Proceedings from the 2009 Annual Meeting of the American College of Physicians, Wisconsin Chapter

The Wisconsin Chapter of the American College of Physicians held its annual meeting in the Wisconsin Dells, Wis, September 11-13, 2009. Internal Medicine residents from each of Wisconsin's 5 residency programs (Gundersen Lutheran Health System, Marshfield Clinic, the Medical College of Wisconsin, University of Wisconsin Hospital and Clinics, and University of Wisconsin Milwaukee Clinical Campus [Aurora Sinai Medical Center]) presented their research and/or unusual clinical experiences via posters and vignettes.

PRESENTED POSTERS

Ocular Melanoma Metastasizing to Liver

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Case: A 77-year-old Hispanic man who had recently arrived from Mexico presented with generalized weakness and easy fatigability of 3-week duration, which increased to the extent that he was unable to walk. He had vague abdominal discomfort mostly in the right upper quadrant (RUQ) and epigastrium, which increased with standing and pressure. He was also experiencing nausea, weight loss (7-8 lbs), jaundice, and occasional itching. History of gastric esophageal reflux disease (GERD) and ocular tumor status post-enucleation 4-5 years prior. On physical exam, patient had a left prosthetic eye, scleral icterus, and abdominal tenderness in the RUQ with massive hepatomegaly extending 8-10 cm below the costal margin. Rectal exam revealed external hemorrhoid and guaiac positive brown stool. He was somewhat obtunded and had mild tremors in both hands. There was no lymphadenopathy or skin lesion. Initial lab work revealed total billirubin 12.7, direct 10.5, alkaline phosphate 304, aspartate aminotransferase (AST) 107, alanine aminotransferase (ALT) 68, lipase 324, and negative hepatitis panel. X-ray of the abdomen showed 3.9 cm sized calcified round density in left upper lobe. Computed Tomography (CT) scan showed mottled enhancement and irregular contour of left lobe. Biopsy showed malignant cells that on immunohistochemistry were found to be consistant with metastatic malignant melanoma. Malignant cells were also found in paracentesis fluid, which was found to be metastasis from the ocular melanoma. During hospitalization, he was treated conservatively with lactulose and proton pump inhibitors (PPIs) but continued to feel weak. The patient denied any further aggressive workup and opted for comfort care.

Discussion: Ocular melanoma has a unique predilection for the liver, which has been attributed to the lack of lymphatic drainage to the eye and tendency to spread hematogenously. The liver has been reported as initial site of metastasis in more than 50% of patients. Among patients who develop metastasis, the liver is involved in 71%-94% of cases. It can metastasize up to 15 years after the primary tumor. Hepatic metastasis is identified as poor prognostic marker for response to treatment and survival. Median survival after diagnosis of liver metastasis ranges from 2 to 9 months. Diagnosis is confirmed with biopsy and immunohistochemistry, which is positive for vimectin and human melanoma black (HMB)-45. Metastatic disease has been proven to be resistant to most available chemotherapy and immunotherapy regimens. This has led to the evolution of new regional treatment modalities like hepatic artery chemotherapy embolization and regional immunotherapy. Follow-up of ocular melanoma patients should include liver enzymes and ultrasonography. Results of melanoma vaccine are promising but further studies are needed.

Ouch! My Back Isn't Worth Beans!

Tracy Blichfeldt, MD, Steven Pearson, MD, FACP, Balaji Srinivasan, MD; Gundersen Lutheran Medical Foundation, La Crosse, Wis

Case: A 39-year-old man presented with acute onset thoracic back pain after turning in bed. He denied recent trauma. His past medical history was significant only for injuries sustained in a motor vehicle collision at age 22. His medications included occasional Excedrin. On physical exam, his blood pressure was 159/93 and vertebral thoracic tenderness to palpation. The remainder of the exam was normal. Laboratory results demonstrated kidney disease (creatinine of 5.98 mg/dL and blood urea nitrogen [BUN] 48 mg/dL). His electrolytes were normal. He was anemic (hemoglobin 12 g/dL). Urinalysis showed 3+ albumin, 3+ blood, with 17 red blood cell (RBC)/highest possible frequency (hpf). A CT scan of his thorax revealed new thoracic compression fractures of T 4, 5, and 6. Further work-up of his kidney disease revealed nephrotic range proteinuria, normal complement levels, negative antinuclear antibody (ANA), antineutrophil cytoplasmic antibody (ANCA), anti-glioblastoma multiforme (GBM) antibody, cryoglobulins, antistreptolysin O-antibody, human immunodeficiency virus (HIV) serology, and hepatitis panel. Immunofixation showed no monoclonal protein. He had normal calcium, hyperphosphatemia, and secondary hyperparathyroidism (parathyroid hormone [PTH] of 265 pg/mL).

He had a slight vitamin D deficiency. Renal ultrasound revealed small kidneys. Renal biopsy showed sclerotic glomeruli with cellular crescents due to immunoglobin A (IgA) nephropathy. He was started on dialysis and has been dialysis dependent since. Further work-up of his osteoporosis included a normal thyroid-stimulating hormone (TSH) and free testosterone levels. A dual X-ray absorptiometry (DEXA) scan showed a T-score of -3.5 in the lumbar spine consistent with osteoporosis.

Fracture risk is increased in patients with chronic kidney disease (CKD) as they can develop renal osteodystrophy. This is a term that traditionally has been used to describe the abnormalities in bone morphology that develop in CKD. Phosphate retention in CKD inhibits bone resorption by osteoclasts and arrests generation of osteoclasts. CKD causes a deficiency of calcitriol, which has a suppressive effect on bone formation and resorption. These both stimulate PTH secretion that, in turn, stimulates bone resorption and high turnover rates (eg, osteitis fibrosa cystica). There can also be low-turnover lesions (adynamic bone disease and osteomalacia).

A DEXA scan, used to diagnose osteoporosis, cannot accurately predict fracture risk in CKD as it cannot distinguish between the types of renal osteodystrophy, since it is a disease of bone quality and not only bone density. Instead, the gold standard for diagnosing the type of renal osteodystrophy is tetracycline-labeled quantitative bone histomorphometry.

Not the Typical Right Lower Quadrant Pain

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Case: A healthy 21-year-old man presented with recurrent episodes of right lower quadrant (RLQ) pain. The pain was described as intermittent and alternated between crampy and sharp. The only other accompanying symptom was bouts of non-bloody diarrhea. One year prior, the patient presented to the emergency department (ED) with similar symptoms, that prompted abdominal CT showing multiple mesenteric lymph nodes without appendicitis. Since that time, the patient had recurring symptoms lasting about 7 days approximately every 3 months. Prior to presenting, the patient was on no medications, had no allergies, and his family and social history were noncontributory. Physical exam was remarkable for diffuse abdominal tenderness primarily in the RLQ. There was no rebound, guarding, or hepatosplenomegaly. Labs on admission were significant for an elevated white blood cell count (WBC) of 14.7 with 26% eosinophils.

CT of the abdomen, when compared to the study from the previous year, demonstrated an interval increase in the size and predominance of mesenteric lymph nodes. The patient underwent negative stool testing, and a tissue transglutaminase antibody was found to be unremarkable. Upper endoscopy and colonoscopy were eventually performed showing no gross irregularities. Mucosal biopsies taken during the procedures revealed increased eosinophils within the lamina propria of the duodenum and right colon. The patient was diagnosed with eosinophilic enteritis. He was started on oral glucocorticoids ,and his symptoms quickly resolved along with normalization of the CBC. Tryptase and total IgE levels were within normal limits and genetic testing revealed no CHIC-2 mutation.

Conclusion: This case demonstrates 1 of the many presentations of the rare eosinophilic gastrointestinal disorders (EGIDs), which are defined as disorders causing eosinophilic-rich inflammation within any part of the gastrointestinal tract. Primary EGIDs are those causing eosinophilic-rich inflammation in the absence of known causes of eosinophilia. EGID patients commonly present with failure to thrive, abdominal pain, irritability, gastric dysmotility, vomiting, diarrhea, dysphagia, microcytic anemia, and hypoproteinemia. Patients with primary EGID are commonly atopic and often have an immediate family member with EGID. Diagnosis is made by microscopic evaluation of biopsy samples and hypereosinophilic syndromes should be exluded. Steroids are often the mainstay of treatment.

A Perplexing Pneumonia

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Introduction: Interstitial lung disease (ILD) must be considered in the differential for unexplained pulmonary infiltrates. Acute fibrinous and organizing pneumonia (AFOP) is a recently described and rare ILD pattern that can lead to significant morbidity and mortality. The preferred approach to treatment of AFOP has yet to be established.

Case: An 83-year-old woman presented with a 2-week history of progressive dyspnea on exertion. A chest radiograph revealed infiltrates in the left and right upper lobes. Antibiotics were started for presumed community acquired pneumonia. On the third day in the hospital, she developed spiking fevers and a CT scan demonstrated significant progression of her pulmonary process. Her antibiotic regimen was broadened and an antifungal agent was added, yet she continued to have fevers and progressive hypoxia. A bronchoscopy was subsequently performed and bacterial, mycobacterial, and fungal studies were negative.

In the setting of worsening radiographic findings and respiratory failure, a video-assisted thorascopic surgery (VATS) was performed and tissue from a right lower lobe nodule was obtained. Histologic examination revealed AFOP. Antibiotics were discontinued and stabilized her condition. While the patient initially declined steroids, systemic glucocorticoids were started due to persistent dyspnea following discharge. Her symptoms dramatically improved. A repeat radiograph demonstrated nearly complete resolution of her pulmonary process just 1 week after initiation of steroids.

Discussion: In the setting of progressive pulmonary infiltrates, a comprehensive differential must include interstitial lung processes. Bronchoscopy or VATS is often necessary to obtain a definitive diagnosis in such cases. AFOP is a newly recognized histologic pattern of interstitial lung disease. Its distinctive pattern is intra-alveolar deposition of "fibrin balls" and a patchy distribution. Fulminant disease with rapid progression to death and a subacute presen-

tation with eventual stabilization are the 2 most common clinical disease patterns. While the role of steroids in AFOP is debatable, there have been documented cases of significant clinical improvement with this therapy, as was seen in our patient.

'I'm Going Soft in My Old Age'

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Case: A 60-year-old man with a long-standing history of arthralgias and rib fractures presented for evaluation of joint stiffness and aching of various bones and muscles. He also reported lower extremity weakness causing falls. Physical exam revealed multiple areas of costal point tenderness, vertebral tenderness, and bilateral gastrocnemius tenderness. Otherwise, the exam was unremarkable. Labs were significant for alkaline phosphatase 416 U/L, serum phosphate 1.9mg/dL, 25-OH vitamin D 16ng/mL, PTH 98pg/mL, urine phosphate 85ng/dL, and human leukocyte antigens (HLA) B27 negative.

Plain films of the pelvis and lower extremities revealed prominent pelvic trabeculae suspicious for Paget's disease, as well as fractures of the bilateral proximal fibulas. Nuclear medicine study revealed multiple areas of increased bone turnover in the femurs, radiuses, and ribs, as well as an area of increased uptake in the R posterior femur. Magnetic resonance imaging (MRI) of the right thigh showed a heterogenous soft tissue mass correlating with the area of increased uptake. Needle biopsy of the thigh mass revealed a phosphaturic mesenchymal tumor.

Discussion: Tumor-induced osteomalacia (TIO) is a rare disorder, with an occult nature that delays its recognition, often 2.5 years after the onset of symptoms. Tumor secretion of FGF23 is implicated in the inhibition of renal phosphate transport. The presentation above is typical with reports of longstanding, progressive muscle and bone pain, weakness, and fatigue. TIO should be suspected in a patient with osteomalacia or rickets in the setting of hypophosphatemia, renal phosphate wasting, and inappropriately low serum calcitriol. Treatment is focused on removal of the tumor, which results in healing of the bony abnormalities. Ocreotide is an alternative treatment in cases where the tumor cannot be localized.

Young Male with Acute Campylobacter Myocarditis

Akshatha Gowda, MD, Rachel Hawker, MD; Gundersen Lutheran Medical Foundation, La Crosse, Wis

Case: A 20-year-old man was transferred from an outside facility where he presented with sudden onset retrosternal pleuritic chest pain. The pain lasted for 2 hours and had resolved by the time he arrived at the hospital. His associated symptoms included epigastric discomfort, diarrhea, vomiting, mild diffuse headache, myalgia, and intermittent profuse sweating over the previous 6 days. He had a history of sick contacts with family members who had a mild form of gastroenteritis. He is a dairy farmer and has been in contact with cows and dogs.

His 12-lead electrocardiogram (EKG) showed J-point elevation in the inferior leads. Troponin T, creatinine kinase (CPK), and C-reactive protein (CRP) were significantly elevated. Stool cultures grew *Campylobacter jejuni* on day 2. Cardiac MRI showed a pattern typical of myocarditis with left ventricle ejection fraction of 50%. The patient was initiated on metoprolol, captopril, and erythromycin. His CRP and CPK trended down, reaching near normal levels by day 5. He was discharged in a stable clinical condition after a 6-day hospital stay.

Discussion: In developed countries, viral infection is the most common cause of myocarditis, with the most frequently identified viruses being adenovirus and enterovirus (including coxsackievirus). *Campylobacter jejuni* is one of the most common causes of human gastroenteritis in the world, but there has been no accurate estimate of the incidence of *Campylobacter jejuni* myocarditis with <20 reported cases worldwide. The diagnosis of myocarditis is difficult to establish because the clinical presentation is highly variable. Although endomyocardial biopsy is the gold standard technique, due to the complicated nature of this procedure, contrast-enhanced MRI is increasingly popular. It can not only definitively diagnose myocardial involvement but can also detect the extent and degree of inflammation. Management of myocarditis includes treatment of the underlying cause, minimization of hemodynamic load of the heart, and management of associated complications.

GAVE Syndrome: A Tale of Two Patterns

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Background: We present 2 cases of gastric antral vascular ectasia (GAVE).

Case 1: A 57-year-old white man with cirrhosis presented with hematemesis. Examination showed a pale and jaundiced individual with ascites and pedal edema. Hemoglobin was 8.8gm/dl. An esophagogastroduodenoscopy (EGD) showed diffuse punctate vascular malformations in the antrum compatible with GAVE, with signs of active bleeding, which was treated with Argon plasma coagulation (APC). His bleeding subsided and hemoglobin remained stable.

Case 2: A 68-year-old white woman with hypertension and diabetes mellitus presented with dyspnea on exertion. Examination revealed conjunctival pallor and hemoccult positive stool. Hemoglobin was 6.6 gm/dl. She underwent EGD, which showed areas of vascular malformation alternating with normal mucosa in the antrum, consistent with GAVE. The lesions were treated with APC. Biopsy showed dilated blood vessels within the lamina propria.

Discussion: GAVE, or watermelon stomach, causes 4% of non-variceal upper gastrointestinal bleeding. The term "watermelon stomach" is derived from the characteristic endoscopic appearance of longitudinal rows of flat, reddish stripes radiating from the pylorus to the antrum, which represent ectatic and sacculated mucosal vessels. GAVE has been associated with cirrhosis of the liver, connective tissue disorders, chronic renal failure, hypertension, diabetes mellitus, and acute myeloid leukemia.

Two subsets of GAVE have been described based on endoscopic findings. Cirrhosis is linked with diffuse, punctate lesions, whereas non-cirrhotic patients are likely to have typical watermelon appearance. The majority of non-cirrhotic patients are female, with mean age of 73 years, whereas cirrhotic patients with GAVE tend to be younger and male. Histological features include capillary ectasia and thrombosis within the mucosa and fibromuscular hyperplasia of lamina propria. Endoscopic ablation, APC, is the first-line treatment. Surgical antrectomy should be reserved for unresponsive cases. Endoscopic subtypes have no significant influence on the response to treatment and mortality.

Colchicine Induced Toxic Epidermal Necrolysis

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Case: An 85-year-old woman with history of gout on colchicine presented with warm, erythematous skin and diffuse, pruritic bullae for 1 day. The patient's history was limited due to her advanced dementia, however she stated the rash was only painful after she itched it. She was brought to the ED from her nursing home after the nurses became concerned that her lower extremity edema had increased, and her "water blisters" were rupturing when they attempted to move the patient. Initially she had warmth and erythema of the extremities and trunk, on the lower extremities to a greater extent than upper extremities. Tense bullae were seen mostly in the flexural areas of the lower extremities. Larger, flaccid blisters were seen scattered throughout the trunk and extremities. Large flaccid lesions heavily populated the bilateral lower extremities as well as the posterior trunk. Areas of sloughing were concentrated on the bilateral lower extremities, scattered areas of sloughing included under the right breast, trunk, and right forearm. The total surface area of affected skin was approximately 40%-50%, and was Nikolsky's sign positive. No mucosal lesions or purulent conjuctivitis were noted. Fever of 38°C and leukocytosis of 13,600 were present. Punch biopsies were performed on the lower extremities. All samples were taken from the margins of active blisters and showed both vacuolar interface injury and subepidermal vesiculations. There was patchy necrosis of the epidermis, often above the blister roof. In the dermis, there was perivascular infiltrate, that was lymphocytic with melanphages and other scatter eosinophils. A 4mm punch biopsy was used for direct immunofluorescence. Non-specific staining of necrotic epidermis, antibodies to immunoglobin M (IgM), C3, and fibrin were seen. The findings were most consistent with erythema multiforme spectrum including Stevens-Johnsons syndrome (SJS) and toxic epidermal necrolysis (TEN), not characteristic for autoimmune blistering diseases. It was concluded that her colchicine was causing these lesions.

Discussion: TEN is a rare condition generally triggered by medications like antibiotics, anticonvulsants, nonsteroidal anti-inflamatory drug (NSAIDs), and allopurinol. There have only been case reports implicating colchicine. TEN involves mucocutaneous lesions in 90% of cases. The reaction usually starts with fever and generalized warmth and erythema of the skin, then progressing to bullae formation and sloughing of the epidermis with full thickness necrosis at times. TEN is differentiated from SJS by the surface area of affected skin. TEN is more severe, with at least 30% of the skin affected. These patients are treated in a burn unit and require adequate supportive care similar to the needs of a burn patient such as monitoring of fluid and electrolytes, as well as reducing risk of infection.

Chronic HCV and the Lymphoproliferative Effect

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Background: Mixed cryoglobulinemia (MC) is a common consequence of chronic Hepatitis C virus (HCV) infection. Although MC is well-controlled by treating the underlying HCV, undertreated or undiagnosed HCV may lead to a myriad of MC-related extrahepatic manifestations.

Case: A 48-year-old Hispanic woman presented with new-onset painful purpuric lesions to bilateral hands associated with generalized arthralgias and weakness. Her past medical history includes HCV and end-stage renal disease (ESRD) secondary to membranoproliferative glomerulonephritis (MPGN) for which she is currently on hemodialysis (HD), chronic steroids, and mycophenolate. Her HCV has gone largely untreated due to prior cardiopulmonary arrest thought to be due to pegylated-interferon and ribavirin. On admission, she was afebrile with an elevated blood pressure. Physical examination revealed a somnolent female with tender, well-demarcated, bright violaceous lesions to bilateral hands and hyperpigmentation of the lower extremities with several amputated toes. Labs revealed stable BUN/Chromium (Cr), low complement levels, trace cryoglobulinemia, and a monoclonal spike on protein electrophoresis. Bone marrow biopsy showed a collection of atypical B-cells concerning for low-grade lymphoma. She was discharged home after receiving 5 sessions of plasmapheresis, which resulted in marked improvement of the vasculitic lesions, and was started on rituximab. She was readmitted several weeks later for painful digital necrosis, which again improved after several sessions of plasmapheresis. Although her HCV remains untreated, HD was successfully stopped after completion of 4 doses of rituximab.

Discussion: Clinical manifestations of MC typically include the classic triad of purpura, arthralgias, and weakness, but may also include renal, liver, and lung involvement as well as peripheral neuropathy and widespread vasculitis. MC is associated with a 20%-30% increased risk of non-Hodgkin lymphoma. Interferon-alpha and ribavirin remain the standard treatment of HCV-associated MC. Although asymptomatic MC is generally untreated, severe manifestations of MC often require emergent plasmapheresis, high-dose steroids, immunosuppressants, and rituximab. Although rituximab has been shown to be effective against many MC-related manifestations, including low grade B-cell lymphoma and MPGN, it is associated with frequent relapse as long as the viral antigenic trigger, namely HCV, remains.

Back Pain: The Yeast Connection

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Case: A 47-year-old diabetic Native American man presented with a 6-week history of progressive swelling and pain in the midback region. He also reported low-grade fever and chills along with significant weight loss. Physical examination revealed a well-defined, smooth, nontender swelling in the left paraspinal region at T7-8 level. Pain was localized slightly lateral to the swelling at the same level. CT scan of chest revealed a 3.9 x 4.1 x 2.7 cm left paraspinal mass, fracture of the posteromedial left 8th rib and multiple tiny 1-1.5 mm miliary nodules throughout both lung fields. Subsequent MRI of the spine showed a 6.5 x 3.3 cm mass in the left paravertebral region extending from T7 to T8 along with involvement of the adjacent vertebral bodies with evidence of extension into the canal by way of the T7-8 and T8-9 neural foramen.

CT-guided fine needle aspiration of the mass was performed. Cytology showed large yeast consistent with blastomyces species and a fungal culture grew *Blastomyces dermatitidis.* A percutaneous drain was placed under CT guidance for drainage of abscess. Treatment was initially started with amphotericin B and itraconazole; however, the patient developed side effects to both medications. Due to concerns for central nervous system (CNS) involvement, he was subsequently started on voriconazole, which was continued for 12 months. During follow-up, the patient's symptoms steadily improved, and repeat imaging after 9 months documented improvement in radiological findings.

Discussion: Blastomycosis is a fungal infection endemic to the Great Lakes region of North America, which most commonly manifests as pulmonary disease but dissemination to other sites such as skin, bones, genitourinary, and CNS can occur especially in immunocompromised patients. Miliary blastomycosis is relatively rare and is often associated with disseminated disease. Bone involvement can occur in up to 25% of extra pulmonary cases and vertebrae and ribs are among the most common bones affected. Contiguous paraspinal abscesses are potential complications of blastomycosis involving vertebrae. Amphotericin B remains the initial drug of choice for severe disseminated blastomycosis. Newer azoles like voriconazole have been successfully used, especially in CNS blastomycosis.

Ischemic Colitis in a Patient with Hemophilia

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Case: A 37-year-old woman presented with a 1-day history of severe, colicky left lower quadrant abdominal pain that was accompanied by 2 episodes of nonbloody, non-bilious emesis. She also reported passing 1 black bowel movement followed by several liquid stools that were associated with bright red blood per rectum. The patient had a history of hemophilia A and menorrhagia that periodically required infusion of factor concentrate on several occasions in the past. She denied any symptoms of recent fever or chills, exposure to sick contacts, dietary changes, recent travel, or use of NSAIDs, alcohol, or illicit drugs. Abdominal exam was most remarkable for extreme tenderness to palpation in the left lower quadrant (LLQ). Clinical concern about an acute abdominal process led to an emergent CT scan that showed only mild wall thickening of the descending colon. Subsequent flexible sigmoidoscopy showed an area of erythema and friability in the watershed area between the splenic flexure and descending colon compatible with a diagnosis of ischemic colitis.

The colon is relatively vulnerable to ischemia since it receives comparably less blood flow than the rest of the gastrointestinal (GI) tract. Ischemic colitis may develop as a result of non-occlusive changes in the systemic circulation or local occlusion of a mesenteric blood vessel due to systemic embolism, local thrombus formation, or vasoconstriction. Although uncommon in the general population, ischemic colitis occurs with greatest frequency in elderly patients with additional atherosclerotic risk factors. One recent case control study determined that age >60 years, hemodialysis, hypertension, diabetes mellitus, hypoalbuminemia, and constipation-inducing medications predicted the presence of ischemic colitis in patients experiencing lower abdominal discomfort. When ischemic colitis occurs in younger individuals, more unusual etiologies should be considered, including the presence of an underlying hypercoagulable state, use of cocaine, oral contraceptives, carbon monoxide poisoning, or marathon running.

This patient demonstrated none of the traditional risk factors that have been associated with the development of ischemic colitis. Published reports of ischemic colitis occurring in hemophilia patients without the simultaneous administration of coagulation factors or anti-fibrinolytic agents are exceedingly rare. This case emphasizes the importance of maintaining a broad differential diagnosis, even in patients who present with seemingly common clinical complaints.

Hyperbilirubinemia Gone Awry

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Case: A 31-year-old man who is a bodybuilder presented with 6 weeks of RUQ abdominal pain, general malaise, nausea, vomiting, and watery diarrhea. A complete blood count (CBC) and basic metabolic panel (BMP) were within normal limits and the patient was diagnosed with viral gastroenteritis and was discharged.

The patient re-presented 4 weeks later with continued symptoms, but now noted dark-colored urine, scleral icterus, and diffuse pruritus. Liver function tests revealed total bilirubin 6.7 (0.2-1.0 mg/dL), direct bilirubin 5.4 (0-0.2 mg/dL), AST 31 (7-40 U/L), ALT 78 (7-40 U/L), alkaline phosphatase 177 (38-126 U/L), gamma-glutamyl transpeptidase (GGT) 44 (9-50 U/L), and lipase 212 (10-140 U/L). A CT scan of the abdomen revealed gallbladder wall thickening and a stone in the common bile duct. The patient subsequently underwent endoscopic retrograde cholangiopancreatography (ERCP), which revealed an essentially normal biliary tree without obstructing stones.

Ten days later, the patient developed

intractable pruritus with diffuse jaundice, and total and direct bilirubin levels rose to 22.8 and 18, with no major changes in other liver function tests. Studies of intrinsic causes of liver disease were sent (viral hepatitis serologies, genetic causes, autoimmune etiologies, tumor markers) and returned unremarkable.

Given concern for cholecystitis, cholangitis and/or liver disease, the General Surgery Department performed open cholecystectomy with open liver biopsy and obtained biliary cultures, with gallbladder pathology revealing acute cholecystitis, sterile cultures, and liver biopsy displayed features consistent with centrilobular cholestasis. Post-operatively, the patient continued to suffer from intractable pruritus with total bilirubin levels rising to 35.

The patient used NitroTech supplements for bodybuilding (concern for hypervitaminosis A) and had received a prolonged course of ampicillin-sulbactam (concern for iatrogenic ductopenia) after the ERCP. These were discontinued and the patient was placed on ursodeoxycholic acid, cholestyramine, and polyethylene glycol, with no improvement noted.

Taken together, the clinical picture of a rapidly rising direct hyperbilirubinemia, consistently normal GGT levels, exclusion of all other causes of intrinsic liver disease, and centrilobular cholestasis on liver biopsy, all supported a diagnosis of benign recurrent intrahepatic cholestasis precipitated by acute cholecystitis. As the patient's intractable pruritus was unresponsive to medical therapy, the patient subsequently underwent serial plasma exchange with complete resolution of symptoms noted along with normalization of liver function tests. The final diagnosis was benign recurrent intrahepatic cholestasis responding to serial plasma exchange.

DISPLAYED POSTERS

Disseminated Adenovirus in a Kidney Transplant Patient

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Background: Adenovirus infection typically manifests as either a respiratory, gastrointestinal, or ocular illness. In the immunocompromised host, presentations can be more severe. We present a case of disseminated adenovirus infection resulting in acute renal failure and hemorrhagic cystitis.

Case: A 65-year-old woman with ESRD secondary to diabetes mellitus was transferred to our institution after being treated at an outside institution for presumed urinary tract infection (UTI). She had a baseline creatinine of 0.9-1.0 mg/dl, but it was 4.9 on initial presentation. The presumed UTI was treated with levofloxacin, but the creatinine did not return to baseline. On admission to our hospital, her vital signs were stable; her physical exam was unremarkable except for moderate distress and gross blood within her urinary catheter bag. Laboratory data showed WBC 15,000, BUN 98 mg/dl, and creatinine 4.2 mg/dl. Due to persistent elevation of her creatinine, a biopsy was done on day 3 in the hospital. Pathology was consistent with acute interstitial nephritis; intravenous (IV) methylprednisolone was tried for 3 days, but without success. Further workup was then done, including viral staining of the biopsy, and adenovirus was positive. Immunosuppresive agents were withdrawn with the exception of a half dose of tacrolimus. Adenovirus polymerase chain reaction (PCR) of both blood and urine was determined, showing 1x107 copies/ml in the urine and 64,500 copies/ml in the blood. A trial of antiviral therapy was then initiated. One dose of cidofovir was given, and within 3 days, her viral load dropped, hematuria resolved, and her physical complaints resolved. She was discharged with stable creatinine of 2.3 mg/dl.

Discussion: Adenovirus is a double-stranded deoxyribonucleic acid (DNA) virus with 49 distinct types that are stable to physical agents and adverse pH media, permitting prolonged survival in the body. In the immunocompetent host, typical manifestations are self-limited respiratory, gastrointestinal, or ocular illnesses. However, in immunocompromised patients, morbidity is increased and mortality reported is as high as 48%. When adenovirus infection becomes systemic, appropriate therapy is necessary for halting the progression of the disease. Our case demonstrates the importance of early diagnosis and treatment of adenovirus in the immunocompromised host.

The End of End-Stage Renal Disease

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Background: Calciphylaxis is a poorly understood and highly morbid syndrome of vascular calcification and skin necrosis associated with ESRD. The management of calciphylaxis is controversial and not well-defined.

Case: A 66-year-old woman with a history of ESRD secondary to diabetes mellitus and hypertension on peritoneal dialysis for the past 7 years was admitted for fever and painful skin lesions on her lower extremities. Her lesions started as multiple bruises initially and subsequently transformed over 2 months into multiple, black-colored, exquisitely tender necrotic lesions on her lower extremities. She was treated initially for cellulitis with vancomycin but did not show any clinical improvement with initial antibiotics. Subsequent punch biopsy of her skin lesions showed calcification within the media of small- and medium-sized arterioles with extensive intimal hyperplasia and fibrosis consistent with calciphylaxis. Further evaluation showed intact PTH level was 150 pg/ml; serum phosphate was 5.5 mg/dl; and serum calcium 8.4 mg/dl. She was managed with wound care, phosphate binders, and low calcium dialysate. Her peritoneal dialysis was stopped, and she was started on HD. The frequency of HD was increased to 4 times a week, and sodium thiosulphate was given as an infusion with each dialysis session.

Discussion: Bryant and White first reported an association of calciphylaxis with uremia in 1898. It affects 1%-4% of patients with ESRD, with mortality rates nearing 80%. The pathogenesis of calciphylaxis remains obscure, but it is typically seen when the calcium-phosphate product exceeds 60-70 mg^2/dL^2. Skin biopsy is the gold standard for diagnosis. Bone scintigraphy has emerged as a highly sensitive tool in diagnosing calciphylaxis and as an adjunct to track prognosis in treated

adults. Secondary infection of the skin wounds is the most common cause of death. Medical care is mainly supportive including discontinuation of parenteral iron therapy, calcium supplementation, and vitamin D supplementation. Other measures include dietary alteration, use of noncalcium/nonaluminum phosphate binders, calcimimetics, and low-calcium bath dialysis. Some benefit may be achieved with increasing the frequency or duration of dialysis sessions. Anecdotal case series show improvement of calciphylaxis with the use of intravenous sodium thiosulphate. It acts by increasing the solubility of calcium deposits.

Fulminant Budd-Chiari as the First Manifestation of Polycythemia Rubra Vera

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Background: Budd-Chiari syndrome is a rare and potentially fatal disorder caused by obstruction to hepatic venous flow. The classic, but not specific, presentation is abdominal pain along with ascites and hepatomegaly on physical exam. Etiology is most commonly secondary to hematologic disorders, inherited thrombotic diathesis, and other hypercoagulable states. When it occurs, Budd-Chiari syndrome most often presents as acute or subacute liver disease; fulminant presentation is rare and requires prompt intervention, which often includes liver transplantation.

Case: A 51-year-old woman with medical history significant only for depression, rosacea, and osteoarthritis presented to an urgent care clinic with a chief complaint of upper abdominal pain accompanied by nausea, vomiting, diarrhea, and lightheadedness as well as a decrease in urine output and slowly increasing abdominal girth. She had been in her normal state of health until about 2 months prior when she began to feel fatigued. A diagnosis of acute gastroenteritis was made and she was treated with intravenous hydration and antiemetics. No blood work was obtained at the time. Due to lack of symptom relief, worsening abdominal distention and new onset jaundice, she consulted her primary care physician 2 days later. Her physician obtained an abdominal CT, that revealed massive hepatomegaly and ascites. A subsequent ultrasound showed portal vein thrombosis and right hepatic vein occlusion. Evaluation for hematologic disorders was pending, and appropriate therapy with anticoagulation was not initiated until 4 days after presentation. Subsequently, the patient was transferred to our institution for management of hepatic encephalopathy and progressive liver failure. Upon presentation, initial hematocrit (Hct) was 52, AST 2383, ALT 1012, Ammonia level 60, Model for End-Stage Liver Disease (MELD) score was 37, and she was placed on the liver transplant list. Hematologic work-up was positive only for Jak-2 mutation, leading to a diagnosis of polycythemia rubra vera. Further history revealed that the patient had been taking oral contraceptive pills. She underwent orthotopic liver transplant on the third hospital day and, apart from developing retroperitoneal hemorrhage secondary to anticoagulation therapy, she had a good recovery phase and has since done well.

Discussion: The exact incidence rate of Budd-Chiari syndrome is unknown but has been reported to be 0.2-0.5 per million inhabitants per year. Because it is uncommon, the diagnosis and vital treatment of Budd-Chiari can be missed or delayed. This case illustrates the importance of prompt diagnosis and intervention in patients with Budd-Chiari syndrome.

Antepartum Pancreatic Adenocarcinoma

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Background: Pancreatic adenocarcinoma is the fourth-leading cause of cancer death, with annual mortality rate greater than 33,000. The presentation of pancreatic adenocarcinoma during pregnancy is rare. There have only been 7 case reports in the literature of antepartum pancreatic adenocarcinoma, of which 2 had favorable outcomes for mother and fetus.

Case: A 37-year-old gravid 3 para 1 female who was 17 weeks pregnant presented to her primary care physician with a 2-week history of right upper back pain, acholic stools, darkened urine, and dyspepsia with nausea and vomiting. An ultrasound showed multiple small gallstones without evidence of cholecystitis. An ERCP was performed, showing biliary dilatation secondary to a mass at the head of the pancreas. An endoscopic ultrasound with fine needle aspiration demonstrated cells consistent with pancreatic adenocarcincoma. After weighing the risks and benefits of a Whipple procedure, with or without elective termination of the pregnancy, the patient elected to proceed with surgery while preserving the fetus. The patient's pancreaticoduodenectomy resected a poorly differentiated, grade 3 mass > 5 cm that had invaded into the patient's duodenum. The surgical margins were clear. Thirty-three lymph nodes were sampled, 18 of which were positive for malignancy. Six weeks after surgery, gemcitabine chemotherapy was instituted. The patient delivered a healthy 4 lb 9 oz male at 34 weeks of pregnancy. At the time of this report, the patient has been found to have hepatic lesions concerning for metastases.

Discussion: This case illustrates the dilemmas of treating a patient with pancreatic adenocarcinoma during pregnancy. Pancreatic adenocarcinoma should remain in the differential for patients with jaundice and sudden onset back pain, including during pregnancy. With the aggressive nature of pancreatic adenocarcinoma, timely therapy is of importance to delay progression and/or metastases of the tumor. A review of the literature shows that only 2 patients (of 7 case studies) were alive at the study conclusion. Of these 2 cases, patient follow-up was limited. Six of the 7 cases indicated successful delivery of a healthy fetus. Overall, the diagnosis of antepartum pancreatic adenocarcinoma is a devastating diagnosis with a very poor maternal prognosis that historically has not precluded favorable fetal outcomes.

Acute Heart Failure Secondary to MPO-ANCA Microscopic Polyangiitis

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Case: An 82-year-old woman presented with a 5-month history of fevers, chills, dry cough, night sweats, weight loss,

and swelling in the lower extremities. No hemoptysis, wheezing, or chest pain was present. Five months earlier, she had been started on Prednisone 20mg daily for suspected mixed connective tissue disease. Physical exam was unremarkable other than bilateral pedal edema. Lower extremities Doppler showed proximal deep venous thrombosis (DVT). Chest CT showed pulmonary embolism. Anticoagulation was started.

Prednisone taper was started. At the 15 mg level, she developed dyspnea from flash pulmonary edema. Brain natriuretic peptide (BNP) was elevated at 2360. Troponin was transiently elevated but normalized within 24 hours. Repeat echocardiography (echo) showed marked decline in left ventricle systolic function with wall motion abnormalities. Ejection fraction dropped from 70% 2 weeks earlier to 30%. Due to supratherapeutic international normalized ratio (INR) (6.9) and elevated creatinine, coronary angiogram was postponed and a nuclear study performed, revealing an old infarct but no inducible ischemia. She was started on diuretics and improved. Her cerinuclear neutrophil cytoplasmic antibody (P-ANCA) returned positive for myeloperoxidase (MPO). Sural nerve and deep muscle biopsy showed active necrotizing vasculitis of small arteries and arterioles with no granulomas. Diagnosis of microscopic polyangiitis (MPA) was made. She was started on cyclophosphamide and high-dose steroids, to which she responded.

Discussion: MPA is a necrotizing systemic vasculitis with few or no immune deposits affecting small vessels (ie, capillaries, venules, and arterioles). It commonly affects glomerular and pulmonary capillaries. Cardiovascular complications, although rare, can occur in MPA. In a study of 85 MPA patients, 17.6% presented with heart failure and 10% with pericarditis. Myocardial infarction, conduction disturbances, and cardiomyopathy have been also documented. This is attributed to vasculitis within the myocardial small vessels. This patient had acute heart failure in the presence of active MPO with no other explanation. This case fits well into acute cardiac failure probably secondary to MPO.

Immunocompetence and Dialysis: Mutually Exclusive Propositions

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Background: Rhodotorula sp is ubiquitous and an uncommon pathogen. Since its recognition as human mycoses in 1960, less than 5 cases of Rhodoturala peritonitis and 103 cases of fungemia have been reported in the literature.

Case: We report a case of an otherwise healthy 35-year-old man on peritoneal dialysis since February 2008, with recent history of culture negative peritonitis in September 2008 treated per International Society of Peritoneal Dialysis (ISPD) protocol. In November 2008, he returned with recurrent abdominal pain, milky peritoneal dialysate, normal CBC, elevated peritoneal neutrophil count of 3300 cells/mL (normal <200 cells/mL), no eosinophilia, unremarkable gram stain, negative tuberculosis (TB) QuantiFERON gold test, and a benign abdominal imaging study except for previous left nephrectomy and evidence of residual right ureteropelvic junction (UPJ) obstruction. Fungal cultures available a week later confirmed Rhodotorula sp. Acid-fast bacillus (AFB) cultures were negative. Cefazolin and ceftazidime were discontinued with initiation of caspofungin followed by oral voriconazole. Peritoneal catheter was removed immediately, and patient was subsequently started on HD.

Discussion: This vignette underscores that even young and healthy-appearing patients on dialysis are immunocompromised. It also emphasizes the importance of evaluating for fungal infections in culture negative peritonitis, and draws attention to the recent change in ISPD and the Infections Diseases Society of America (IDSA) guidelines recommending removal of peritoneal dialysis catheter immediately in fungal peritonitis.

Recent systematic reviews suggest *Rhodotorula fungemia* is more common than perceived. In the last 2 decades it has garnered increasing attention from systematic reviews as an "emerging pathogen," particularly in the immunocompromised manifesting as endocarditis, meningitis, catheter-related fungemia and endopthalmitis with up to 20% mortality. However it may occur even in the absence of neutropenia or profound immune suppression. Although fungal peritonitis is uncommon in the general population, it is important to emphasize that age-adjusted incidence ratio of fungal peritonitis in dialysis patients is extremely high.

Too Little... But Not Too Late!

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Case: A 30-year-old woman with known HIV for 8 years presented to the infectious disease clinic with fatigue, weakness, and shortness of breath. Symptoms had progressed over the previous 3 days. Review of systems was positive for chills and night sweats. She was up-to-date on immunizations and had no animal or outdoor exposures. She was an immigrant from Honduras, but had no recent travel outside of the United States. The patient was found to be markedly anemic and thrombocytopenic, with a hemoglobin of 4.5 and a platelet count of 52. Review of her peripheral smear demonstrated microspherocytes without a significant number of schistocytes, as well as giant platelet forms. This was consistent with autoimmune hemolytic anemia and thrombocytopenia, thus indicating Evans syndrome. Treatment with high-dose IV methylprednisone and IV immunoglobulin was initiated, and the patient was supported with transfusions of packed red blood cells and platelets once cross match was obtained. This resulted in stabilization of hemoglobin and platelet counts, and steroids were transitioned to prednisone. The inciting factor was not determined, but thought to be an unidentified infection, despite negative blood and sputum cultures and tropical infectious disease workup.

Conclusion: Evans syndrome is an autoimmune disease defined by the combination, either simultaneously or sequentially, of immune thrombocytopenia and autoimmune hemolytic anemia. No specific underlying immune defect has been identified, but evidence suggests abnormalities in both cellular and

humoral immunity. Researchers have speculated abnormalities of lymphocyte subsets and immunoglobulin synthesis, supporting the concept of aberrant immunoregulation in this condition. Infection is considered to be the most likely precipitating cause in susceptible individuals. Diagnosis is confirmed by the presence of autoimmune hemolytic anemia and thrombocytopenia with a positive direct antiglobulin test and absence of known underlying etiology. The clinical course is often chronic and relapsing. Treatment is often ineffective but typically consists of high dose steroids; some patients may also require IV immunoglobin. In refractory cases, immunosuppressive medications, including Rituxan, and splenectomy have been used. The cause of death is generally bleeding, especially intracranial hemorrhage, or sepsis.

Assessment of Decision-Making Capacity in an Incarcerated Patient with Suspected Lung Cancer

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Background: Impaired decision-making in hospitalized patients often goes undetected. However, the ability to establish a patient's capacity to consent or refuse treatment is critical in respecting the patient's autonomy. The refusal of treatment by a patient who is incarcerated may heighten concern regarding capacity for decision-making.

Case: A 56-year-old incarcerated man with no documented psychiatric history reported symptoms including a cough lasting 3 months and recent development of hemoptysis. The patient endorsed fever, night sweats, weight loss, and a history of smoking. An outpatient examination included a CT scan, which revealed a large cavitary lung lesion. One week later he was found minimally responsive and was transported to an outside hospital where antibiotic coverage was administered. However, the patient refused further diagnostic evaluation. His ability to make medical decisions was brought into question, and his sister consented for CT guided biopsy of the lung mass for which he was transferred to our institution. Initially, the patient agreed to cooperate on several occasions; however, at the time of procedure refused for varying reasons. Following manipulative behavior by the patient, the psychiatrist's re-evaluation confirmed that the patient did not demonstrate the capacity to make decisions. Though the patient understood the situation and its consequences, he was unable to communicate a clear thought process behind his decision. Given the patient's incarcerated status and his unwillingness to cooperate, a decision was made in conjunction with the ethics committee to pursue guardianship. As the patient was medically stable, he was transferred back to the correctional facility for this process.

Conclusion: This case illustrates the difficulty in detecting impaired decision-making capacity. The prison population presents complex issues of trust and respect for patient autonomy in medical decision making circumstances. Assessments of competence using systematic approaches in hospitalized patients would be of significant benefit to patients and clinicians.

Hemophilic Pseudotumor

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Case: A 73-year-old man with a history of hemophilia A presented with an erythematous, warm and tender 6 x 3 x 2 cm mass located over the lateral aspect of his distal right fibula. The patient reported that a cystic lesion had been present in this location for the past 35 years; this lesion remained stable until 1 year prior to admission when the integrity of the skin was compromised and the mass began to show signs of a localized infection with a gradual increase in its size and firmness. Approximately 4 weeks prior to presentation, a CT scan of the leg demonstrated a large, heterogeneous fluid collection with characteristics of a chronic hematoma extending from the popliteal fossa, caudally towards the calf. Following an incision and drainage procedure, and empiric outpatient treatment with amoxicillin, the mass became more ulcerated, painful, erythematous, and swollen. He was treated with vancomycin and piperacillin sodium/tazobactam for the soft tissue infection and showed significant improvement. Subsequent imaging with ultrasound and a repeat CT scan demonstrated a multi-loculated, encapsulated mass in the lateral compartment of the right leg with blood products in various stages of evolution. A clinical diagnosis of pseudotumor was entertained and orthopedic surgery was consulted for more definitive drainage and resection of the mass. The patient was given multiple doses of recombinant factor VIII to prevent significant blood loss. Following surgical drainage, the patient continued to improve with physical therapy. There has been no recurrence of the infection or the mass as of the writing of this report.

Pseudotumors are chronic, encapsulated, slowly expanding hematomas that typically occur in patients with underlying bleeding diatheses or coagulation disorders. These masses usually occur in soft tissues and their constitutive elements can include areas of new bone formation as well as various blood products. For reasons that are not well explained, pseudotumors are an uncommon and unusual complication of hemophilia. Hemophilic pseudotumors have been reported to occur in only 1%-2% of all patients with severe forms of this disease; they are found almost exclusively in men between the ages of 20-70.

Conclusion: This case demonstrates a need for increased awareness of this possible complication that can occur in patients with hemopbilia. Although no standard treatment protocols have been validated, some authorities argue for a conservative approach including immobilization and factor replacement, while others advocate for more aggressive management with surgical debridement. Pseudotumor location and degree of functional compromise must be evaluated in determining the surgical risk versus benefit.

Adult Still's Disease

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Case: A 25-year-old Hispanic woman presented to the ED with a 2-day history of fevers and chills accompanied by dyspnea, headaches, sore throat, nausea, vomiting, neck pain, and myalgias. During the exam, the patient was tacycardic and febrile with a temperature of 103.7°F, and hypotensive with pressures of 90/50. Patient was lethargic but

alert and oriented. Physical exam was within normal limits except for tender cervical and positive Brudzinski's sign. Kernig's sign was negative and there was no photophobia. Lumbar puncture was performed in the ED, and patient was started on IV ceftriaxone and vancomycin. Initial labwork included WBC of 13.3 with 19 bands, lactic acid of 3.0, and potassium of 3.0. Monospot was negative. Patient was admitted to the intensive care unit (ICU) for severe sepsis caused by bacterial meningitis. Patient continued to spike diurnal fevers up to 104°F. WBC rose to 20,000. Results from lumbar puncture were negative, and blood cultures were negative despite re-culturing patient during febrile episodes. Patient was treated with broad spectrum antibiotics. QuantiFERON gold for TB negative, Legionella urine negative, and D-dimer was elevated at 36.3. A CT scan of the chest was negative for pulmonary embolism. A CT of abdomen and pelvis showed mild thickening of common bile duct, followed by normal hepatobiliary iminodiacetic acid (HIDA) scan. Despite treatment, patient still had muscle aches, fever of 104ºF and leukocytosis of 20,000. Tagged WBC scan demonstrated an abnormal uptake around pericardium, however, transesophageal echocardiography (TEE) was negative for vegetation or pericardial effusion. Further laboratory results revealed erythrocyte sedimentation rate (ESR) 86 and C-reactive protein (CRP) 39.1, with Ferritin of 31000 and lactate dehydrogenase (LDH) 1659. Both ANA and rheumatic factor (RF) were negative. The patient was diagnosed with adult Still's disease (ASD) as the cause of her fever. Antibiotics were discontinued, and the patient was started on prednisone. Her fever subsided, WBC trended to normal, and arthralgias resolved.

Discussion: Fever of unknown origin is classically defined as temperature >38.3ºC, illness >3 weeks, and failure to obtain diagnosis despite 1 week of inpatient investigation. Major etiologies of fever of unknown origin include non-infectious inflammatory 22%, infection 16%, malignancy 7%, and no diagnosis 51%. The etiology of ASD is unknown. The incidence is estimated at 0.16 per 100,000. Diagnosis is made through the Yamaguchi Criteria requiring 5 features with at least 2 major diagnostic criteria. A ferritin >3000 ng/ml has been observed with ASD. This degree of hyperferritinemia is not observed with other rheumatic disease and correlates with disease activity. Ferritin has been used as a serologic marker to monitor treatment response.

Unusual Presentation of Lemierre Syndrome: Liver Abscesses and Portal Venous Thrombosis Due to Fusobacterium Varium

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Case: A 58-year-old man presented with diffuse abdominal pain associated with watery diarrhea. His symptoms started with fatigue, myalgia, fever, and chills. He had severe shortness of breath at rest and with exertion. Two days before admission, he noticed yellowish eye discoloration and unintentional weight loss. On examination, the patient was in respiratory distress with respiratory rate 20-28, saturating 99% on 2-liter oxygen, pulse 88 and blood pressure (BP) 107/70. He had icteric sclera and dry oral mucosa with poor dentition. He also had decreased air entry on left posterior chest with dullness on percussion at the same site. Abdomen was positive for fluid thrill. Lab work recorded WBC 32, hemoglobin 13.2, Hct 37.5, BUN 75, creatinine 2-4, bilirubin 19.2, alkaline phospate 304, AST 304, ALT 162, amylase 186, lipase 1090, albumin 2.4, sodium (Na) 134, potassium (K) 4, bicarbonate 21, anion gap 23, lactate 3.1, partial thromboplastin time (ptt) 14.6, and INR 1.5. A CT scan of the left side of the chest showed pleural effusion with consolidation. A CT of abdomen showed multiple liver abscess and portal vein thrombosis. Initial blood culture and CT-guided liver abscess aspirate grew *fusobacterium varium.* He was covered with zosyn and flagyl.

Discussion: Fusobacterium sp are normal flora of oropharyngeal, gastrointestinal, and genitourinary tract of healthy humans. The following combination were used by many authors to define Lemierre Syndrome (LS): (1) history of angina/illness in the preceding 4 weeks or compatible clinical findings, (2) evidence of metastatic lesion in lungs and/or another remote site, and (3) evidence of internal jugular vein thrombophlebitis or isolation of fusobacterium from blood culture or a normally sterile site. LS variant has been reported in literature with the same presentation as our patient, but the isolation of *fusobacterium varium* with his atypical clinical presentation makes him very unusual. The patient showed unusual presentation of LS involving gastrointestinal tract. From our literature search, this is the first case of *fusobacterium varium* sepsis with portal vein thrombosis and liver abscess. This report underscores the fact that LS is a very rare, but often fatal, disease. Oropharyngeal presentation with metastasis to the lung is a very common presentation, however, the LS variant with metastasis to liver, brain and other parts of body should be considered.

VIGNETTES

Shortness of Breath Drives Hunter from Woods

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Case: A 70-year-old man presented with shortness of breath and diaphoresis that began 3 days before admission while deer hunting. He recalled finding a tick on his scrotum 3 weeks earlier. Ten days later, he saw his physician with complaints of abdominal pain and chills. Lyme disease titers at that time were negative. At 1-week follow-up, he had slight improvement but later developed fatigue, fever, chills, non-productive cough, myalgias, slight leg swelling, and worsening shortness of breath. He denied rash, headache, sore throat, vomiting, and abdominal pain. On physical exam, he was diaphoretic, tachycardic with a pulse of 106 and febrile with a temperature of 38.9ºC. He had increased work of breathing as well as scrotal tenderness and lower extremity edema. Laboratory studies were significant for a platelet count of 120,000 that decreased to 55,000 in 2 days as well as leukopenia, anemia, and

elevated liver aminotransferase levels. Subsequent chest radiograph and CT were negative for infiltrate and pulmonary embolism. Tick-borne illness was a major diagnostic consideration and serologies for babesiosis and ehrlichiosis were ordered. Serologies resulted in a very positive anaplasmosis titers of immunoglobin G (IgG) 1:4096 and immunoglobin M (IgM) 1:1260. He was started on doxycycline and discharged in improved condition.

Discussion: Human granulocytic anaplasmosis is a febrile illness caused by the obligate intracellular organism, *A. phagocytophilum.* It is transmitted by deer ticks (*Ixodes scapularis*), which are commonly found in the upper Midwest and northeastern United States. Symptoms develop between 4 and 8 days after exposure. Clinical manifestations include fever, malaise, myalgias, chills, and headache. Nausea, vomiting, and diarrhea are less frequent, as are cough, confusion, and rash. Most patients develop leukopenia, thrombocytopenia, and elevated serum levels of hepatic aminotransferases. Such findings in a febrile patient with recent tick exposure are key to diagnosis. Severe complications occur most often in the elderly and include adult respiratory distress syndrome, a toxic shock-like syndrome and life-threatening opportunistic infections. The most sensitive and specific means of confirmation is seroconversion or a 4-fold change in antibody titer during the convalescent phase. Doxycycline is first-line treatment and usually results in rapid improvement within 24-48 hours.

Revenge of the Cinchona Tree

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Case: A 51-year-old woman with a history of alcoholic cirrhosis, chronic obstructive pulmonary disease (COPD), and insomnia was admitted with 1 day of acute abdominal pain and vomiting. She had been well prior to her current presentation, except for an earache recently, for which she took some leftover amoxicillin. She reported that she first noted acute shortness of breath followed by sharp pain in her abdomen that migrated up to her chest. This progressed to recurrent emesis. On admission she was noted to be aneuric and have a creatinine level of 3.3. She was mildly anemic and severely thrombocytopenic. Fourteen hours later, she was noted to be pancytopenic. Her reticulocyte count was low for her degree of anemia. She had evidence of hemolysis, including an elevated LDH, decreased haptoglobin, and elevated bilirubin. She responded well to transfusion. Her creatinine continued to rise and her mental status became significantly altered. A direct Coombs test and indirect Coombs test were positive. A peripheral smear did show schistocytosis and a few large platelet forms. She eventually required HD.

The differential diagnosis includes disseminated intravascular coagulation (DIC), idiopathic thrombocytopenic purpura (ITP), thrombotic thrombocytopenic purpura (TTP), hemolytic uremic syndrome (HUS), Evans syndrome, bone marrow suppression (toxic/infectious/inflammatory/infiltrative), and drug toxicity, among others. This clinical scenario has features that provide evidence for and against all of these possibilities. After further questioning of the patient's husband, it was found that the patient may have taken the husband's quinine. Apparently the patient's bottle of amoxicillin looked exactly like her husband's quinine. To prove this, quinine-specific platelet autoantibodies were tested for and found to be present. These data suggest that the most likely diagnosis was quinine-induced HUS. After 2 months the patient's renal function and cell counts returned to normal.

Verapamil Overdose: A Change of Course After ECMO

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Case: The patient is a 34-year-old woman with degenerative joint disease, anxiety, and migraine headaches who was admitted after ingesting 30-40 pills of verapamil, estimated to be 3.0-3.6 grams. The patient was complaining of chest pain upon arrival in the ED. She stated that she had been taking a pill every 1-2 hours. She felt generally weak, short of breath, and diaphoretic. Physical examination showed a well-nourished patient who appeared uncomfortable and diaphoretic. Initial vital signs showed a BP of 66/40 with a regular pulse of 52. A 12-lead EKG showed complete heart block with ventricular escape rhythm. Chest X-ray was unremarkable. She was admitted to the ICU after stabilization in the ED where she was intubated for hypoxic respiratory failure. She underwent a cardiac catheterization as well that returned negative. She was started on IV fluids, insulin, and dextrose infusion, calcium infusion, glucagon bolus followed by an infusion, and atropine. Her blood pressure continued to decline and she was started on vasopressors. Her oxygenation continued to drop despite maximum mechanical ventilatory support and she went into multiorgan systems failure with acute respiratory failure (ARF), fulminant hepatic failure, cardiogenic shock, and paralytic ileus in addition to the respiratory failure. She underwent continuous veno-venous hemofiltration (CVVH) for ARF. Extra corporeal membrane oxygenation (ECMO) was started 36 hours after admission to the ICU, when the PO_2 was 46 mmHg on 100% O_2 on mechanical ventilation. It resulted in dramatic improvement and change of course in 72 hours when it was discontinued. After approximately 2 weeks, she recovered her kidney and liver functions, and was successfully extubated. Her ileus also resolved. The patient was then transferred to inpatient rehabilitation services, where she recovered fully and was discharged home.

Discussion: The patient was started on ECMO only after her course deteriorated rapidly despite maximum support. Previous research described the use of percutaneous cardiopulmonary bypass as a therapy for cardiac arrest in an adult patient intoxicated with verapamil. They concluded that in patients with cardiac arrest attributable to massive verapamil overdose, percutaneous extracorporeal cardiopulmonary bypass could provide adequate tissue perfusion and sufficient cerebral oxygen supply until the drug level is reduced and restoration of spontaneous circulation can be achieved.

Hypocalcemic Cardiomyopathy with Significant Ultrasenstive Troponin I Elevation Mimicking Acute Myocardial Infarction

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Case: A 49-year-old woman with a history of billroth II procedure performed 5 years ago for peptic ulcer disease that was followed by chronic nutritional deficiencies, presented to the ED with muscles spasms, shortness of breath, and diffuse chest pain for 2 days. No history of CAD or cardiomyopathy was present. Initial vital signs showed BP 100/70, heart rate 110, temperature 107°F, respiratory rate 25, and pulse oxygen 94%. Physical exam revealed normal heart sounds with no murmurs, clear lungs, no jugular-venous distention (JVD) and 2 plus pitting edema in the lower extremities.

Shortly after presentation, she developed severe respiratory distress and laryngeal spasm, and was intubated. She became hypotensive and was started on norepinphrine. Chemistry panel showed calcium of 4.8 mg/dl, ionized calcium .68mmol/l, potassium 2.5mg/dl, albumin 1.7 gm/dl, creatinine 1.6mg/dl, lactate 2.5mmol/l, WBC count 13.7, hemoglobin 10.5g/dl, and platelet count 320. EKG showed prolonged QTc 736 ms and no ischemic changes. Cardiac enzymes showed CPK 5926, creatine phosphokinase MB (CK-MB) 186.4, myoglobin 16194 and ultrasensitive tropnin I 55. Chest X-ray was normal. Patient was started on broad-spectrum antibiotics, and her electrolyte imbalance was treated aggressively. A 2-D echo showed left ventricular ejection fraction (LVEF) of 25% with severe global hypokinesis. Hyperthermia resolved over the next day. She was extubated 3 days later and weaned off pressers. Work-up revealed no sepsis and her antibiotics were discontinued. Electrolyte imbalances were corrected. Cardiac enzymes trended down. Vitamin D level was undetectable and PTH was 927. A repeat echo 6 days later showed LVEF of 55%. Patient had cardiac catheterization, which revealed normal coronaries.

Discussion: Hypocalcemic cardiomyopathy is a rare disease, with 25 reported cases in literature; however, the exact causal relationship has not been established. Hypotheses are based on the physiologic role of calcium in excitation contraction coupling and the absence of other causes of cardiomyopathy. Congestive heart failure in reported cases showed dramatic response after correction of hypocalcaemia. This patient had a unique presentation with significantly high ultrasensitive Troponin I elevation. It was not clear what may have predisposed her to have acute or chronic hypocalcaemia. No common causes such as sepsis, hemodialysis, acute pancreatitis, transfusion of citrated blood, or recent parathyroidectomy were identified.

Though causal relationship between hypocalcemia and acute cardiomyopathy cannot be established, this patient's clinical course, echocardiographic/cardiac catheterization findings, and dramatic improvement with correction of hypocalcaemia are most consistent with our diagnosis.

A Case of SLE Presenting as Protein Losing Enteropathy

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Case: A 71-year-old woman from Mexico of unknown medical history was admitted to the hospital with a nearly 4-month history of fever, watery diarrhea, and increasing abdominal girth. The patient denied alcohol and illicit drug abuse, and did not have any stigmata of liver disease on exam, but did have a left pleural effusion. CBC showed thrombocytopenia (70K/uL). Chemistry was remarkable only for profound hypoalbuminemia (1.3 g/dL). Tests of liver function were also within normal limits.

Prior to arrival at our facility, the patient had also undergone single photon emission computed tomography (SPECT) scan of the liver that showed increased uptake in the left hepatic lobe, and an exploratory laparoscopy that revealed a grossly normal liver, no varices or splenomegaly, and an absence of carcinomatosis despite a significant amount of ascites. A liver biopsy was ultimately found to be suggestive of immune versus toxic injury.

Our initial evaluation revealed osmotic diarrhea and low saggital ascites with negative infectious workup including viral disease, TB, *Tropheryma whipplei,* and bacterial/parasitic causes of diarrhea. Transthoracic echocardiogram (TTE) was within normal limits. Protein-losing enteropathy was entertained as other serum proteins were found to be low. Colonoscopy was unremarkable, but a duodenal biopsy from an EGD showed villous blunting with plasma cell infiltration, and a CT scan showed a focal area of duodenal involvement, both of which were thought to suggest celiac disease. The patient was placed on a gluten-free diet, with no relief, and tissue transglutaminase (tTG) later came back negative. In screening for other possible causes, serum protein electrophoresis (SPEP)/immunofixation electrophoresis (IFE) showed global hypoproteinemia only. ANA, dsDNA, and Smith antibodies were all drawn, and found to be markedly elevated. A trial of high-dose steroids (1 mg/kg of methylprednisolone) provided prompt improvement in diarrhea and increase in albumin, suggesting systemic lupus erythematosus (SLE) related protein losing enteropathy. The patient later stopped treatment and had return of diarrhea. The diarrhea again responded to steroids.

Discussion: In evaluation of this patient's case, she did meet 4 of 11 ARA consensus criteria for the diagnosis of SLE, including specific autoantibodies. Protein-losing enteropathy is a rare manifestation of SLE, and even more rare as an initial presentation. Nearly 50 cases are reported in the literature to date, with the largest group coming from a Chinese case series in 2007. In this series, 8 of 15 had enteropathy as initial presentation of SLE, with 11 of 15 having ascites as a manifestation of protein losing enteropathy (PLE). All patients ultimately met ARA criteria for the diagnosis of SLE, though 1 took as long as 30 years. Interestingly, all patients in the literature with SLE-related PLE had ribonucleoprotein

(RNP) antibodies, and our case was no exception. However, dsDNA antibodies are very rare among this demographic, which were also noted in our patient. The vast majority of these cases are steroid responsive, with the remainder responding to added immunosuppressants. Overall prognosis is good.

Acute Bilateral Swelling, Pain, and Stiffness in the Hands of an Elderly Woman: A Case Of RS3PE Syndrome

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Background: Remitting Seronegative Symmetrical Synovitis with Pitting Edema (RS3PE) syndrome is a rare inflammatory arthritis seen in older adults that occurs acutely and is resolved by a short course of low-dose oral steroids. The diagnostic criteria for RS3PE Syndrome include bilateral pitting edema of the hands, abrupt onset of polyarthritis, age >50 years, and seronegative RF. Not uncommonly, it represents a paraneoplastic process.

Case: An 82-year-old woman presented with sudden onset of bilateral swelling, pain, and stiffness in her hands. Prior to presentation, she tried over-the-counter naproxen 220 mg orally twice daily for 2 weeks but had minimal improvement of her complaints. A complete review of symptoms was otherwise negative. Besides the symmetrical synovitis and pitting edema in the hands, there were no other abnormal findings on physical exam. CRP and ESR were checked and were moderately elevated. RF and ANA were negative. She was treated with prednisone 5 mg orally twice daily for 4 weeks, and the bilateral hand swelling, pain, and stiffness resolved. She completed a prednisone taper over 2 more weeks. At a follow-up appointment 8 weeks after completion of the prednisone taper, she had no reoccurrence of her hand symptoms.

Due to the association of RS3PE Syndrome with cancer, she underwent an extensive malignancy workup, including mammogram and colonoscopy. All screenings were negative, thus no systemic cause for RS3EP Syndrome was found.

Was That Really Small?

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Case: A 77-year-old white man presented with a 4-week history of unsteadiness. On examination, he had positive cerebellar signs. An MRI of the brain and cerebral spinal fluid (CSF) analysis were normal. Chest X-ray showed a scar at the left lung base, that was attributed to previous trauma. A CT scan of the chest and abdomen revealed a bladder mass, that was found to be a poorly differentiated small cell carcinoma. A paraneoplastic panel was positive for Anti-Hu antibody. These features suggested paraneoplastic cerebellar degeneration secondary to a small cell bladder cancer. Positron emission tomography (PET) scan was negative for metastatic disease. He was initiated on steroids and chemotherapy. Unfortunately, his symptoms neither improved nor progressed after 3 cycles of chemotherapy.

Discussion: This is a case of subacute cerebellar degeneration occurring with systemic cancer, present with diffuse cerebellar dysfunction. The etiology is believed to be an autoimmune response against onconeural antigens. Specifically anti-Yo, anti-Tr, and anti-Mglu1 are associated with pure cerebellar syndrome. The common associated malignancies are Hodgkin's lymphoma, breast cancer, and lung cancer. This is a rare presentation of bladder tumor. The striking histological finding is diffuse loss of purkinje fibers. CSF evaluation may show nonspecific elevation of protein, oligoclonal bands, and elevated IgG index. A CT and MRI are generally normal. ANA are useful for diagnostic purposes although a negative assay does not rule out the diagnosis. Treatment consists of plasmapheresis, IV immunoglobin, corticosteroids, or cyclophosphamide given alone or in combination. Unfortunately, less than 10% of patients respond to treatment.

An Elusive Diagnosis Exposed By Autoimmunity

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Background: Henoch-Schönlein purpura (HSP) is an immune complex small-vessel vasculitis typically seen in young children. Identification of this uncommon autoimmune disease in adults warrants prudent consideration of its association with concurrent diagnoses of infection or malignancy.

Case: A 38-year-old man presented with a 6-month history of night sweats and migratory polyarthritis of the ankles, knees, and elbows. Initially diagnosed with rheumatoid arthritis (RA), his symptoms worsened on hydroxychloroquine, with development of a lower-extremity purpuritic rash, painful raised lesions on the hands, nausea, dark-colored urine, and fevers. Skin biopsy demonstrating leukocytoclastic vasculitis with IgA immunofluorescence was diagnostic for HSP. He was treated with steroids without improvement. Careful physical exam revealed a systolic murmur at the right upper sternal border. Blood cultures identified gram-positive cocci in chains. Echo characterized a 1.8 cm vegetation engulfing the patient's congenitally bicuspid aortic valve. Fifteen blood cultures grew *Abiotrophia* (nutritionally variant *Streptococcus* [NVS]) organisms nonviable for sensitivity testing. Treatment consisted of aortic valve replacement and 6 weeks of IV vancomycin, with subsequent resolution of bacteremia, skin lesions, and hematuria.

Discussion: This case illustrates the concept of autoimmunity induced by infection. HSP is generally a self-limited disease in children. Adult cases are uncommon and display a more severe course, with frequent joint symptoms, less GI involvement, and a high incidence of renal disease. Adult HSP often represents a secondary process. Therefore, identification of HSP in adults warrants prudent consideration of associated etiologies such as infections, malignancies, or connective tissue diseases. Rheumatic manifestations in endocarditis delay diagnosis. Compared with other *Streptococci,* infective endocarditis due to NVS has a higher rate of extracardiac complications and is more difficult to culture. To our knowledge, this is the first case report of *Abiotrophia* (NVS) endocarditis causing HSP.

Disseminated Blastomycosis: A Case Report

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Background: Blastomycosis is a fungal infection caused by *Blastomyces dermatidis*, a thermally dimorphic fungus. The primary mode of entry is inhalation of spores into the respiratory system. The disseminated form can involve skin, bone, CNS, eyes, liver, etc.

Case: A previously healthy 44-year-old man presented with a chief complaint of a swollen, painful right ankle. He worked as a painter and was an avid outdoor fisherman and hunter throughout central and northern Wisconsin. He acknowledged remote IV drug use and occasional smoking. Initial foot X-rays were negative for any pathology, and the patient was treated with vicodin for pain relief. Subsequently, he had worsening right ankle pain, fever, occasional diaphoresis, cough, shortness of breath, 10-12 lb weight loss and generalized fatigue for 3-4 weeks. He was also found to be hypoxic and have violaceous skin lesions on his back. The chest X-ray revealed a diffuse reticular nodular pattern. Keeping in mind a differential diagnosis including *Pneumocystis jiroveci* (carinii) pneumonia and community acquired pneumonia, he was started on trimethoprimsulfamethoxazole, ceftriaxone, and azithromycin. The joint aspirate from the ankle revealed blastomyces, and the patient was started on IV amphotericin-B. Cultures from sputum, skin, and right ankle bone also revealed blastomyces. The patient underwent surgical debridement of the right ankle lesion and was treated with 2 weeks of IV amphotericin-B. The discharge plan was for oral itraconazole for 1 year.

Conclusion: Systemic blastomycosis in a previously healthy immunocompetent male is very infrequent. The primary presentation as ankle pain is also very infrequent. The literature search revealed frequent reports of disseminated spread in immunocompromised patients but only 2-3 reports of patients with an intact immune system.

Multiple Infectious Complications in Patient Treated for Ulcerative Colitis

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Case: An 82-year-old man presented with a history of late-onset ulcerative colitis (UC) diagnosed at the age of 71. He was found to be intolerant to methotrexate and sulfasalazine, but had been in remission for several years. At presentation, he had 2 weeks of persistent watery diarrhea, which was bloody for the last few days, and a 25-lb weight loss. After appropriate resuscitation, the patient underwent a colonoscopy and biopsy, which was consistent with a UC flare. Thus, he was started on prednisone, budesonide, and azathioprine. Over the course of the next week, his diarrhea and weight had much improved, and consideration was made to start infliximab to avoid the need of strong-dose steroids. To rule out latent TB, which may be reactivated by tumor necrosis factor (TNF)-alpha receptor inhibitors, the patient received a purified protein derivative (PPD) skin test and chest X-ray. PPD was negative, but the chest X-ray displayed nodule-like opacities that were absent in an X-ray performed just 2 months prior. A follow-up CT confirmed the presence of multiple nodules, and a lung biopsy and bronchoalveolar lavage (BAL) performed the following week proved his lesions to contain *pneumocystis carinii* pneumonia (PCP) and nocardia.

During this time the patient developed a productive cough, intermittent fever and chills, and continued to be at a low body mass index (BMI). In addition, he developed multiple ulcerated lesions around his nose and circumoral regions, which on culture were consistent with herpes labialis. Four weeks after admission to the hospital, this patient was on atovaquone for PCP (due to a drug allergy to sulfa), minocycline and ciprofloxacin for nocardia, and valcyclovir for herpes simplex. In another week, he finally began to regain his original health via the numerous antibiotics, enhanced nutrition, and physical therapy.

However, this case clearly illustrates how devastating the immunosuppressive side effect of corticosteroids can be, especially in the elderly.

A Cold Case Investigation

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Case: A 61-year-old man with a 60-pack-per-year smoking history presented with a 2-day history of dyspnea on exertion, jaundice, and generalized weakness. The patient denied any recent fever, abdominal pain, vomiting, diarrhea, melena, or hematochezia. His admitting laboratory studies were remarkable for hemoglobin 6.1 g/dl, reticulocyte count 5.13%, LDH 429 IU/L, haptoglobin < 7mg/dL and indirect bilirubin 3.9 mg/dL. Direct Coombs test and cold agglutinins were both positive. Tests for cytomegalovirus, Epstein Barr virus, and mycoplasma pneumoniac antibodies were all negative. A few days prior to admission, work-up of a left hilar mass discovered on routine chest X-ray revealed a stage Ib (T2N0M0) squamous cell lung carcinoma. The patient's clinical presentation was consistent with autoimmune hemolytic anemia (AIHA), specifically cold agglutinin disease. Because the patient tested negative for the common infectious causes of cold agglutinin disease, and because his cancer had no bone marrow involvement, it was felt that the hemolytic anemia was likely secondary to a paraneoplastic syndrome.

Paraneoplastic syndromes are cancer-related disorders not directly attributable to mass effect or tissue invasion. A handful of case reports describe AIHA as a paraneoplastic syndrome related to various cancers, including squamous cell lung cancer. Unlike this case, most previous reports of cancer-related AIHA have occurred in patients with large tumor burdens and/or metastatic disease. Scant research exists in this area, but 1 review showed that erythrocyte auto-antibodies and carcinoma coexist 12-13 times more often than expected from their individual relative frequencies. Another review found that roughly 25% of patients with cold agglutinin disease also have malignancy with 5% having carcinoma. Numerous mechanisms have been proposed for

this interaction, most revolving around immune dysfuntion caused by the tumor/immune system interface.

Management of paraneoplastic cold agglutinin disease typically begins with keeping the patient warm, but definitive treatment often is dependent upon removal or cure of the underlying malignancy. In severe cases, plasmapheresis can be used as a temporary measure. Rituximab, a CD20 monoclonal antibody, has shown promise in treating cold agglutinin disease. A recent case series reported an increase in hemoglobin levels in over half the treated patients, but relapse was also common with this form of therapy.

Unilateral Somatic Symptoms And Hyperventilation

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Case: A 67-year-old right-handed man was referred to our institution for evaluation of a 2-year history of recurrent spells, most dramatic over the past 2 weeks. Each episode was stereotypical in character though variable in duration, lasting <30 minutes. Symptoms included dizziness, perioral and tongue numbness, tingling dysesthesias involving fingertips bilaterally and traveling proximally up both arms and right face, and right arm weakness described as "being paralyzed." During an observed spell, the patient complained of anxiety with soft and poorly articulated speech and a normal breathing pattern. Examination showed decreased hand grasp, decreased resistance to muscle strength testing on the right upper extremity, weakness in raising the right arm, and decreased sensation to fine touch and pinprick during the spell with normal examination between spells. Voluntary hyperventilation reproduced the patient's symptoms. Echo and CT angiography of the head and chest, were normal. Arterial blood gas performed at the time of spell showed a pH of 7.6, pCO_2 of 11, HCO_3 24, and pO_2 of 83. As the spell was resolving, repeat blood gas revealed a pH of 7.48, pCO_2 of 27, and pO_2 of 83. The patient was diagnosed with hyperventilation with unilateral somatic symptoms and generalized anxiety. Treatment included behavioral therapy, forced breathing in a paper bag during the spells, and clonazepam. Follow-up 1 year later showed no new neurologic disease or symptoms.

Discussion: The term "hyperventilation syndrome" describes a constellation of somatic and psychological symptoms thought to be caused by hyperventilation. Recent evidence however, suggests that the term is a misnomer and that hyperventilation may, in fact, be a consequence rather than a primary trigger for symptomatic episodes. Furthermore, hyperventilation and hypocapnia may not always be identified on examination, or upon voluntary hyperventilation provocation testing. Unilateral symptoms typically lead to alternate diagnoses such as transient ischemic attacks, seizures, or migraines. It is important that physicians recognize and understand the symptoms of hyperventilation, as effective diagnosis and management generally leads to resolution.

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