and workup of a relatively rare disorder as well as the need to consider testing for autoimmune disorders such as Hashimoto’s thyroiditis, especially in light of positive symptomatology.

### From Nasal Congestion to Intestinal Perforation

Due to the variable ways by which they present, systemic diseases provide some of the most challenging diagnostic mysteries in medicine. In this case, a 64 year-old woman with no past medical history presented to emergency department with polyarthralgias five days after initiation of augmentin for persistent sinusitis. Exam was notable only for minimal distal interphalangeal joint tenderness in the second and third fingers and lab studies were notable for CRP of 136. Her symptoms initially improved with administration of steroids. Polyarthralgias recurred, however, so she went to her primary physician. The physician prescribed a second trial of steroids plus indomethacin. The polyarthralgias improved again with steroids but indomethacin caused severe bloody diarrhea and was stopped. Seventeen days later, she presented to the emergency department with severe periumbilical abdominal pain and nonbloody emesis. CT revealed perforated sigmoid colon diverticulitis with large abscess involving the bladder wall. The patient was taken to the operating room urgently for laparoscopy and partial colectomy. The colon biopsy results revealed a disease process that rarely manifests in the GI tract. This case provides an opportunity to review pattern recognition for this inflammatory disease along with proper workup and diagnostic strategies.

### CKD Checkpoint-- An unusual case of obstructive uropathy

Chronic kidney disease (CKD) is inevitably progressive and results in significant morbidity and mortality. The internist’s role in the treatment of CKD is to identify its cause and appropriately stage it to ensure optimization of modifiable risk factors and treatment of comorbidities. This clinical vignette illustrates the catastrophic complications of a rare yet reversible cause of kidney disease. Our goals are to review unique features associated with lithium induced nephrotoxicity as well as help the clinician recognize the importance of
excluding reversible causes of renal failure before committing a patient to long-term hemodialysis. This often requires renal imaging and sometimes even gynecological examination. **CASE DESCRIPTION:** The patient is a 74 year old woman with a history of hypertension, hyperlipidemia, well controlled type II diabetes, coronary artery disease status post CABG, and bipolar disorder who developed end stage renal disease presumed to be secondary to lithium toxicity requiring intermittent hemodialysis complicated by a tunneled line associated bloodstream infection. She was hospitalized and found to have MSSA native mitral valve endocarditis with a large bilobed, highly mobile vegetation complicated by septic embolic strokes, new heart block and mitral regurgitation. On initial evaluation the patient was noted to have marked uterine procidentia with a visible cervix and cystocele outside the vagina. No renal imaging had been obtained prior to initiation of dialysis. CT abdomen confirmed complete uterine prolapse as well as prolapse and obstruction of both distal ureters resulting in marked bilateral hydronephrosis and renal parenchymal atrophy. The patient ultimately underwent surgical repair of the mitral valve followed by an ill-fated two month ICU stay and died soon after withdrawal of care. **DISCUSSION:** Any patient with oliguria or signs of renal failure with non-prerenal pattern warrants renal ultrasonography to exclude hydronephrosis. This is because of the overlap between intrinsic and post-renal disease on urinary and serum analysis (FeNa >2%, urine sodium >40mEq/L, urine osmolality <400mOsm/kg). Although chronic lithium ingestion is classically known to cause nephrogenic diabetes insipidus, it may also lead to a variety of other intrinsic causes for renal failure including chronic tubulointerstitial nephropathy. In post-renal disease, there is often a history of urgency, frequency, or hesitancy; exam is notable for bladder distention, a pelvic mass, or prostate enlargement; and imaging is consistent with bilateral hydronephrosis. In the adult, extrinsic post-renal disease is commonly secondary to benign prostatic hyperplasia, malignancy, or nephrolithiasis. Our case highlights pelvic organ prolapse as a rare but reversible cause of obstructive uropathy that should also not be overlooked. When faced with acute or chronic renal disease, clinicians should evaluate older women with a full urogynecologic exam as well as with renal ultrasonography. If not promptly identified end stage renal disease may ensue.

| Beth Thielen, MD, Ann Settgast | **A fluke diagnosis**  
A 39-year-old Karen woman presented to clinic with a 10-year history of recurrent, month-long episodes of severe right upper quadrant abdominal pain. Two months prior, she had immigrated to the U.S. from a Thai refugee camp and two weeks prior had been briefly hospitalized at an outside facility for another such episode. Laboratory studies during that hospitalization were notable for eosinophilia of 1800 cells/microliter, a positive Echinococcus serology and an abdominal ultrasound that revealed a large complicated multi-cystic mass in the left hepatic lobe. Additional diagnostic testing performed in clinic were notable for persistent eosinophilia up to 7000 cells/microliter; multiple negative stool ova and parasite exams; a positive interferon gamma release assay for tuberculosis; positive |
serologies against Strongyloides stercoralis, Entamoeba histolytica and Toxocara spp.; and a CT scan of the abdomen that again revealed a large, multi-cystic liver mass. Due to consideration of Echinococcal disease and potential for inducing an acute hypersensitivity reaction from cyst rupture, biopsy of the lesion was delayed awaiting confirmatory serologies for Echinococcus spp, and the patient was started on empiric coverage with albendazole for Echinococcus infection, ivermectin for Strongyloides infection, and metronidazole for Entamoeba histolytica liver abscess. Approximately 6 weeks after the initial clinic visit, confirmatory serology for Echinococcus returned negative, and liver biopsy was performed, revealing grossly purulent fluid with large numbers of eosinophils and Charcot-Leyden crystals and no organisms identified. Patient continued to have persistent eosinophilia so additional serologies were performed, including a Fasciola serology that return strongly positive approximately 2 ½ months after the initial clinic visit. Triclabendazole was ordered from the Centers for Disease Control, and the patient completed a course of treatment, after which she experienced resolution of her eosinophilia and CT abnormalities. Although the parsimonious explanation may not always be correct in patients traveling from regions with many endemic parasites, this patient’s abdominal pain, profound eosinophilia and liver mass were all explained by a single unifying diagnosis of fascioliasis. These findings result from a stage in the parasite’s life cycle in which the fluke migrates from the intestines through the peritoneum and liver before finally arriving in the biliary system to mate. Typically a parasite of herbivores worldwide, Fasciola is a trematode, which can be contracted by humans eating contaminated watercress and other aquatic plants. As illustrated in this case, the infection can be challenging to diagnose because biopsy may not yield diagnostic material due to the migratory nature of the fluke. Furthermore, the symptomatic stage of trans-hepatic migration occurs prior to the production of detectable eggs in the stool. While multiple parasite infections were considered, very high eosinophilia is more typical of Fasciola infection, whereas Strongyloides and Echinococcus typically cause more modest eosinophilia.

Gwen Thompson, MD,  
Korosh Sharain, Rodrigo Cartin-Ceba

Cannonballs in Disguise
The differential diagnosis of multiple pulmonary nodules or “cannonball” lesions on chest imaging is broad including malignant, infectious, and autoimmune etiologies. When treatment for common conditions does not result in improvement, other etiologies should be investigated. Lymphomatoid granulomatosis (LYG) is a rare lymphoproliferative disorder associated with multiorgan involvement and constitutional symptoms. These characteristics make the diagnosis of LYG difficult to distinguish from other systemic diseases such as vasculitis and infectious processes. Herein, we discuss two cases of LYG that presented with multiple pulmonary nodules on imaging and were initially attributed to other disease processes. Case Presentations: A 61-year-old Caucasian male nonsmoker presented with four months of unintentional weight loss, malaise, nocturnal fevers, arthralgias, and a mild dry cough. Past medical history was insignificant. Examination was unremarkable. CT chest and abdomen showed multiple bilateral nodules.
pulmonary nodules and a lesion in the right lobe of the liver. A diagnostic evaluation including HIV antibodies, fungal serologies, QuantiFERON, ANA, anti-CCP, SPEP, and ANCAs were normal. CT guided biopsies of a lung nodule and liver lesion demonstrated necrotizing granulomas. Consideration was given to empiric treatment for granulomatosis with polyangiitis. After further discussion, a VATS biopsy was pursued. Pathology was consistent with LYG and chemotherapy with R-CHOP was initiated. A 53-year-old Caucasian female who was a past smoker, presented with six months of unintentional weight loss, drenching night sweats, and a mild dry cough. Past medical history was significant for rheumatic heart disease status post mechanical valve replacement. Chest xray demonstrated “cannonball lesions” and CT chest demonstrated multiple pulmonary nodules. Diagnostic evaluation including sputum cultures, fungal serologies, and ANCAs were negative. Earlier in her course, the patient was initially treated for infectious etiologies without improvement. Transbronchial biopsy was nondiagnostic. VATS biopsy was consistent with LYG and R-CHOP was initiated. Discussion: When evaluating a patient with multiple pulmonary nodules, it is important to keep the differential broad including metastatic cancer, lymphoma, infectious etiologies such as septic emboli, fungal infections, and tuberculosis, autoimmune diseases such as granulomatosis with polyangiitis and sarcoidosis and other conditions such as hereditary hemorrhagic telangiectasia. Early closure should be avoided when there is a rare presentation of a disease. Lymphomatoid granulomatosis is a rare lymphoproliferative disorder associated with EBV that mimics other systemic diseases. Knowledge of this disease and a high index of suspicion are necessary to make this diagnosis. Multiple lung nodules with concurrent skin or nervous system involvement suggest the diagnosis of LYG. The diagnosis is often confirmed pathologically along with positive in situ hybridization for EBV. Without treatment high grade LYG is often progressive and fatal. Treatment for high grade LYG consists of systemic chemotherapy, most commonly with R-CHOP.

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<th>Sean Tracy, MD, William C. Mundell</th>
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<td><strong>Statin-induced rhabdomyolysis as an initial manifestation of occult malignancy</strong></td>
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| A 75-year old male with a history of hyperlipidemia controlled for several years with rosuvastatin was started on metformin, for a new diagnosis of type 2 diabetes mellitus. Within two weeks of drug initiation, he developed severe fatigue, weakness, and muscle aches. Metformin was discontinued. Despite cessation, the patient’s weakness progressed to the point that he could not mobilize without assistance, and his urine output decreased precipitously. He presented to the emergency department and was diagnosed with rhabdomyolysis (creatine kinase 28,360 U/L, aldolase 135.7 U/L, myoglobin >5000 mcg/L), acute kidney injury (Cr 10.3 mg/dL, BUN 149 mg/dL, K 7.0 mmol/L), as well as a cholestatic pattern of transaminitis (AST 503 U/L, ALT 798 U/L, total bilirubin 3.0 mg/dL, direct bilirubin 2.7 mg/dL, and alkaline phosphatase 1798 U/L.) Hemodialysis was initiated, rosuvastatin was discontinued, and the patient’s creatine kinase, ALT, and AST all downtrended over several days. Bilirubin was not rechecked. EMG demonstrated predominantly proximal myopathy, but
an extensive rheumatologic evaluation for autoimmune myopathies was negative. The patient was diagnosed with statin-induced rhabdomyolysis; investigations into metformin-statin interactions revealed no known associations. The patient was discharged with close follow-up. He developed jaundice shortly after discharge which was found to be secondary to a progressive direct bilirubinemia. Direct bilirubin increased to a maximum of 12 mg/dL within one week. Abdominal ultrasound was performed and demonstrated dilatation of the common bile duct. Subsequent MRI demonstrated a mass of the pancreatic head measuring 3.2 x 3.0 cm, confirmed by biopsy to be pancreatic adenocarcinoma. Given these findings, the patient's rhabdomyolysis was thought to have occurred due to supratherapeutic rosuvastatin levels caused by biliary obstruction, secondary to occult pancreatic malignancy. Discussion: While all statins have the potential of causing either rhabdomyolysis or hepatic dysfunction, they do not typically occur simultaneously without cause. The incidence of either of these adverse effects is less common in patients who have previously tolerated long-term statin therapy. Another clue to the patient's underlying malignancy was his new diagnosis of diabetes mellitus; while rosuvastatin itself has been associated with a slight increase in the risk of type 2 diabetes, in general the acute onset of diabetes in a geriatric patient should raise suspicion for an underlying pancreatic malignancy. The chronology of events suggests an incipient pancreatic malignancy led to obstructive liver disease, which in turn led to statin-induced rhabdomyolysis. Conclusion: This case illustrates a severe adverse effect of a common medication administered in the setting of an unrecognized malignancy. Clinicians should be aware that the simultaneous onset of statin-associated hepatic dysfunction and myopathies may suggest the presence of hepatic obstruction. This case further highlights the importance of continued investigations when a unifying diagnosis for an unusual presentation is lacking.

Roses are red, violets are blue, polyneuropathy and plasma cells are key clues

A 38 year old male without past medical history presented with two weeks of abdominal pain and fatigue. CT revealed portal vein thrombosis; he was started on warfarin. Two weeks later, he was admitted for worsening abdominal pain, back pain, and bilateral lower extremity numbness. Portal vein thrombosis had progressed to involve the proximal splenic and superior mesenteric veins with splenomegaly. Testing was positive for heparin induced thrombocytopenia; hypercoagulability workup was otherwise negative. Serum protein electrophoresis showed a 0.2 g/dL monoclonal IgA lambda immunoglobulin, consistent with monoclonal gammopathy of undetermined significance. He was discharged on fondaparinux. One month later, he returned with progressive lower extremity weakness requiring use of a cane. EMG showed bilateral L5-S1 radiculopathy; symptoms stabilized following administration of IVIG but did not significantly improve. CT and bone scan were negative for bone lesions, but MRI showed enhancing lesions in R iliac and L sacral ala. Bone marrow biopsy showed normocellular marrow with megakaryocyte clustering; polyclonal plasma cells comprised 3-40% of cellularity.
skewed toward lambda light chain production. We began thorough evaluation for POEMS syndrome. He was found to have elevated VEGF level at 686 pg/mL, low free testosterone level with new erectile dysfunction, and hyperpigmented skin lesions. Treatment was initiated with cyclophosphamide and dexamethasone with plan for eventual autologous stem cell transplantation. DISCUSSION POEMS syndrome is a rare paraneoplastic process characterized by 1) polyneuropathy and 2) a monoclonal plasma cell disorder. In addition, diagnosis requires fulfillment of at least one major criteria (Castleman disease, sclerotic bone lesions, elevated VEGF) and at least one minor criteria (organomegaly, extravascular volume overload, endocrinopathy, skin changes, papilledema, and thrombocytosis or polycythemia). Due to the rarity of this syndrome and heterogeneous clinical picture, there is often a delay in diagnosis with median time from symptoms to diagnosis around 1.5 years. Median survival is approximately 14 years. The few case studies available suggest that the most common findings at presentation include bone lesions, thrombocytosis, peripheral edema, hepatomegaly, and skin changes in addition to the requisite polyneuropathy. Nearly 20% of patients experience arterial or venous thromboses during their disease course. No available case reports have identified thrombosis on initial presentation, making this a unique case of POEMS syndrome. In the absence of bone marrow involvement, treatment with radiation therapy to 1 or 2 isolated bone lesions may be curative. Alkylating agents or autologous stem cell transplant are the cornerstones of treatment in patients with bone marrow involvement. Initial presentation of paraneoplastic processes may be strongly suggestive of non-oncologic diseases. Persistence of symptoms in the face of adequate treatment for the presumed diagnosis should prompt expansion of the differential diagnosis and further workup.

Mazie Tsang, MD

Spells: A diagnostic conundrum

Spells can be a diagnostic enigma and have a wide differential. Here, we present a patient who had an unexpected cause of spells that should be considered in a patient who presents with fevers and spells. Case: A 73 year old man presented with spells, headaches, fevers, and cough. He had a history of pulmonary sarcoidosis on chronic prednisone, hypertension, hyperlipidemia, and recent knee arthroplasty who was recovering at a swing bed. During the hospitalization, he continued to have spells; no arrhythmia was seen on the cardiac monitor. Neurology was consulted and evaluated a spell, which was deemed to be consistent with seizures, so he was started on Keppra. MRI/A of the brain showed new, multi territory strokes and vascular changes concerning for vasculitis. A lumbar puncture was performed, which showed cryptococcal meningitis and blood cultures were also positive for yeast. Infectious disease was consulted, and he was started on Amphotericin and flucytosine. Electrolytes were aggressively repleted while on Amphotericin. The antibiotics he was on for a possible pneumonia were discontinued. The vasculitic-like changes and multiple strokes are thought to be secondary to the CNS infection. He had difficulties maintaining his potassium, magnesium and phosphorus levels on the Ambisome, but he stabilized on a regimen. He was eventually transitioned to fluconazole and flucytosine. Discussion:
Cryptococcal meningitis typically presents as an indolent process over a period of weeks. Most commonly, patients present with fever, malaise, and headache. Disseminated disease is suggested by cough, dyspnea, and skin rash or skin lesions resembling molluscum contagiosum. In a third of patients, stiff neck, photophobia, and vomiting may also be present. Initial exam may be notable for lethargy or confusion associated with fever. Although there is a high index of suspicion for cryptococcal meningitis in patients with HIV and a low CD4 count, it should also be considered in the differential in patients who are on chronic immunosuppression, especially if they are not improving despite other appropriate therapies.

Chung Sang Tse, MD, Arya B. Mohabbat, MD

The puzzling finding of a positive pregnancy test in a post-menopausal woman without ovaries

A 56-year-old woman presented to the emergency department with an acute onset of severe abdominal pain. Initial work-up revealed a positive pregnancy test. However, the patient states that she is post-menopausal and underwent a total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO) four years ago. How should the positive pregnancy test be interpreted? Pregnancy tests measure the level of human chorionic gonadotropin (hCG), a dimer consisting of a unique beta-subunit and an alpha-subunit, which is structurally identical to other pituitary glycoprotein hormones, including luteinizing hormone, follicle-stimulating hormone, and thyroid-stimulating hormone. Laboratory testing utilizes immunoassays to detect the presence of the hCG beta-subunit; the threshold for detection is ≥20 IU/L in urine and >1-5 IU/L in serum. Serum concentration of hCG increases with age; in women > 55 years old, a normal hCG can be as high as 13.1 IU/L. To account for this, our institution uses hCG values of >25 IU/L as the cutoff for positive pregnancy tests. False-positive pregnancy tests have also been reported to occur for a variety of reasons. One study demonstrated the importance of proper handling of hCG samples. The authors noted a high false positive hCG rate in their institution’s emergency department, which was subsequently found to be due to improperly cleaned test tubes previously utilized by pregnant women in their maternity ward. Besides handling errors, false-elevations of hCG may occur as a result of the test assay itself. Patients who have human anti-animal or heterophilic antibodies have been found to have false-positive hCG results that were corrected when the assay combined a heterophilic antibody blocking agent. Apart from causes related to testing methodologies, elevations in hCG in non-pregnant individuals include pathological conditions such as trophoblastic tumors, germ cell tumors with trophoblastic components, and non-trophoblastic tumors (ovarian, bladder, pancreatic, stomach, lung, and liver cancer). In the case of our patient, further history revealed that her TAH-BSO four years ago was part of an extensive abdominal debulking procedure for a serous ovarian adenocarcinoma. Her presentation of acute, severe abdominal pain was likely due to a small bowel obstruction secondary to adhesions as evidence by the air-fluid levels seen on an abdominal CT scan. She was managed conservatively with bowel rest and IV fluids. After two days of minimal improvement, an oral Gastrografin challenge was administered...
to provide intestinal decompression and the partial bowel obstruction was relieved. On hospital day four, the patient was discharged in stable condition. Our case illustrates that although the hCG test is a common, fast, and inexpensive component of the work-up for abdominal pain in women, there exists a broad differential for non-pregnancy related elevations in hCG that must be considered.

Cyril Varghese, MD, Suraj Sunder and Walt Wilson

But it's Just Meningitis!

S. pneumoniae is the most common bacterial cause of pneumonia in adults of all ages. Treatment strategies are quite straightforward for susceptible strains of S. pneumoniae. However, treatment of resistant strains in patients who also have allergies to various classes of antibiotics can be quite challenging. Case: A 45-year-old woman without history of facial or head trauma presented with headache, nausea and photophobia. Six months prior to the incident she had a week of URI symptoms and reported sneezing and nose blowing. This was followed by 6 months of unexplained rhinorrhea. When she presented to the hospital she had fevers, nuchal rigidity and anterior left cervical chain lymphadenopathy. Lumbar puncture revealed a glucose of <1mg/dL, protein of 683 mg/dL and white count of 15,056 (100% neutrophils). Gram stain was negative, but cultures grew S. pneumo resistant to meningeal concentrations of penicillin and most cephalosporins with intermediate sensitivity to Cefotaxime. It was however sensitive to vancomycin and fluoroquinolones. She was started on empiric therapy with acyclovir, ceftriaxone, vancomycin and dexamethasone. After culture results she was de-escalated to vancomycin monotherapy and transferred to our facility. Rifampin was added to synergize the effect of vancomycin. Unfortunately, around day 9 of treatment she developed fevers and pancytopenia due to vancomycin. She was switched to Moxifloxacin and her fevers and cytopenias resolved. A CT cisternogram revealed CSF leak into the right ethmoid air cells which was repaired using an autologous fascial graft. By the third week of her ordeal she started developing a drug rash to Moxifloxacin. She ended up on a combination of Cefotaxime, Rifampin and Levofloxacin and completed a total of 4 weeks of antibiotics from the time of the CSF leak repair. Patient was back to her baseline at a clinic visit several months later without any residual neurological deficits. Discussion: Treatment of S pneumo meningitis that is supposed to be relatively straight forward can get quite complicated in a patient who has an organisms resistant to both penicillin and cephalosporin class of antibiotics. Early in the antibiotic era S. pneuno was uniformly penicillin susceptible. But resistance B lactams began to emerge in the 1980s. While the resistance to B lactams are not absolute, but rather dose dependent, it is tough to achieve high doses of B lactams across the blood brain barrier. This makes treatment of resistant strains of S. pneuno challenging. While fluoroquinolones are known to have better penetration across the blood-brain barrier, there are not enough in vivo studies describing their effectiveness as monotherapy in treatment of resistant bacterial meningitis. Therefore, in this case we used a combination of different antibiotic classes to obtain a synergistic effect, and successfully treated a very complicated case of S. pneuno meningitis.
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<th>Priya Vijayvargiya, MD</th>
<th>Complications with an Overnight Admission of Upper Respiratory Infection</th>
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<td>Pulmonary embolism (PE) is a life threatening condition that often presents with few or no symptoms. Often the combination of presenting symptoms does not indicate PE evaluation. Unfortunately, there is an associated 30% mortality rate for untreated PEs.</td>
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<td>Case Description</td>
<td>An 80 year old female skilled nursing facility resident undergoing acute rehabilitation after chronic left sided weakness secondary to lacunar infarct, presented to the emergency department with symptoms of subjective fever, mild cough, generalized weakness and light headedness. Evaluation demonstrated sinus tachycardia, left neutrophil shift and negative chest X-ray and urine analysis. Troponin was 0.3 and 0.26 unit. Cardiology was consulted for elevated troponins and this was deemed to be a negative trend. The patient was treated with Tamiflu for presumed upper respiratory infection (URI) and was admitted to general medicine ward. Upon inpatient evaluation, patient started feeling better with intravenous fluids. Further history noted dizziness upon standing. Vital signs demonstrated tachycardia to 113, normal blood pressure and temperature. Physical exam was further noted for left sided hemiparesis and edema along the left lower extremity, that the patient stated was at her baseline. Throughout the evening, she remained persistently tachycardic despite fluid resuscitation, developed stronger non-productive cough, pleuritic chest pain and progression of left lower extremity pitting edema. Six hour troponin was 0.28 units. Electrocardiogram (ECGs) demonstrated evolving presence of S1, Q3, T3 wave changes. Decision was made to pursue immediate chest scanning. Chest Tomography Angiogram (CTA) demonstrated a saddle embolus bridging the main pulmonary artery bifurcation and nearly occlusive segmental and subsegmental emboli in the right lower lobe. Transthoracic echocardiography demonstrated severely enlarged right ventricle with decreased systolic function. She was placed on heparin drip and bridged to warfarin. Repeat echocardiogram 6 weeks afterwards demonstrated normal right ventricular size and function.</td>
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<td>Discussion</td>
<td>(1) Though the initial presentation was consistent with a URI, this case progressed to illustrate the classic presentation of PE: tachycardia, orthostasis, cough, dyspnea, pleuritic chest pain and lower extremity edema in the setting of limited mobility. (2) PE can be an indolent condition that requires a high index of suspicion for correct diagnosis and early treatment (3) Progression of symptoms, especially during overnight admissions, needs to be monitored closely as it may provide the final evidence to help synch the diagnosis.</td>
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<th>Benjamin Webber, MD</th>
<th>Lithium: How Slow Can You Go</th>
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<td>Lithium is well known to be a potential cause of bradycardia. However despite its ubiquitous use in psychiatric patients, it’s arrhythmogenic potential can present in varying and misleading ways. A 51-year-old man with past medical history significant for chronic obstructive pulmonary disease and schizophrenia presented to the Emergency Department with significant shortness of breath at rest and associated chest pain. His schizophrenia had been well controlled on lithium for many years. Initial assessment of vitals was significant for 100% oxygen</td>
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saturation on room air and severe bradycardia with heart rates as low as 36 beats per minute. Heart auscultation was significant for an irregularly irregular rhythm with no extra heart sounds or appreciable murmurs. NT-Pro BNP was normal for his age group. Troponin I was negative on repeat measurements. Initial electrocardiogram was significant for marked bradycardia with incomplete right bundle branch block, 1st degree AV block, and multiple pauses between beats. It was noted that his ECG was significantly different from previous. The patient was evaluated in the Emergency Department by Cardiology and there was concern that his heart rhythm may be junctional and could progress to high grade AV block. As a result, the patient was admitted to the Step Down Unit and as a precaution cardiac resynchronization pads were applied to the patient’s chest. The patient’s lithium was held due to concern for worsening bradycardia. The following day, the bradycardia persisted with heart rates in the 50s. Electrophysiology was consulted and after review of multiple ECGs, atrial parasystole was diagnosed. The diagnosis was further confirmed when the arrhythmia disappeared on exertion with increased heart rates. After a discussion with Psychiatry, lithium was discontinued to prevent further episodes of bradycardia that may predispose to atrial parasystole. The patient was discharged with follow up with his Mental Health provider to discuss other options for schizophrenia treatment. This case of atrial parasystole, a potential side of effect of lithium induced bradycardia, illustrates how a relatively unknown, yet benign, arrhythmia can lead to a lengthy and anxiety-provoking hospital workup.

Isaac Weeks, MD

Arterioportal Fistula: A Case Report and Review of the Literature

Arterioportal Fistulas (APFs) are a rare vascular disorder leading to a wide range of clinical symptoms and pathology, but most commonly portal hypertension. A 44-year-old female presented with acute encephalopathy secondary to alcohol consumption leading to respiratory arrest. Following stabilization, she was incidentally found to have an arterioportal fistula of the right hepatic artery and the right portal vein leading to atrophy and fibrosis of the posterior right lobe of the liver, hypertrophy of the left lobe and portal hypertension. APFs can present with a wide-variety of symptoms that develop over time including portal hypertension, heart failure and gastrointestinal ischemia. They can be congenital, acquired or idiopathic and are usually treated surgically or with embolization. This case report will discuss this recent presentation of APF and review the published literature on this rare condition.

Kai Wilhelm, MD,
Peter Lund

When A Cold Doesn’t Get Better: Diagnosing AIDS in a Patient With No Risk Factors

While the high risk demographics for HIV/AIDS have traditionally been MSM and IV drug users, sometimes patients present with no risk factors. This case illustrates the importance of considering the diagnosis of HIV regardless of perceived risk. A 64 year old woman with a past medical history of hypertension and recently diagnosed thrombocytopenia (thought to be ITP), presented to her primary care physician with six weeks of cough and shortness of breath. Her social history was unremarkable. She was divorced twice with two children, worked in sales, had healthy diet and exercise habits and no history of
IV drug use or blood transfusions. At her initial visit, the patient’s vital signs and examination were unremarkable and she was diagnosed with a viral upper respiratory infection and treated symptomatically. One month later, the patient returned with lingering dyspnea on exertion, cough, and a temperature of 100.6F. A CT pulmonary angiogram revealed central ground glass opacities bilaterally, and no PE. She was referred to pulmonology with concern for interstitial pneumonia and a full rheumatology work-up was negative except for elevated ESR/CRP. Pulmonary function tests showed severely reduced diffusion capacity and normal spirometry. The patient’s dyspnea continued to worsen and she was started on home oxygen and a bronchoscopy was scheduled. After the bronchoscopy, she was admitted to the hospital for worsened hypoxia and started on steroids due to concern for Cryptogenic Organizing Pneumonia. Two days after admission, the bronchial washings were positive for Pneumocystis jirovecii, and the patient was started on TMP-SMX. An HIV/CD4 test was then ordered and returned positive with a CD4 count of 23. Further social history revealed that the patient’s ex-husband may have had extramarital sexual partners while on business travels in Southeast Asia and this was felt to be the most likely mode of transmission. The patient improved over the next few days and was discharged on TMP-SMX, azithromycin, and fluconazole for opportunistic infection prophylaxis. At a follow-up visit with ID, she was started on abacavir/lamivudine/dolutegravir (Triumeq) following HIV genotyping. Over the next month, her pulmonary symptoms resolved and her CD4 count began to rise. This case reinforces the need to keep HIV on the differential, even in a patient who fits a low risk demographic. In 2013, women represented 20% of new HIV diagnoses in the United States. The CDC now recommends HIV testing for everyone, regardless of risk, and annual testing for higher risk groups. It illustrates the well known fact that HIV is far from eradicated in the United States and can affect anyone regardless of class, sexual orientation, or living situation.

Anthony Williams, MD

Her sodium was what?!

A 57 year old female with a past medical history of anoxic brain injury in 1989 secondary to cardiac arrest from withdrawal was brought in by her family for 7 months of difficulty walking, with acute worsening in the 1-2 weeks leading up to admission. Per family, at baseline patient had some mental deficits (mainly in short-term memory) but was capable of walking and clearly communicating her needs. There were no symptoms of nausea, vomiting, diarrhea, increased urine output, or new focal neurological deficits but the patient did have decreased appetite for the last several weeks. Physical exam in the emergency department showed an alert, afebrile, tachycardic patient with dry mucous membranes and decreased movement in all extremities. She was not following commands or communicating. The remainder of her exam was benign. Her results were notable for: hypernatremia (180), hyperkalemia (5.5), acute kidney injury (2.53 with baseline of 0.7 four months ago), leukocytosis (18), elevated lactate (6.3), and elevated troponin (0.260). EKG demonstrated sinus tachycardia. Head CT and MRI were obtained and were negative for acute stroke, but did show mild ventriculomegaly, cerebral volume loss, and some chronic small
vessel ischemic changes. Catheterized urinalysis was negative for esterase and nitrite but did show large amounts of blood, >300 protein, and hyaline casts. Toxicology screen was positive for caffeine and theobromine. Initial emergency department resuscitation included a normal saline bolus followed by normal saline at a rate of 75 cc/hr. Patient’s sodium trended up to 185 over the next 4 hours and she was transferred to the ICU. Patient was started on ½ NS at 200 cc/hr. Sodium, lactate, creatinine, and leukocytosis all began resolving with aggressive fluid administration. Over the next several days hypernatremia was successfully managed with a combination of ½ NS and D5W. Within 3 days of admission patient’s mental status was back to baseline and sodium levels were ~160. However, despite patient’s improvement, what wasn’t initially clear was how she had come to be this hypernatremic in the first place. Underlying diabetes insipidus was the initial suspicion but urinary osmolality, urinary electrolytes, and patient’s response to free water hydration did not support this. Theobromine toxicity and increased insensible losses due to infection were also ruled out. Eventually the etiology of her hypernatremia was determined to be extreme hypovolemia in the setting of severely impaired thirst mechanism, although no new CNS lesion was identified to explain this change. This case highlights not only the management of severe hypernatremia, but also the use of urinary electrolytes, osmolality, and free-water calculations to get a sense of appropriate renal function.

Jennifer Wong, MD

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<th>Bilateral Pulmonary Opacities in HIV patient: Beyond PCP</th>
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| Opacities on CXR in an HIV patient often prompts further workup. While bilateral opacities are often suggestive of PCP in immunocompromised patients, alternative diagnoses should be considered. A 40 year old male with 10 year history of untreated HIV (CD4 count of 168) presents with progressive shortness of breath over last 6 months and 40 pound weight loss. CXR showed bilateral perihilar opacities with a right upper lobe 3cm cavity lesion confirmed by CT. Treatment for cystic pneumocystis pneumonia was started with Bactrim and prednisone. Sputum and BAL stained positive for PCP. Three AFB cultures obtained later resulted as negative. After patient was discharged, cryptococcal antigen titer returned at 1:8, and BAL fungal culture grew cryptococcus neoformans. After much difficulty in contacting the patient, lumbar puncture was scheduled as outpatient and returned negative for cryptococcus antigen. Patient had no neurological changes at the time. CSF culture later returned negative for Cryptococcus. Patient was started on fluconazole 800mg daily, later halved, and eventually changed to voriconazole from nausea and vomiting that required hospitalization. After his second discharge, blood cultures came back positive for cryptococcus neoformans and patient was readmitted for treatment. Patient received induction treatment with liposomal amphotericin and flucytosine for two weeks, then switched to voriconazole, with plans for at least 8 weeks. Stribild was started after amphotericin was completed. During this last hospitalization, patient also experienced hoarseness with findings suggestive of fungal laryngitis on laryngoscopy, improved with above antifungal treatment. Repeat chest CT showed enlarging RUL cavity, but
patient was symptomatically improving and enlargement felt secondary to evolving pneumatoceles. Of note, patient was CMV positive on initial BAL viral culture with CMV load 36000 but had no evidence of end organ damage (colitis, pneumonitis, or retinitis). Infectious disease thought likely reactivation that did not require treatment. Patient was discharged home with infectious disease follow-up. This case illustrates that while patient had smear confirmed PCP to explain his CXR findings, additional diagnoses should be considered as multiple diseases can occur concurrently in HIV positive patients. High cryptococcal antigen titers require workup to rule out CNS involvement and bloodstream dissemination as this requires more aggressive treatment.

Allison Yang, MD, Karthik Ravi

A Rare Diagnosis that’s Hard to Swallow
Esophageal lichen planus is rare cause of dysphagia and long segment esophageal strictures. It is often misdiagnosed and underrecognized, leading to significant delays in treatment. A 79-year-old woman presented to clinic with a one-year history of progressive dysphagia to solids. She was treated for a food impaction (pork chop) one year prior to presentation and reported dysphagia initially to meats and bread and later to fish and soft foods. At the time of evaluation, she was only able to eat small mouthfuls of mashed foods and required several glasses of water with each meal. She denied odynophagia, regurgitation or reflux, or emesis. She had a seven pound weight loss over the three weeks prior to presentation. She was a lifetime nonsmoker and had no family history of esophageal malignancy. EGD showed a benign-appearing, intrinsic severe stenosis which was dilated. Following the dilation, there was significant sloughing of the esophageal mucosa both proximal and distal to the stricture site. Esophagram showed diffuse esophageal narrowing with the narrowest area measuring 6 mm.

Biopsies showed parakeratosis and patchy intraepithelial lymphocytosis as well as dyskeratotic cells. The constellation of mucosa sloughing on EGD, diffuse narrowing on esophagram, and pathology was consistent with a diagnosis of esophageal lichen planus. She was treated with repeat endoscopy with pull-through dilation, triamcinolone injection to the esophagus, and started on budesonide. The evaluation of dysphagia in adults begins with differentiating oropharyngeal versus esophageal dysphagia. Esophageal dysphagia to solids is secondary to a mechanical obstruction that when progressive is due to peptic strictures or esophageal cancer, and when nonprogressive is due to esophageal rings or eosinophilic esophagitis. Dysphagia to both solids and/or liquids suggests a motor disorder that may be due to scleroderma (progressive disease in the setting of chronic heartburn), achalasia (progressive diseases with regurgitation and/or respiratory symptoms), or esophageal motility disorders (intermittent symptoms). Lichen planus is an uncommon diagnosis that can involve the skin, oral mucosa, genitalia, scalp, nails, or esophagus. Cutaneous lichen planus most frequently affects middle age adults and the etiology is not known. Esophageal involvement is very rare and is characterized by endoscopic findings of peeling, friable mucosa, white plaques, and stricture formation in the upper and mid-esophagus. Barium swallow often shows a long segment smooth stricture. Treatment usually includes topical or systemic steroids and stricture dilations.
Who Are These People In My House?

Visual release hallucinations occur in patients with visual field or acuity loss. Also known as The Charles Bonnet syndrome, they are likely more common than realized. Under-reporting may be due to patient’s fear of psychiatric disease, or misdiagnosis as psychosis. Disease affecting any part of the visual pathway, from eye to visual cortex, may be responsible for causing visual release hallucinations including stroke, multiple sclerosis, and macular degeneration. The most accepted theory is that these hallucinations occur due to disinhibition of occipital cortex due to modified afferent sensory input to the cortex. Visual deprivation studies and fMRI data seem to support this theory. In a small sample of patients, fMRI has shown that active hallucinations are associated with spontaneous activity in the ventral occipital cortex. A 61-year-old man was admitted for worsening visual hallucinations with history of right eye melanoma status post enucleation, metastasis to cerebellum status post resection, local brain radiation, and right occipital ischemic stroke. The hallucinations had been present for years; however, he recently had a decline in his ability to distinguish them from reality due to cognitive impairment, which caused significant distress. Toxic metabolic encephalopathy labs were negative, MRI showed innumerable foci of hemosiderin staining from microhemorrhage, a chronic PCA infarction, and postoperative changes in the left cerebellar hemisphere. Due to his history of right sided enucleation and poor vision in his left eye, along with absence of delirium, he was diagnosed with visual release hallucinations. The duration of hallucinations which extinguish with eye movement and closure, ability to ignore them and realize they are not real, along with the lack of auditory and tactile symptoms suggested visual release hallucinations rather than psychosis. We provided education, which included eye closing and ocular movement exercises. He was also treated with quetiapine, which substantially decreased his hallucinations. During his hospitalization he was better able to ignore the hallucinations and realize that they are not real. Other medications used in the treatment of visual release hallucinations that we considered included donepezil, and a variety of antiepileptic and antidepressant drugs. This case illustrates that both behavioral as well as pharmacologic therapy can offer significant improvement in the quality of life for patients with disease affecting the visual pathway and visual release hallucinations.

When Thick Blood Bleeds

Hyperviscosity syndrome (HVS) is a clinical feature in 10 to 30% of patients with Waldenström macroglobulinemia. Clinical manifestations can include visual changes related to retinal hemorrhages, epistaxis, gingival bleeding, or dizziness. HVS is treatable with plasmapheresis and monitored with serum or plasma viscosity measurements. Case A 64 year old female with morbid obesity (BMI 56), stage 3 chronic kidney disease, mental illness, and central retinal vein occlusion presented to the ED after a fall. Her symptoms began two weeks prior with complaints of weakness, dizziness, and fatigue. She attributed her symptoms to recent psychiatric medication adjustments. On presentation, she was mildly tachycardic and hypotensive. Exam was
notable for conjunctival pallor. Abdominal examination was difficult secondary to body habitus, but no hepatosplenomegaly was appreciated. No mucosal bleeding was noted. Neurologic exam was unremarkable. Initial laboratory evaluation demonstrated a profound macrocytic anemia (Hgb 4.6 g/dL, MCV 99.3 fL) and thrombocytopenia (Plt 73 x 10^9/L). Pertinent subsequent investigations included a low reticulocyte index, indicating hypoproliferation, and rouleaux formation on peripheral smear. Colonoscopy showed a solitary ulcer in the descending colon. Pathology was consistent with acute ischemic colitis with edema and hemorrhage in the lamina propria and superficial epithelial necrosis. Serum protein electrophoresis demonstrated a M-spike in the gamma fraction. Immunofixation showed monoclonal IgM kappa M-protein with IgM levels >10,000 g/dL, consistent with Waldenström macroglobulinemia. Bone marrow biopsy supported the diagnosis showing lymphoplasmacytic lymphoma involving 80% of bone marrow. The patient endorsed headache, blurry vision, and confusion. Her serum viscosity was elevated at 4.2 centipoise. She received one treatment of therapeutic plasmapheresis. Rituximab and bendamustine chemotherapy was initiated. Discussion Early recognition and diagnosis of HVS is imperative to begin prompt treatment. Anemia is present in approximately one-third of Waldenström macroglobulinemia patients. One possible cause is occult hyperviscosity-related gastrointestinal bleeding due to small vessel ischemia or direct deposition of IgM protein in the gastrointestinal tract. This patient’s colonoscopic result could plausibly be a consequence of vascular injury.

Jennifer Yui, MD, Sara Bonnes, MD

Metronidazole-Induced Encephalopathy: A Rare but Serious Adverse Effect

Metronidazole is a frequently prescribed antimicrobial agent used primary to treat anaerobic bacterial or protozoal infections. While its most frequent adverse effects include gastrointestinal upset and a disulfiram-like reaction to alcohol, it can rarely cause neurotoxicity including metronidazole-induced encephalopathy. We present a case of this serious but reversible adverse effect of a commonly prescribed medication. Case Presentation: The patient was a 74 year old woman on chronic immunosuppression for rheumatoid arthritis who presented with three weeks of a productive cough and progressive weakness. CT chest demonstrated a left upper lobe cavitary consolidation suggestive of infection. Blood and sputum cultures did not demonstrate any growth, and she was discharged on an empiric antibiotic regimen of levofloxacin and metronidazole to be continued until resolution of her cavitary pneumonia. Six weeks later, follow up CT chest demonstrated near complete resolution of the lesion. Her respiratory symptoms had improved, but she had developed new neurologic symptoms including dysarthria and left lower extremity weakness and paresthesias. Further neurologic exam revealed poor attention, poor recall, and dyscalculia. Neuromuscular exam was limited by her severe rheumatoid arthritis. She was admitted to the hospital for evaluation of stroke which was unrevealing. CT head did not demonstrate any acute pathology. MRI brain demonstrated T2 hyperintensities of the entire splenium of the corpus callosum and the bilateral dentate nuclei suggestive of a toxic or metabolic etiology, which was consistent with previous reports of
neurotoxicity of metronidazole. Given the resolution of her cavitary pneumonia, her antibiotics had been discontinued upon hospital admission. Within 72 hours of discontinuation of her metronidazole her symptoms improved, and her speech returned to baseline. Brain MRI six weeks later demonstrated resolution of the previously seen corpus callosum and dentate nuclei abnormalities. Discussion: Metronidazole-induced encephalopathy is a rare adverse effect which typically presents with subacute cognitive impairment, cerebellar ataxia, and dysarthria. Characteristic MRI lesions are found in the bilateral dentate nuclei and corpus callosum. In most cases, the symptoms and MRI findings resolve after withdrawal of metronidazole. Clinicians must maintain a high index of suspicion for metronidazole-induced encephalopathy, and if suspected, metronidazole should be discontinued. While metronidazole offers many benefits over other possible antibiotic choices including its oral bioavailability and low cost, the potential for this serious neurotoxicity should be considered and monitored when prescribing a prolonged course of empiric antibiotics.

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<th>Farah Yusuf, MD</th>
<th><strong>Secondary IgA nephropathy</strong></th>
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<td>Mr. S is a 63 year old male with history of cirrhosis secondary to alcohol abuse, hypertension, stage II chronic kidney disease who presented with extensive bilateral lower extremity non-palpable purpura associated with areas of ulceration and eschar formation and hematuria. He was immediately initiated on steroids due to concern for vasculitis. An extensive vasculitis work-up was unrevealing. Additionally, the punch biopsy of skin lesions showed fibrin thrombi, neutrophilic inflammation involving the dermis, extending around some vessel walls which was not entirely diagnostic for vasculitis. The decision was made to proceed with renal biopsy, which revealed findings consistent with IgA nephropathy. Primary IgA nephropathy is the most common pattern of primary glomerulonephritis seen in the developed world, where in the majority of cases the cause remains unknown. It can be seen in patients with certain inflammatory conditions such as HSP and spondyloarthropathies, however Mr. S did not have pathognomonic findings of either and no recollection of recent infection. Given this patient’s skin involvement, it is unlikely a primary IgA nephropathy. The etiology is most likely related to a consequence of alcoholic cirrhosis, the most common cause of secondary IgA nephropathy. Skin lesions slowly improved during hospitalization with high dose steroid administration, with plans for a long taper. Although it is not clear that his rash is related to his renal findings, we suspect that the patient’s skin lesions are likely due to vasculitis/vasculopathy even without definitive pathological diagnosis.</td>
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<th>Anteneh Zewde, MD</th>
<th><strong>Susac</strong></th>
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<td>Susac Syndrome is rare autoimmune disease know by the characteristic triad of encephalopathy, hearing loss, and branch retinal artery occlusion. About 300 cases have been described since first described in 1979 by neurologist JO Susac. Here we describe a 22 year-old male who presented with 2 weeks of head ache and behavioral changes, including hallucination. As diagnosing this syndrome is challenging, it is even more challenging to approaching treatment plan. It is very important to consider Susac Syndrome in the differential in patients presenting with</td>
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sudden encephalopathy, hearing or vision impairment. Key in the diagnosis of Susac Syndrome is a high index of suspicion in a patient with unknown etiology of acute encephalopathy, hearing loss and vision complaints. We highly recommend doing fluorescein angiography in setting of high suspicion, as the ophthalmologic presentation is late and in a setting of encephalopathy patient might not have visual complaints. Early recognition and aggressive immunosuppression is key for a favorable outcome. SNHL progressed in our patient despite systemic steroids. Improvement was seen with intratympanic steroids.

Xin Zhang, MD, Thorvardur Halfdanarson

Red flushes out of the blue
Carcinoid tumor is a rare neuroendocrine tumor that arises in structures derived from embryonic gut. A minority of patients with hormone producing carcinoid tumor will develop carcinoid syndrome from overproduction of biologically active substances, most importantly serotonin. The primary symptoms of carcinoid syndrome are diarrhea and flushing. It is thought that patients with gastrointestinal carcinoid tumor should not experience this syndrome without hepatic metastasis, as a disease-free liver should be able to inactivate the excessively produced serotonin delivered via portal circulation. Here, we present an unusual case of a patient who presented with carcinoid syndrome despite having no liver metastasis. Case: A 43-year-old woman, with primary appendiceal carcinoid tumor, presents with frequent episodes of diarrhea and flushing. She had successfully undergone appendectomy and right hemicolectomy for the primary tumor. She was also incidentally found to have carcinoid tumor metastasis in the round ligament while undergoing left oophorectomy for ovarian cyst. Since then, multiple imaging modalities, including gallium-68 DOTATOC PET/CT, revealed no current evidence of active disease. Despite the negative imaging studies, she continues to experience symptoms consistent with carcinoid syndrome. Due to the high likelihood of remaining carcinoid tumor metastasis, open total abdominal hysterectomy, right oophorectomy and salpingectomy were recommended. Discussion: In a patient who presents with persistent carcinoid syndrome, it is necessary to have high suspicion of residual disease. Extra-intestinal metastasis must be considered when there is no liver involvement. Female patients can present with primary or metastatic ovarian carcinoid tumor. Metastatic ovarian carcinoid tumor is usually bilateral and is associated with peritoneal carcinomatosis. Additionally, hormone producing carcinoid tumor in the gynecologic organs can cause carcinoid syndrome without liver metastasis, as the venous drainage bypasses the portal circulation and flows directly into systemic circulation. Carcinoid tumors, both the primary tumors and the metastases, should be resected whenever possible and resection can effectively control symptoms. In patients with unresectable or widely metastatic disease, the symptoms of carcinoid syndrome can be managed with somatostatin analogs. This case demonstrates the limitations of current post resection surveillance techniques for carcinoid tumors and the importance of anatomical blood flow considerations.