Proceedings from the 2013 Annual Meeting of the American College of Physicians, Wisconsin Chapter

The following abstracts were presented during the 58th Annual Meeting of the Wisconsin Chapter of the American College of Physicians in 2013. Internal medicine residents from each of Wisconsin's 5 residency programs presented their research and/or unusual clinical experience via case- and research-based vignettes and posters. All of the vignettes as well as the winning posters are published here. Additional poster presentations are available online in an appendix and can be accessed at https://www.wisconsinmedicalsociety.org/_WMS/publications/wmj/pdf/114/1/WPAC_abstracts_2013.pdf.

CASE-BASED VIGNETTES

1st place

Adderall-induced Bilateral Blindness

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Introduction: Pseudotumor cerebri (PTC) is a rare disorder of unknown etiology, most commonly seen in obese females of child bearing age, that usually has a self-limited disease course. Although certain medications (tetracycline, retinoids, etc) have been associated with PTC, there have only been 6 case reports of adderall-associated PTC. We describe the case of a 35-year-old man on Adderall who developed PTC with bilateral vision loss.

Case: A 35-year-old man on Adderall with a history of attention deficit hyperactivity disorder (ADHD) presented with 6 days history of rapid bilateral complete vision loss. He also complained of headache but no diplopia. Physical exam revealed no perception of hand movements or light, normal intraocular pressure on eye exam. Fundoscopy revealed bilateral papilledema with retinal hemorrhages. The rest of his neurological exam was normal. Complete blood cell count (CBC), comprehensive metabolic panel (CMP), erythrocyte sedimentation rate (ESR), angiotensin-converting enzyme (ACE) levels, magnetic resonance imaging (MRI), magnetic resonance angiography (MRA) and magnetic resonance venography (MRV) were all normal. Lumbar puncture (LP) demonstrated an opening pressure of 330 mm H_2O with significant relief of his headache and improvement of vision. Cerebrospinal fluid (CSF) analysis including protein, glucose, cell count, Venereal Disease Research Laboratory test (VDRL), herpes simplex virus (HSV), varicella-zoster (VZ) polymerase chain reaction (PCR) test, *Toxoplasma*, cryptococcal antigen, West Nile Virus, *B burgdorferi,* Gram stain, bacterial, viral, and fungal cultures, and cytology were all normal. Work-up for multiple sclerosis (MS) was negative. He was diagnosed with Pseudotumor cerebri. Adderall was stopped. He was treated with acetazolamide and steroids. A lumboperitoneal (LP) shunt was placed with continuous gradual improvement in vision. Post discharge he regained his vision completely and, as a result, optic nerve fenestration procedure was felt unnecessary.

Discussion: PTC is a rare disorder with an incidence of 1/100,000. More than 90% of cases are seen in women of child bearing age. It is extremely rare in a young male like our patient. It is characterized by headache, vision loss, and papilledema, normal MRI, MRV, and an elevated opening pressure on LP. Optic neuritis, MS and glaucoma all were ruled out in our patient. PTC also has been associated with other diseases such as hypoparathyroidism, anemia, and systemic lupus erythematosus (SLE), which were ruled out in our patient. Medications have been associated with PTC. Growth hormone, tetracycline, and retinoids have well-defined association. Others with more anecdotal evidence include lithium and steroid withdrawal. There have been only been 6 reports of PTC in patients on Adderall. Our patient's only home medication at presentation was Adderall. Treatment options include acetazolamide, steroids (short term) and surgical options like optic nerve sheath fenestration (ONSF) and CSF shunt. Our patient was started on acetazolamide and had a CSF shunt placed with dramatic improvement in his vision.

Airway Compression Resulting from Mediastinitis

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Introduction: Fibrosing mediastinitis is described as excessive fibrotic reaction in the mediastinum. It can result in the compromise of airways and great vessels. It is thought to be a sequel of histoplasmosis, though it can be idiopathic or autoimmune. Less than 1% of 500,000 annual cases of histoplasmosis develop fibrosing mediastinitis, making it a rare diagnosis.

Case: An 81-year-old retired man with a history of deep vein thrombosis (DVT) presented to the emergency department (ED) for a tender right neck mass of 1 day duration. He reported that he was hospitalized twice in the past 6 months for this type of transient mass. Chest x-ray showed no acute cardiopulmonary findings. Computed

tomographic (CT) scan of his neck showed findings compatible with a myositis vs parotitis. The patient was diagnosed with parotitis and discharged on augmentin, just in time to make his granddaughter's wedding.

The patient returned 3 days later presenting with the same complaint. Exam was significant for a 6 x 4-cm rubbery, warm pink mass over the right sternocleidomastoid (SCM) muscle. ESR was elevated at 104. CT scan of his neck compared to 3 days prior showed enlargement of SCM and the right-sided strap muscle overlying the thyroid cartilage, increasing 3-fold in thickness compared to the contralateral side. The larynx was displaced in a leftward direction and there was subtotal fibrous occlusion of the superior vena cava. Ultrasound-guided biopsy of the right SCM muscle showed dense fibrosis.

Though there is no curative therapy for fibrosing mediastinitis, a case report on SCM enlargement suggested treatment with prednisone. To treat airway compression resulting from his neck mass, the patient was given 60 mg prednisone and the patient's neck mass dissolved over the next 2 days. At follow-up 1 week later, the patient did not report symptoms.

Discussion: This case illustrates a rare diagnosis resulting in airway compression. Though it is reported that glucocorticoids do not appear to be beneficial in treatment of fibrosing mediastinitis, controlled trials have not been performed. In this case, when airway compression presented, glucocorticoids proved to alleviate symptoms.

Bleomycin-induced Pulmonary Fibrosis

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Case: A 43-year-old woman presented to the ED of our institution with the chief complaint of cough and minimal shortness of breath for 5 days duration. She denied fevers, chills, sweats, malaise, and/or any other global symptoms. Chest radiograph revealed a suspected right lower lobe infiltrate and her vitals were significant only for mild tachycardia. She was started on treatment for community-acquired pneumonia with Levaquin, supplemental oxygen, and intravenous (IV) fluids and admitted to the floor.

The patient's medical history was significant for hypertension, recurrent cystitis, and a granulosa cell tumor, for which she had undergone surgery and completed chemotherapy 3 months prior. Within the first 24 hours, the patient's clinical picture remained unchanged. She never mounted an increased leukocytosis and had no improvement in her tachycardia with fluid resuscitation. Echocardiogram was obtained showing normal ejection fraction (EF) and no global ischemia or impaired cardiac function. Due to failure to improve, a chest CT and pulmonary consult were ordered. Her CT showed diffuse ground glass opacities concerning for diffuse infection vs diffuse alveolar damage. An infectious disease consult was placed for further guidance and the patient was started on anti-fungals as well as additional antibiotics for broader coverage. She also was started on steroids for *Pneumocystis jiroveci* pneumonia (PCP) coverage and suspected bleomycin-induced lung injury. A bronchoscopy with bronchial-alveolar lavage was performed, which yielded no findings on Gram stain and all cultures had no growth. All rheumatological assays also remained negative and the patient was diagnosed with bleomycin-induced lung injury. During an 18-day hospital course, the patient developed acute respiratory failure that was refractory to all treatments and therapies available and attempted. Care was withdrawn on day 18, as her prognosis had been determined as terminal and futile and family chose not to pursue further care/treatment.

Discussion: This case represents the known complication of pulmonary fibrosis secondary to bleomycin toxicity. Although rare, this complication is often fatal and should be considered in patients with prior therapy presenting with respiratory complaints.

Cutaneous Findings as a Clue for Occult Metastatic Prostate Cancer

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Introduction: While prostate cancer is among the most common cancers in men, cutaneous findings indicative of metastatic disease are exceedingly rare. Here we present a case of cutaneous metastasis from prostate cancer in a gentleman presenting with neurological findings.

Case: An 83-year-old-man with a history of congestive heart failure (CHF), pacemaker-dependent atrial fibrillation, and prostate cancer (status post transurethral resection of the prostate [TURP] in 2012) presented from an outside hospital for recurrent falls, progressive weakness, and dizziness over 4 months. Head CT 3 months prior was concerning for acute posterior circulation ischemic stroke, but a recent head CT revealed multiple hypodense, contrast-enhancing lesions more consistent with metastatic malignancy. On admission, further imaging showed widespread lung, mediastinal, pelvic, and prostate involvement. Findings on exam revealed a 4 x 4-cm hard, mobile nodule on the left central chest that had been present for "roughly 10 years," but previously had been deemed a benign cyst by an outside provider. Skin biopsy showed an invasive, poorly differentiated tumor deep within the dermis with positive prostate-specific antigen (PSA), prosaposin (PSAP) and CD56 immunostaining. PSA was noted to be 27.1 during admission, and was 14.9 four months prior. The patient was stable throughout his stay and offered radiation and chemotherapy treatment, but elected for hospice care closer to home. Per the patient's request, his cardiac defibrillator was deactivated, and he subsequently passed away 5 days after discharge.

Discussion: This case begs the question if earlier identification of a PSA-positive cutaneous nodule might have allowed earlier intervention, which could have altered this patient's outcome. While cutaneous presentation is indeed a rare finding in metastatic prostate cancer, care should be taken to investigate any unusual skin finding in the setting of a known malignancy. Furthermore, we submit that metastatic lesions should be included in the differential for a hypodense lesion in the brain, even when ischemic stroke is the primary concern.

A Heart in Trouble

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Background: Pulmonary embolism (PE) ranges from asymptomatic, incidentally dis-

covered emboli to massive, fatal embolism. Acute PE can occur unpredictably and may be difficult to diagnose. We describe a highly unusual initial presentation of PE involving syncope, Torsade de pointes, rapidly progressive heart failure, and pulmonary hypertension.

Case: A 19-year-old morbidly obese man was hospitalized after presenting with micturitional syncope. While hospitalized, he had 2 additional episodes of unresponsiveness requiring cardiopulmonary resuscitation (CPR), during which he was noted to be in polymorphic ventricular tachycardia (Torsade de pointes). He had return of spontaneous circulation following defibrillation and was transferred to our tertiary care center. On admission, he denied dyspnea or chest pain and had normal vital signs. He was found to have a prolonged corrected QT interval of >630 ms and a mild troponin leak. A transthoracic echocardiogram (TTE) revealed biventricular failure with an EF of 40%, moderate right ventricular dysfunction, moderate tricuspid regurgitation (TR) and pulmonary hypertension. A cardiac catheterization revealed elevated right-sided filling pressures, normal left-sided filling pressures, pre-capillary pulmonary hypertension, and decreased cardiac output. A repeat TTE 2 days later showed stable left ventricular function but worsened right ventricular function and pulmonary hypertension, and severe TR that had acutely worsened. A chest CT angiogram revealed a massive, saddle PE with signs of right heart strain and bilateral pulmonary infarction of the lower lobes. He was treated with systemic thrombolytic therapy and heparin bridging to long-term warfarin. An ultrasound with Doppler imaging of his lower extremities confirmed a large acute deep vein thrombosis in the left lower extremity, for which an inferior vena cava filter was placed. He remained without recurrence of any syncopal events or arrhythmias, and a repeat TTE prior to discharge showed modest improvement in his right ventricular systolic function.

Discussion: This patient had no provocative factors for venous thromboembolism (VTE), and clinical prediction scores indicated a low probability of PE. The clinical presentation of tachyarrhythmia-induced syncope, rapidly progressive heart failure in the absence of dyspnea, chest pain, hypoxia, or hypotension makes this case an unusual presentation for PE. Additionally, the unprovoked nature of this event means strong consideration for lifelong anticoagulation should be given.

A Heart-smelting Case of Chest Pain and Dyspnea Following Zinc Oxide Exposure

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Background: Metal Fume Fever, otherwise known as Smelter's Fever, is a well-documented constellation of symptoms that follow inhalational exposure to certain metal fumes.

Case: A 48-year-old man auto parts manufacturer with no past medical history presented with complaints of chest tightness and difficulty breathing. One day prior, the patient was at work during a "meltdown" wherein molten zinc was accidentally mixed with hydraulic fluid, producing a thick white smoke that the patient breathed in for approximately 2 to 3 minutes. The patient stated that shortly thereafter he developed a cough. He woke up the next day with difficulty breathing, pleuritic pain, and a sensation like his chest "had concrete on it." He denied hemoptysis or palpitations. On admission he was febrile to 101.2 but defervesced quickly. Chest x-ray showed no acute lung pathology but demonstrated a heart size at the upper limits of normal. He underwent CT PE-protocol that showed no PE but demonstrated a possible pericardial effusion with no other lung involvement. The patient was started on ibuprofen for pericarditis and given PRN nebulizers for shortness of breath. Overnight the patient improved markedly with supportive care and reported resolution of his dyspnea and improvement in his cough, although he had some lingering chest discomfort. He was discharged home with a prescription for 14 days of ibuprofen therapy three times a day and a short course of inhaled steroids and albuterol. Based off of his presumed exposure to zinc oxide fumes and presentation with delayed onset chest pain, shortness of breath, and fever, the patient was likely experiencing Metal Fume Fever.

Discussion: Metal Fume Fever is an acute, self-limited illness that is tied almost exclusively to inhalational exposure of heavy metal oxides and is a common occupational hazard among welders and smelters. The diagnosis is made largely by constellation of symptoms and recent inhalational exposure to metal oxides. Typical presentation is 24 to 48 hours after exposure and patients often complain of chest pain, fevers, and chills. Symptoms rarely last longer than 24 hours and the care is supportive. It is important to distinguish this illness from other common respiratory conditions that may require more aggressive medical therapy.

Hypoxemia, Heart Failure, and Recurrent Stroke Associated With a Giant Pulmonary AVM

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Background: Hereditary hemorrhagic telangiectasia (HHT) is an autosomal dominant disorder of the vasculature characterized by telangiectasias and arteriovenous malformations (AVMs) of the skin, mucous membranes, lung, brain, and gastrointestinal (GI) tract. Patients with HHT experience a wide range of symptoms depending on the location of vascular abnormalities. We present a patient with HHT admitted with a massive pulmonary AVM (pAVM), hypoxemia, and heart failure. This pAVM is among the largest in the literature successfully treated with embolization; previously reported massive pAVMs have been treated with resection.

Case: A 70-year-old woman with a longstanding history of HHT, atrial fibrillation, and recurrent cerebrovascular accidents was admitted with confusion, hypoxia, and generalized weakness. On arrival, she was tachypneic and hypoxic. She had an irregularly irregular heartbeat, clear lungs, 3+ lower extremity edema, and lip telangiectasias. Labs were significant for elevated brain natriuretic peptide (BNP) and hypoxemia. Her P/F ratio was 52. Chest imaging showed cardiomegaly, a large right lower lobe pAVM, and no pulmonary embolism. Transthoracic echo revealed an apical thrombus in the left ventricle, EF 30%, and severely dilated cham-

bers. Shunt study demonstrated a fraction of 25%. The patient's pAVM measured 3.6 x 7 cm and the feeding artery measured 14 mm. Her pAVM was successfully embolized with a 22 mm Amplatzer upon which her P/ F ratio improved to 263.

Discussion: AVMs are direct connections between arteries and veins with resultant bypass of capillary beds. In the lungs, capillaries facilitate gas exchange, but also filter emboli and bacteria from the bloodstream. Loss of capillary bed filtration and right-to-left shunting from pAVMs allow passage of emboli into the cerebral circulation. Patients can develop brain abscesses, transient ischemic attacks, or ischemic strokes; unfortunately, these are often the first manifestations of a pAVM. Because of these potentially catastrophic initial presentations, routine screening for pAVMs is recommended for all patients with HHT. Guidelines suggest embolization of pAVMs with feeding arteries > 1 mm.

Conclusion: HHT can be associated with dysfunction of multiple organs; screening for involvement of brain and lung vasculature is important because early intervention can significantly decrease morbidity and mortality.

Inferior Vena Cava Syndrome in a Patient With Giant Hepatic Hemangiomas

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Background: Inferior vena cava (IVC) syndrome is caused by compression of the IVC. This syndrome is characterized by abdominal discomfort, anasarca below the level of the diaphragm, abdominal ascites, hepatomegaly, shortness of breath, and increased risk for infection and thrombosis. IVC syndrome most commonly occurs in the setting of thrombosis. IVC syndrome also can occur in patients with neoplastic hepatic masses and has been reported in association with biloma.

Case: We present a 60-year-old woman who developed IVC syndrome in the setting of multiple giant hepatic hemangiomas. She had recently been hospitalized for management of bleeding from the hepatic hemangiomas and had undergone chemical and coil embolizations of the superior right hepatic artery and the right hepatic segmental arteries. Presenting symptoms included fatigue, increasing difficulty with activities of daily living, insomnia, right upper quadrant pain, back pain, and redness and weeping of right thigh. Pertinent findings on examination included shallow respirations with clear lung fields, prominent abdominal ascites, anasarca up through the abdomen, and weeping ulcers on right thigh and groin. Laboratory abnormalities included anemia, elevated liver function tests and international normalized ratio (INR), hypoalbuminemia, hyponatremia, and hypochloremia. She was re-admitted to the hospital. Abdominal ultrasound and subsequent abdominal CT scan imaging demonstrated multiple giant hepatic hemangiomas causing mechanical compression of the IVC. Initial attempts at volume reduction using diuretics and paracentesis were unsuccessful with persistence of hyponatremia and slight worsening of renal function. Subsequent fluid challenge improved sodium but increased dyspnea and anasarca. Despite evidence for anasarca and ascites, she appeared to be intravascularly volume depleted. Hyponatremia only responded to IV fluids, which caused worsening of her other symptoms. The patient was ultimately transferred to another medical center for stenting of the IVC, a procedure that has been successful in patients with IVC syndrome associated with hepatic neoplasms. Unfortunately, the patient died from complications of the IVC stenting procedure.

Nasal Type Extranodal NK/T-cell Lymphoma: A Diagnostic Challenge

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Introduction: Extranodal NK/T-cell Lymphoma (ENKTL) is an aggressive non-Hodgkin's lymphoma (NHL), rare in the United States. It is common in Asia and Latin America. It primarily involves the nose and upper aerodigestive tract. It is invariably associated with Epstein-Barr virus (EBV) infection. This case illustrates the potential challenge in the diagnosis of ENKTL.

Case: A 49-year-old Hispanic woman presented with progressively worsening headaches for 2 months, low-grade fever, foul-smelling nasal discharge, and left periorbital swelling. She was treated previously for bacterial sinusitis. Physical exam noted blood mixed purulent drainage from nares and tender sinuses bilaterally. Labs showed anemia and microscopic hematuria. CT scan showed soft tissue mass in the right nasal cavity extending into the left orbit. Bilateral nasal endoscopy showed advanced necrosis, highly suspicious for Wegener's granulomatosis. Biopsy showed extensive bone and soft tissue necrosis. Though serologic markers were negative, patient was started on treatment for Wegener's granulomatosis. Due to lack of improvement after 14 days, patient had additional biopsies. Pathology this time revealed ENKTL. Patient was started on chemoradiation. She did well initially, but passed away 6 weeks later from disseminated disease.

Discussion: ENKTL is a rare malignant disorder (1.5% of all lymphomas in the United States), presenting in adults in their 5th decade with 3:1 male predominance. Most present with nasal obstruction, sinusitis, ulcer, or epistaxis. ENKTL is characterized by an extensive vascular destruction and tissue necrosis, aggressive clinical course, and poor clinical outcome. Accurate diagnosis is prolonged and very challenging due to insufficient tissue samples, extensive necrosis, and limited clinician experience. A meticulous examination by otorhinolaryngologist is mandatory. Nasal endoscopy should be performed and multiple biopsies obtained from involved and suspicious areas. Tissue samples should be fresh and forwarded to an experienced pathologist. Combined chemoradiation may be effective for localized disease if diagnosed early.

Orofacial Dystonia as a Manifestation of Globus Pallidus Lesions

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Background: Basal ganglia lesions are rare, generally reflecting global derangements such as toxic poisoning, metabolic abnormalities, vascular abnormalities, focal inflammatory and infectious conditions. These lesions usually manifest with movement disorders. We present the case of a patient who presented with new onset bruxism that coincided with bilateral signal intensity changes in her globi

pallidi believed to be secondary to decompensated liver disease.

Case: A 39-year-old woman with approximately 20 years of alcohol abuse and alcoholic liver disease presented to our facility for worsening abdominal pain. She also reported a 2-day history of speech changes. She previously had been at her baseline state of health, although she was chronically ill with alcoholic liver disease and its sequelae including jaundice, hepatic encephalopathy, cirrhosis, and ascites. Physical examination revealed jaundiced skin and sclerae, abdominal distension, and, perhaps most notably, a clenching of the teeth and jaw and slowed speech. She reported that her last drink was 9 months prior to presentation; blood alcohol levels were negative. She also denied using any other illicit drugs including cocaine or heroin. Urine drug screen was negative. MRI of her brain revealed focal, well-defined, symmetric areas of increased T1 and T2 in the globus pallidus bilaterally, which were not considered typical for alcoholism, nutritional abnormalities, or other metabolic factors. Workup for other heavy metals and carbon monoxide were negative.

After ruling out metallic, carbon monoxide poisoning and Wilson's disease, we think that the patient's presentation is most consistent with acute decompensation of alcoholic liver disease. We propose that her new onset diurnal bruxism was due to systemic metabolic derangement from chronic liver disease. Clinicians should look for systemic insults if bilateral lesions of the basal ganglia—especially the globus pallidus—are seen on brain imaging and may manifest as bruxism.

A Strikingly Unusual Skin Reaction to Vancomycin

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Introduction: Vancomycin has been in use for more than 50 years and has been associated with multiple dermatological adverse reactions such as morbilliform exanthem and red man syndrome with its more frequent use. In this report we document the joint occurrence of 2 rare hypersensitivity reactions secondary to vancomycin in the same patient.

Case: A 59-year-old Italian American man was admitted for the evaluation of vesiculobullous lesions. The patient was just discharged from the hospital after a 3-week stay for septic arthritis of the right shoulder and related *staphylococcus aureus sepsis.* During that period, the patient had received 1 dose of vancomycin with scheduled ampicillin/sulbactam. Ampicillin/sulbactam was subsequently discontinued because of the development of palpable purpura involving both lower limbs and left arm, proven to be leukocytoclastic vasculitis by histopathology. The patient also had splinter hemorrhages with no transesophageal echocardiogram (TEE) evidence for infective endocarditis. His serial blood cultures were negative and vancomycin was continued. The preexisting lesions, however, continued to worsen, turning to vesicles and bullae. Subsequent histopathology showed evidence of linear IgA Bullous dermatosis (LABD) without signs of vasculitis. Vancomycin was discontinued and the patient was started on low-dose dapsone that was advanced as tolerated to 100 mg daily and topical wound care. The lesions started getting better in 3 to 4 days.

Discussion: LABD is a very rare disease with an incidence of 0.5 to 2.3 per million people. A comprehensive literature search revealed only 2 case reports so far of leukocytoclastic vasculitis caused by vancomycin. LABD secondary to vancomycin has not yet been described as concurrent with vasculitis, which makes this a unique presentation. The treatment is always discontinuation of the offending drug.

Without a Target: Understanding Atypical Presentations of Lyme Disease

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Introduction: Lyme disease is the most common tick-borne disease in the United States and Europe. The most common clinical manifestation is the classic target lesion of erythema migrans. Patients also present without erythema migrans with nonspecific complaints such as headache, arthralgias, fatigue, cognitive slowing, and memory difficulty.

Case: A 75-year-old man presented with a 3-week history of weakness, low back pain, upper extremity tremors, and double vision. As a result of these symptoms, he reported having difficulty writing, dialing phone numbers, and reading. He also had a weight loss of 20 pounds over several weeks that he attributed to decreased appetite, dysphagia, and odynophagia. He denied possible ingestions of toxins, medication misuse, recent travel, and insect or tick bites. The patient's neurologic exam revealed decreased reflexes but normal muscle tone, bulk, and power. He had a positive Romberg test, intention tremor with finger-to-nose testing, delayed rapid alternating hand movements on his left side, and a wide-based gait. He also had vertical diplopia with leftward gaze and scored only 13 out of 30 on Montreal cognitive assessment. Brain MRI was significant for slightly prominent ventriculomegaly and global volume loss. He underwent lumbar puncture, and CSF analysis revealed elevated protein, elevated leukocyte count, normal glucose, negative cytology, and negative Gram stain and culture. Subsequent MRI of his lumbar spine revealed diffuse leptomeningeal enhancement along the visualized lower cord, conus, and cauda equina. Eventually, CSF Lyme serologies returned positive for IgG and were confirmed by western blot. The patient was treated with a 2-week course of ceftriaxone and was improved at the end of his therapy.

Discussion: The more serious clinical sequelae of Lyme disease develop as a consequence of the hematogenous spread of the spirochete. Approximately 10% of patients with erythema migrans who go untreated will have a neurologic manifestation such as trigeminal neuralgia, facial nerve palsy, meningitis, or encephalopathy. Lyme encephalomyelitis is a rare observation that occurs when inflammatory appearing parenchymal abnormalities appear in the brain or spinal cord. Randomized trials have shown that doxycycline, amoxicillin, and cefuroxime are effective oral treatments for Lyme disease. Those patients who have evidence of disseminated infection, including neurologic manifestations or Lyme carditis, might be considered for parenteral antibiotics.

RESEARCH-BASED VIGNETTES

1st place

RALYL Hypermethylation: A Potential Molecular Diagnostic Marker for Esophageal Squamous Cell Carcinoma

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Background: Esophageal cancer is the third most common cancer of the human digestive tract. The most common types of esophageal cancer are squamous cell carcinoma and adenocarcinoma. Most esophageal cancer is diagnosed at advance stages, contributing to the high ratio of mortality to incidence. Therefore, it is important to discover novel molecular markers for esophageal cancer to augment current early detection approaches.

Experimental Design: Utilizing a pharmacologic unmasking and subsequent microarray analysis, we identified RALY-like protein (RALYL) as a novel cancer-specific methylated gene in esophageal squamous cell carcinoma (ESCC). A methylation-specific polymerase chain reaction (PCR) primer set was developed, methylation in RALYL promoter area was confirmed by DNA sequencing. We then performed real-time quantitative methylation-specific PCR (TaqMan-MSP) in primary cancer tissues to confirm hypermethylation of the RALYL promoter in tumor and analyzed its correlation with clinicopathological data.

Results: In this study, we found that RALYL was hypermethylated in human ESCC cell lines and primary tumor tissues but not in normal esophageal tissue. Quantitative MSP confirmed RALYL promoter hypermethylation in 61% (34/56) of the primary ESCC compared to 0% (0/17) in normal esophageal tissues with cutoff value of 10. RALYL methylation status was closely related to differentiation status of ESCC ($P = 0.016$). No significance was found between RALYL methylation and lymph node metastasis or tumor staging.

Conclusion: RALYL appears to represent a novel cancer-specific diagnostic DNA marker in esophageal squamous cell carcinoma, especially in well-differentiated ESCC.

Endoscopic Protection From Left vs Right-sided Colon Cancer

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Purpose: We sought to determine if the protective effect of prior endoscopy was different for left- vs right-sided colon cancer within our integrated health system.

Methods: All patients diagnosed with primary colorectal-adenocarcinoma between January 2006 and March 2013 were reviewed retrospectively. Patients were excluded if they had a history of inflammatory bowel disease, an inherited cancer syndrome, or were less than 50 years at diagnosis. Patients with transverse colon tumors were excluded. Staging and location of tumors were confirmed by pathologic examination of surgical specimens. Patients were categorized by left- or right-sided cancer and by prior protective endoscopy within 6 months to 10 years before diagnosis or no prior protective endoscopy. Protective endoscopy was defined as colonoscopy completed to the cecum for right-sided cancer and colonoscopy or flexible sigmoidoscopy for left-sided cancer. Groups were analyzed for survival, stage, age, sex, and body mass index (BMI). Comparison of the prevalence of right- and left-sided cancers utilized the Mantel-Haenszel chi-square test. Survival curves were generated using the Kaplan-Meier method and survival times were compared using the log-rank test. Comparisons of BMI and age utilized the student's *t*-test.

Results: Three hundred fifty-seven patients were included. One hundred ninety-seven (55.2%) cancers were left-sided; 160 (44.8%) cancers were right-sided. One hundred thirty-three (31.6%) had a protective endoscopy. Fewer patients with left-sided cancer had prior endoscopy than right-sided cancer (25.4% vs 39.4%, $P < 0.005$). Cancer was diagnosed at an older age in patients with prior endoscopy (74.7 vs 70.2 years, $P = 0.0002$). Trends occurred in the prior endoscopy group toward earlier cancer stage ($P < 0.083$) and improved survival ($P < 0.074$). BMI had no effect on any category.

Conclusion: There is statistically significant difference in prior endoscopy rates between left- and right-sided colon cancer patients. This suggests that endoscopy is more protective for left-sided colon cancer than right-sided colon cancer within this integrated health care system. A prior "protective" endoscopy may also result in earlier stage at diagnosis, improved survival, and older age at diagnosis.

Provider Understanding and Utilization of Advance Directives

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Background: Completion of advance directives (AD) can improve the quality of care for patients at the end of life and improve health care spending. AD allow patients to communicate health care preferences when they are no longer able to make these decisions. Despite many health system efforts, completion of AD ranges from 5% to 15% among hospitalized patients. The purpose of this study is to assess health care providers' knowledge, comfort level, implementation of, and barriers to use of AD in various health care settings.

Methods: We anonymously surveyed health care providers across all specialties within a tertiary care center in southeastern Wisconsin.

Results: Of 739 providers, 104 completed the survey. Respondents include physicians from internal medicine (60%), general surgery and surgical subspecialties (22%), family medicine (10%), and others. Approximately half of the providers work in acute care and half in an outpatient setting. The majority (70%) have over 8 years of experience. Most providers (69%) think AD are important in hospitalized patients and almost half (49%) think they are important for all patients over the age of 65. Many providers (41%) are unaware of how to access a patient AD stored in an electronic health record (EHR). The majority of providers (78%) feel knowledgeable or very knowledgeable about AD; similarly 85% felt comfortable or very comfortable with discussing AD. Providers are more likely to use AD to help determine Durable Powers of Attorney (DPOA) (68%), but only occasionally prior to hospitalization (30%) or to determine goals of care (48%). Significant barriers to utilizing AD include time constraints

(50%), not feeling a sense of responsibility to discuss AD (17%), not feeling knowledgeable about AD (13%), not feeling comfortable discussing AD (8%), not the right time (4%), patient factors (5%), and feeling that AD are unhelpful (2%).

Discussion: Although most physicians consider AD to be important and feel they have a good sense of knowledge and comfort with AD, many of them do not use AD in their clinical practice. Identified barriers are logistical (inability to access AD, time consuming) due to provider attitude or assumptions regarding AD ("not my responsibility as a provider," "not the right time") and relate to a need for patient education. The results reveal many areas for quality improvement to improve provider access to AD, to incorporate AD into the workflow, and for patient education.

Variability of Door-to-Device Times in Patients Presenting With STEMI at a Rural Tertiary Care Center

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Background: The goal door-to-device (DTD) time for ST-segment elevation myocardial infarction (STEMI) patients by the American College of Cardiology/American Heart Association has been 90 minutes, with no distinction between urban and rural hospitals. Compared to urban hospitals, rural hospitals have been reported to have longer DTD times for transferred patients. Longer DTD times have also been reported during after-hours. Seasonal variability has not been studied in this regard.

Methods: Four hundred twelve patients presenting with STEMI from 2006 to 2012 after initiation of the Rescue One program for their rapid triage and transfer were divided by season, method of arrival (ED, urgent care, field, and transfers), and time period (ON = Monday-Friday from 9AM to 5PM; OFF = after hours, weekends, and holidays). Median DTD times and proportions of patients achieving DTD times below and above 90 minutes in these subgroups were compared using statistical methods.

Results: Overall median DTD time was 85 minutes; 60% of patients achieved DTD times below 90 minutes and 30-day mortality was 5.3%. A significant difference in median DTD time was observed between spring and fall, though this did not affect the proportions of patients achieving goal DTD times. Patients arriving by ED during OFF hours had a median DTD time 28 minutes longer than during ON hours, representing the time needed to call in the catheterization team; 21% fewer ED patients achieved goal DTD time during OFF hours. Other rural hospitals of similar size were found to have similar DTD times, proportions achieving goal DTD time, and mortality.

Conclusions: In a rural tertiary care center, seasonal variability in DTD time exists but does not affect achievement of goal DTD time. Transportation time needs to be taken into account in DTD times for transferred patients. Improving DTD times during OFF hours for patients arriving by ED may be warranted.

DISPLAYED POSTERS

1st place

Re-emerging Cause of Acute Aseptic Meningoencephalitis

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Introduction: Determining the cause of acute aseptic meningoencephalitis requires a broad differential. In many cases, a specific cause remains elusive. We describe a 59-year-old woman presenting in April with fever, leukocytosis, rash, and altered mental status, who was found to have acute aseptic meningoencephalitis due to a re-emerging pathogen.

Case: The patient had no past medical history, lived in rural southern Wisconsin with healthy horses, had not traveled, and frequently cared for her young grandchildren. Two weeks prior to admission, a rash developed on her anterior thighs that spread to involve the remainder of her body, except her palms and soles. The week prior to admission, the patient noted fatigue, subjective fever, anorexia, sore throat, and congestion. On admission, the patient was febrile to 39°C, tachycardic to 110 with stable blood pressures. Physical exam was notable for a diffuse erythematous maculopapular rash. Laboratory analysis was notable for a leukocytosis of 18,400 (91% neutrophils), thrombocytopenia (118), and normal chemistry and liver enzymes. On hospital day 1, the patient acutely developed expressive aphasia and somnolence without headache or nuchal rigidity. Imaging demonstrated no evidence of stroke or focal process. A lumbar puncture demonstrated 121 nucleated cells (neutrophil predominance), protein of 95, and normal glucose. Empiric anti-infectives and dexamethasone were started. Ultimately, all CSF studies and serologic testing were negative, with the exception of a positive IgM at 2.25 (>1.21 positive) and IgG to mumps virus. On hospital day 4, the patient became afebrile with clinical improvement allowing discharge on hospital day 7.

Discussion: Although mumps is considered a disease of the pre-measles-mumps-rubella (MMR) vaccine era, frequent recent outbreaks have been described. Mumps has long been recognized to cause meningitis, which spontaneously resolves after several days. As only 50% of patients with mumps meningitis develop parotitis, the diagnosis requires a high index of suspicion.

2nd place

Nontyphoidal Salmonella Pericarditis

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Introduction: Nontyphoidal salmonella (NTS) causes 1 million cases of foodborne disease in the United States annually. Bacteremia occurs in 3% to 8% of infections, and cardiovascular infections, including pericarditis, may develop in 1% to 5% of cases.

Case: A 62-year-old man with past medical history of systemic lupus erythematosus (SLE) presented after 3 days of rapid heart rate. He had a recent flare-up of drug-induced SLE treated with prednisone in addition to his maintenance mycophenolate. On presentation, his heart rate was 126 beats per minute, temperature was 98.5°F, and white blood cell (WBC) count was 14.8 K/mcL. Electrocardiogram revealed atrial fibrillation with a nonspecific T-wave abnormality. Initial blood cultures were negative and there was no preceding history of GI symptoms. TEE revealed a 5.6 x 7.0-cm effusion with signifi-

cant mass effect on the right ventricle, which was believed to be inflammatory sequelae of SLE and treated conservatively, as he had a small chronic pericardial effusion. A few days after admission to the intensive care unit he became hemodynamically unstable and required emergent pericardiocentesis (PC), yielding 900 ml of purulent fluid. *S enteritidis* was isolated from the fluid. After antibiotic therapy with pericardiectomy for reaccumulation of the effusion, he fully recovered.

Discussion: Nontyphoidal salmonella pericarditis was reported 19 times in the last 20 years (1993-2013). Among them, 12 cases had an identifiable cause of immunosuppression, 6 were caused by medications, and 2 of these were on steroids for SLE, like this case. Although case immunosuppressive treatment and failure of opsonization has been attributed to salmonella infections in SLE, we postulate that the chronic pericardial effusions of SLE may increase susceptibility to pericarditis by serving as a nidus for infection; this being the first case with documented chronic pericardial effusion prior to infection. Like this case, 15/18 patients did not have GI symptoms reported prior to their pericarditis and only 60% had an elevated WBC. This is due to alterations in local intestinal mucosal immunity to mount an adequate response (including diarrhea), which increase rates of NTS bacteremia. Lack of a GI prodrome adds to the diagnostic challenge that SLE NTS pericarditis presents of differentiating pericardial effusions intrinsic to the disease from those caused by infectious or other etiologies. As the population ages and more people receive immunomodulating drugs, it is possible that NTS bacteremia and cardiac infections will become more common. We believe empiric echocardiography should be considered for patients with NTS bacteremia who have risk factors for progression to pericarditis.

3rd place

Gardner's Syndrome With Desmoid Tumor

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Introduction: Desmoid tumors account for 0.03% of all neoplasms, but may be seen in 10% to 20% of patients with Gardner's Syndrome (GS). GS is a variant of familial adenomatosis polyposis (FAP) characterized by the presence of benign and/or malignant extraintestinal lesions in association with colonic polyposis.

Case: A 21-year-old white woman was admitted to our institution for worsening fatigue and hematochezia. She reported having 5 to 6 episodes of bloody diarrhea daily for the past 5 years and a weight loss of 40 pounds over the past year. Her father underwent a total colectomy at age 35 for unknown reasons. Her physical examination was significant for profound cachexia and palpable mid-abdominal masses. Laboratory findings revealed a hemoglobin of 5.7 g/dl. She underwent colonoscopy, which revealed hundreds of single and coalescing polypoid lesions throughout the colon with rectal sparing. Biopsies of the polypoid lesions revealed adenomatous tissue. Genetic testing confirmed FAP. She ultimately underwent a 2-stage total proctocolectomy with ileoanal anastomosis. A large mesenteric desmoids tumor was encountered during surgery and was resected. She is currently doing well.

Discussion: Desmoid tumors are locally aggressive tumors that do not metastasize. In patients with GS, the most commonly involved site is the intra-abdominal cavity (mesentery). These tumors are rarely symptomatic due to their indolent growth, but may present as intestinal obstruction or ischemia from local compression of surrounding organs. Desmoid tumors are responsible for death in up to 11% of patients with FAP. These tumors may be observed, but surgical resection is indicated when they become symptomatic. Unfortunately, these tumors have a high rate of recurrence after resection despite negative margins. Radiation therapy is effective in patients with high surgical risk.