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ABSTRACTS

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Research and Clinical Vignette Abstract Competition Award Winners

Research Abstract Winners

1st Place	Chris Hermann Emory University School of Medicine	Validation and Testing of a Novel Device to Improve Hand Hygiene (Abstract 6)
2nd Place	Khushdeep Chahal UAB Huntsville	Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) vs Rapid Influenza Diagnostic Test (RIDT) for the Diagnosis of H1N1 Severe Infection for Hospitalized Patients (Abstract 3)
3rd Place	Elliot Backer New Hanover Regional Medical Center	PFTs: Worth Their Weight in GOLD? (Abstract 10)
Honorable Mention	Saif Ibrahim University of Florida-Jacksonville	Hemoconcentration as a Marker of Decongestion in Patients with Acute Decompensated Heart Failure (Abstract 5)

Clinical Vignette Abstract Winners

1st Place	Adva Eisenberg Duke University School of Medicine	Fool Me Twice: A Case of Recurrent Bacterial Meningitis due to a Spontaneous CSF Leak (Abstract 39)
2nd Place	Jeffrey Tran Emory University School of Medicine	To Treat or Not to Treat? That Is the Paraneoplastic Cerebellar Syndrome Question (Abstract 47)
3rd Place	Ena Gupta University of Florida-Jacksonville	A Unique Case of Bronchial Carcinoid Mimicking as Asthma (Abstract 41)
Honorable Mention	Eva Raphael Emory University School of Medicine	Inflammation to Infarction—An Overlooked Link (Abstract 24)

RESEARCH ABSTRACTS

1 Virus-Induced CD28 Down-Regulation as a Driver of Costimulation-Resistant Allograft Rejection

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Background: Belatacept, a B7-specific fusion protein that blocks cluster of differentiation (CD) 28-B7 costimulation to prevent kidney allograft rejection, is ineffective in a sizable minority of transplant recipients. Although T cell receptor and CD28 engagement initiates T cell activation, many human antigen-experienced memory T cells (TMs) lose CD28 and can be activated without CD28 signals. We posit that these cells are central drivers of belatacept-resistant rejection (BRR) and propose that they may arise from antigen exposure. CD28 loss is poorly described in mice, which are typically kept in pathogen-free conditions.

Methods: To study mice in a clinically relevant scenario of viral exposure, we characterized T cell CD28 expression after sequential infections, 3 weeks apart, with polyomavirus (PyV), BK virus homolog, murine *Cytomegalovirus* (mCMV), and mHV68 (Epstein-Barr virus [EBV] homolog). Five mice cohorts, each containing 10 C57BL/6 mice, were defined as mock infections, single PyV infection, single mCMV infection, single mHV68 infection, or "all 3" infections. Flow analysis was performed on the day of infection, at peak infection, and at the memory time point. Mixed lymphocyte reactions (MLRs) were conducted to assess alloreactivity. In vitro alloreactivity was assessed both in the presence and absence of costimulation blockade (CTLA4-Ig, MR1). We are currently performing heart transplants in infected and uninfected mice to assess the phenotypic role of CD28 loss in BRR.

Results: CD28 microflow imaging analysis of both CD4 and CD8 cells showed significant ($P<0.05$) CD28 down-regulation in the effector TMs for all infected cohorts. MLRs revealed that the mHV68 and triple-infected cohorts exhibited significantly higher alloreactivity than the naïve cohorts. Interestingly, the triple-infected cohort demonstrated significantly more interferon gamma production than the mHV68 cohort. The increased alloreactivity is resistant to costimulation blockade.

Conclusion: Clinically relevant viruses PyV, mCMV, and mHV68 induce CD28 down-regulation in mice, suggesting that PyV, CMV, and EBV infections may play a role in human BRR. Additionally, mHV68 exposure confers enhanced alloreactivity in MLRs, suggesting that viruses may lead to functionally relevant changes in the immune repertoire. The MLR observation that the triple-infected cohort produced more interferon gamma than the mHV68 cohort is suggestive of an additive alloreactivity effect driven by multiple viral infections. Overall, the data suggest that clinically relevant viruses may play a significant role in determining how solid organ transplant patients respond to costimulation blockade therapies.

2 Control of *Stenotrophomonas maltophilia* Infection in the Hospital Setting

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Background: *Stenotrophomonas maltophilia* is a multidrug-resistant Gram-negative (MDRGN) *Bacillus* commonly associated with nosocomial infections, especially hospital-acquired pneumonia and central line–related infections. The organism is associated with significant morbidity and mortality.

Methods: We studied the implementation of contact isolation practices in addition to standard precautions in patients infected with this organism. Data were reviewed over 5 years for documented infection with clinical diagnosis and positive cultures. We assessed the efficacy of this intervention to reduce the transmission and infection rate.

Results: The study was conducted in a 941-bed tertiary medical center in north Alabama with 100 ICU beds and average monthly patient days of 19,693 in 2013. Contact isolation was implemented in 2008 for all patients infected with *S maltophilia*; in 2007 we had 183 reported infections with positive culture that increased to 187 in 2008. After initiation of the intervention, we saw a significant decline in documented infections to only 36 infections in 2013—more than an 80% reduction despite annual patient days over the 5 years remaining stable. This result was compared to other Gram-negative bacilli, especially *Acinetobacter baumannii*, extended spectrum beta-lactamase–producing organisms, and MDRGN organisms that usually require isolation. None showed a decrease in infection rate. The most common sources of *S maltophilia* were respiratory (56%), wound and surgical specimen (20%), and bloodstream infection (9%). Interestingly, the infection affected more males than females (64% vs 36%); more than 65% of patients were 55 years or older; and infection was very rare in patients aged 15 years or younger. Organism susceptibility over 5 years did not change significantly, with 56% susceptible to ceftazidime, 86% susceptible to levofloxacin, and 97% susceptible to trimethoprim/sulfamethoxazole.

Conclusion: Implementation of contact isolation for patients with *S maltophilia* was an effective intervention to reduce the rate of this serious infection. Further studies are required to assess and confirm the benefits of this measure, especially for *S maltophilia* and other MDRGN organisms.

3 Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) vs Rapid Influenza Diagnostic Test (RIDT) for the Diagnosis of H1N1 Severe Infection for Hospitalized Patients

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Background: The 2013-2014 influenza seasons were associated with significant morbidity and mortality. The influenza A virus, especially pandemic 2009 H1N1, was predominant. The current Centers for Disease Control and Prevention recommendation to use the rapid influenza diagnostic test (RIDT) for initial testing of suspected patients and then treating them does not reflect the latest advances in diagnostic methods and lacks an emphasis on antimicrobial stewardship and infection prevention in the healthcare setting.

Methods: A retrospective chart review of 264 patients admitted to a tertiary medical center during the 2013-2014 influenza season was conducted. We included all patients with respiratory symptoms who had reverse transcription polymerase chain reaction (RT-PCR) and RIDT for diagnosis of influenza. In addition, we assessed the impact of RT-PCR use for diagnosis of H1N1 and its effect on neuraminidase inhibitor and antimicrobial prescription, as well as isolation practices.

Results: Of 264 patient charts reviewed, the age range was 1-100 years with a mean age of 57 years, 48.5% of patients were male, and 51.5% of patients were female. Thirty percent were confirmed to have H1N1 by RT-PCR: 59% were female, 23% were 51-60 years, 22% were 61-70 years, and 16% were 31-40 years. RIDT had sensitivity of 19.77% (95% confidence interval [CI] 11.96%-29.75%), specificity of 98.00% (95% CI 94.26%-99.56%), positive predictive value of 85.00% (95% CI 62.08%-96.62%), and negative predicative value of 68.06% (95% CI 61.39%-74.22%). By using RT-PCR, we are able to save 292 days of Tamiflu in patients with a negative test. In those patients with positive RT-PCR, we noticed a 63-day delay of initiation of Tamiflu, with a mean of 5 days in those who had an initial negative RIDT. Fifty-six days of unnecessary antibiotics were saved, with a mean of 5 days for patients with a positive RT-PCR. For the patients with a false-negative RIDT, cumulative delays of 152 days in isolation were noted. For patients with a negative RT-PCR, 239 days of inappropriate isolation were saved, with a mean of 11 days by early discontinuation.

Conclusion: RT-PCR for the diagnosis of H1N1 infection in hospitalized patients should be the initial diagnostic test, as it will help in prompt sensitive detection of influenza A, eliminate the need to treat on suspicion, and decrease the cost of unnecessary isolation and use of hospital resources. It would also impact infection control. Correctly identifying influenza patients early would translate into a decreased likelihood of influenza transmission to family members and healthcare professionals.

4 Patient Acuity Scores to Prevent Rapid Responses

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Background: In the last 10 years, patient safety committees nationwide have focused on creating taskforces such as rapid response teams (RRTs) that can intervene when patients start to decompensate prior to a code. At Duke Regional Hospital, approximately 50% of RRT activations were found to occur during the first 24 hours of a patient's stay. Unlike critical care medicine, internal medicine does not have a widely accepted scale to grade the severity of illness. A scale was developed by Edelson et al in 2011 to quantify the likelihood of decompensation. The Duke hospitalists adapted this scale and used it prospectively to determine whether there was a correlation in the presenting acuity of illness and the number of RRT interventions in the first 24 hours and to see if there would be a decrease from year to year.

Methods: A patient acuity score was adapted with permission, and patients were graded prospectively from admission. Patient data from June to December 2013 was summarized using N (%) for categorical variables and mean (standard deviation) for continuous variables. Patients transferred to resident service were excluded from the analysis, making the effective sample size 4,322 patients. The differences in mean severity score by occurrence of an RRT intervention in multiple categories were examined using analysis of variance. The total number of RRT interventions (at any time, within 12 hours, and within 24 hours) and unplanned transfers for June to December in 2012 and 2013 were compared using Wilcoxon rank sum tests for independent nonparametric samples. Additionally RRT interventions were grouped by score of 5 and above vs 4 and below and analyzed via chi square test.

Results: From June to December 2013, there were a total of 4,577 encounters by the hospitalists. A total of 4,322 patients met inclusion criteria. Ninety-two percent of the patients had a recorded acuity score. An RRT intervention occurred in 113 patients. Mean acuity scores were compared between subgroups. There were significant differences in mean acuity scores between patients who experienced an RRT intervention at any time and those who did not, patients who experienced an RRT intervention within 12 hours of admission and those who did not, patients who experienced an RRT intervention within 24 hours of admission and those who did not, and patients who underwent an unplanned transfer and those who did not (all $P<0.007$). It is notable that 100% of the level 7 scores that had a rapid response were transferred to the critical care unit, as well as 79% of the level 6 scores. There were no significant differences in the number of rapid responses between 2012 and 2013. Patients were then analyzed via chi square test in grouped distribution of scores of ≥ 5 and <5. Significant differences were seen in the total number of RRT interventions, the number of unplanned transfers and the number of RRTs within 24 hours. However, when looking at the grouping among patients with only RRT intervention, there was no significant difference between groups with a score ≥ 5 and those ≤ 4.

Conclusion: A patient acuity scale to quantify how likely a patient is to have an adverse event has been shown to correlate with rapid responses and transfers to a higher level of care within the first 24 hours. Patients who had an RRT intervention had a higher score overall with a trend toward increasing transfer rates with elevated scores. Using this scoring system did not lead to a lower amount of rapid responses in comparing years; however, it could be used for selective monitoring to prevent sentinel events.

5 Hemoconcentration as a Marker of Decongestion in Patients with Acute Decompensated Heart Failure

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Background: Congestive heart failure is the leading cause of hospitalizations and death in developed countries. Effective decongestion may reduce intravascular volume leading to hemoconcentration, with improved survival. It is unknown whether hemoconcentration results in decreased rates of readmission and/or delayed times from discharge to readmission. We hypothesize that effective acute decompensated heart failure (ADHF) treatment results in a measurable rise in hemoglobin/hematocrit that is associated with a reduced rate and/or delayed time to readmission rates.

Methods: The study was a single-center, retrospective, nonrandomized study. Patients with an ejection fraction $\leq 40\%$ and documented hemoglobin and hematocrit at the time of admission and discharge were analyzed. Excluded were patients with stage III chronic kidney disease (estimated glomerular filtration rate <59 mL/min/m^2) or acute blood loss/anemia requiring transfusion. Pearson chi square tests and multivariable logistic regression were fitted using univariable and multivariable models.

Results: Of 399 patients screened, 121 patients (mean age 58.9 ± 14.1 years) met the inclusion criteria; 65% were male and 68% were nonwhite. Significant predictors of readmission in univariable analyses were admission use of beta blockers (P=0.042), angiotensin-converting enzyme inhibitors (P=0.018), or diuretics (P=0.042); biventricular implantable cardioverter defibrillator (P=0.005); coronary artery disease (CAD) (P=0.020); and cerebrovascular accident (CVA) (P=0.013). In those readmitted, there were no differences in any of the characteristics. In a multivariable model, only CAD (P=0.002), weight loss (P=0.008), and CVA (P=0.013) were significant predictors of readmission. ADHF conveys a poor prognosis for subsequent readmission.

Conclusion: Despite greater in-hospital weight loss and more intensive heart failure therapy, readmitted patients did not have evidence of hemoconcentration, suggesting that weight loss was perhaps because of extravascular fluid losses. CAD and CVA were shown to be predictors of readmission.

6 Validation and Testing of a Novel Device to Improve Hand Hygiene

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Background: Every year in the US, more than 2 million hospital-acquired infections (HAIs) result in more than 100,000 deaths. HAIs are now the leading cause of accidental death in the US and cost hospitals $10 billion each year. The single greatest way to prevent the spread of HAIs is to perform proper hand hygiene. By improving hand hygiene, hospitals can reduce the incidence of these infections by 40%-70%. Despite the overwhelming evidence, nearly all hospitals have compliance rates that remain below 50%. To address this need, we have developed and tested a simple, cost-effective device to monitor and remind providers to use the hand sanitizer.

Methods: Under IRB approval, we installed hand hygiene devices in the pediatric intensive care unit at Children's Healthcare of Atlanta at Egleston. The device uses an ultrasound-based proximity sensor to detect an individual entering or exiting a patient's room; if the sanitizer device was not utilized, the device played an audio recording saying "Please foam up." The device recorded compliance for each patient interaction. Compliance data was validated using observers who compared hand hygiene events recorded by the device to the events observed. After the validation phase, the devices were activated in all 30 patient rooms, but the voice reminder was silenced for 6 weeks (=baseline compliance). The voice reminder was then turned on for a 6-week period and then resilenced in all patient rooms for another 5-week period. Statistical significance was determined using a one-way ANOVA with a Bonferroni post hoc comparison with $P<0.05$ being considered significant. During the study, the hospital's traditional direct observation system was continued in the unit.

Results: The observers spent a total of 700+ hours and recorded more than 2,800 patient interactions. During the validation phase, the devices detected 99.1% of the providers correctly, detected 97.9% of the sanitizer dispenses correctly, and the mean compliance was 32%. During the first silent phase, the mean compliance was 16% and there was no significant variation among the weeks. After turning the voice on, the compliance increased to 44% in the first week and continued to increase before reaching a consistent level at 60%. After resilencing the devices, the compliance decreased to 25% the following week and there was no statistical difference among the last 4 weeks of this phase compared to the first silent phase. Of note, the device was not set to distinguish isolation rooms, use of sanitizer outside of the patient room, or compliance by visitors and family.

Conclusion: The devices recorded hand hygiene events and sanitizer use accurately over the validation period. The results of the three phases clearly demonstrated that the introduction of the audio reminder led to a 400% improvement in compliance rates, which returned to baseline following the resilencing of the device. The results indicate that an audio reminder has the ability to dramatically improve hand hygiene compliance.

7 Disease Characteristics, Patterns of Care, and Survival in Very Elderly Patients with Diffuse Large B-Cell Lymphoma

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Background: Despite having the highest incidence of diffuse large B-cell lymphoma (DLBCL), patients >80 years are rarely included in DLBCL clinical trials or epidemiologic studies. Although rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone (R-CHOP) are considered standard therapy for DLBCL, patterns of use and the impact of R-CHOP on survival in patients >80 years are less clear.

Methods: We used the Surveillance, Epidemiology, and End Results (SEER)-Medicare database to characterize presentation, treatment, and survival patterns in DLBCL patients diagnosed from 1999-2009. Chi square tests compared characteristics and initial treatments of DLBCL patients >80 years and 66-80 years. Multivariable logistic regression models examined factors associated with treatment selection in patients >80; standard and propensity score-adjusted multivariable Cox proportional hazard models examined relationships between treatment regimen, treatment duration, and survival.

Results: Among 5,924 patients with DLBCL, 1,422 (24%) were >80 years. Patients >80 years were less likely to receive R-CHOP and more likely to be observed or receive R-CVP (rituximab, cyclophosphamide, vincristine, and prednisone), both $P<0.0001$. Sex, marital status, area-level poverty, year of diagnosis, performance status, and disease site were associated with initial R-CHOP in patients >80. R-CHOP was associated with the longest overall survival (OS) in patients >80 of all stages, with R-CHOP for >4 cycles demonstrating the most favorable hazard ratio (HR) (0.48, 95% confidence interval [CI] 0.37-0.62). Among stage III/IV patients, R-CHOP for >4 cycles (HR 0.48, CI 0.31-0.72) and R-CVP for >4 cycles (HR 0.40, CI 0.21-0.76) demonstrated significantly longer OS.

Conclusion: Although DLBCL patients >80 years were less likely to receive R-CHOP, this regimen conferred the longest OS. In stage III/IV DLBCL, R-CVP can be considered as an alternative.

8 Choice of Sedation and its Impact on Adenoma Detection Rate: Results from a Retrospective Study

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Background: The data regarding the performance of colonoscopy with regards to adenoma detection rate (ADR) using conscious sedation (CS) versus propofol sedation (PS) remain controversial. Our primary endpoint was to determine if there is a significant increase in ADR when using PS compared to CS.

Methods: Using an electronic database, we retrospectively reviewed 750 consecutive patients who strictly underwent screening colonoscopies from July 2012 through May 2013. Fifty-one patients were excluded from the study because of incomplete demographic data. Of the remaining 699 patients, 391 underwent colonoscopy with CS, and 308 patients underwent colonoscopy with PS. CS was achieved with fentanyl and midazolam. PS was achieved with propofol administered by an anesthesiologist. Colonoscopies were performed by the same gastroenterology staff or by a gastrointestinal fellow. For purposes of the study, adenomas from the cecum to the distant transverse colon were defined as proximal, and adenomas from the descending colon at the splenic flexure to the rectum were defined as distal. Univariate analysis was performed to investigate the differences between sedation methods. Multivariable analyses with the Cochran-Mantel-Haenszel test were employed to detect the difference in ADR between medication groups, adjusting for confounders.

Results: Of the 699 colonoscopies, 270 were performed by the same gastrointestinal tract staff, 349 were performed by advanced trainees (second- and third-year fellows), and 80 were performed by first year fellows. There were 413 females and 286 males in the study. There was no significant difference in ADR, bowel preparation quality, gender, proximal adenoma detection, and terminal ileum intubation between medication groups. There was a significant difference in race between the two groups, with 67.3% black patients in the CS group and 53.6% in the PS group. More patients with private insurance were in the PS group. Median procedure time, time to cecal intubation, and procedure withdrawal time were of shorter duration in the patients receiving PS. The ADR for all providers was 33% for CS vs 36% for PS when adjusted for satisfactory bowel preparation.

Conclusion: The type of sedation during colonoscopy does not impact the ADR. Adjustments for patient demographics, trainee level, withdrawal time, total time taken, preparation quality, and tracheal intubation failed to show an overall advantage in detecting adenomas when using PS. A greater amount of time spent performing the colonoscopy detected more adenomas. In this era of rising healthcare costs, we can continue to reassure physicians and patients that CS and PS yield comparable results.

9 Information Transfer at Hospital Discharge: A Contemporary Systematic Review (2007-2014)

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Background: Delayed, insufficient, or inaccurate transfer of information at the time of discharge between hospital-based and primary care providers (PCPs) can have a negative impact on patient care. The purpose of this study was to evaluate the timeliness and quality of hospital discharge summaries, as well as interventions to improve the timeliness and quality of hospital discharge summaries.

Methods: We searched PubMed, Medline, EMBASE, CINAHL, Web of Science, and Scopus databases published in English between January 2007 and February 2014. We also hand searched bibliographies of relevant articles. In our analysis, we included observational studies investigating the transfer of information at hospital discharge (n=7) and controlled studies evaluating interventions to improve transfer, quality, and content of discharge information (n=12). Data were extracted on the availability, timeliness, and content of hospital discharge summaries. Data on the effectiveness of interventions were also extracted. Results of studies were combined and presented using a metanarrative approach.

Results: Across the included studies, discharge summaries were completed within 48 hours in 67% of cases (range, 66%-98%) and were available to PCPs within 48 hours only 55% of the time. Most of the time, discharge summaries included demographic and administrative data, primary diagnosis, description of hospital course, and discharge instructions. However, information was limited on pending test results (25%), diagnostic tests performed (60%), and postdischarge medications (78%). In 6 of 7 interventional studies, the implementation of electronic discharge summaries was associated with improvement in the timeliness but not the quality of discharge summaries.

Conclusion: Delayed or insufficient transfer of discharge information between hospital-based providers and PCPs remains common. Creation of electronic discharge summaries may improve timeliness and availability of discharge summaries.

10 PFTs: Worth Their Weight in GOLD?

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Background: Chronic obstructive pulmonary disease (COPD), the fourth leading cause of death worldwide, represents a modifiable cause of mortality, morbidity, and healthcare expenditure. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) puts forth evidence-based treatment guidelines that rely on the use of pulmonary function tests (PFTs). In this study, we evaluated the use of PFTs, diagnostic accuracy, and degree of guideline-consistent COPD therapy in our outpatient residency clinic.

Methods: A retrospective chart review of active patients with a preexisting diagnosis of COPD, restrictive lung disease, or asthma at New Hanover Regional Medical Center's Internal Medicine Outpatient Resident Clinic was performed. We evaluated several data points, including whether patients had a PFT and if their recorded diagnosis in our electronic medical record (EMR) was proven by PFT. If the diagnosis of COPD was confirmed, we compared their GOLD stage and medications with current guideline recommendations. Last, we looked at how many COPD exacerbations the patient had during the last year.

Results: Of the 125 patients who met inclusion criteria for this study, 38% had documented PFT results in our EMR. Of the multiple variables evaluated, only body mass index was statistically significant: overweight patients ($P<0.01$) were more likely to have received a PFT. Some nonsignificant trends were observed: white patients (74%) ($P=0.08$), those with greater pack-year smoking histories ($P=0.06$), and individuals with private insurance ($P=0.07$) were more likely to have a PFT recorded. In patients who had a PFT, the documented diagnosis was correct 77% of the time. Of those with PFT-proven COPD, therapy was consistent with guideline recommendations 38% of the time.

Conclusion: Our study found that of patients with reported COPD, asthma, or restrictive lung disease, only a minority had a PFT performed. The majority of those with PFT-proven COPD were treated outside the current recommendations. Whether a PFT was performed did not influence whether COPD therapy was initiated, nor did it correlate with the observed rate of COPD exacerbations. Limitations of this study may include affordability and access to PFT and medications in our patient population. Other outcomes can be investigated to further characterize some of our observations, and more data are needed to determine the significance of the trends found. This study is now in its second phase in which we are working to reformat how PFTs are ordered and viewed in our EMR. By improving providers' ease of access to diagnostic testing and results, as well as implementing guideline-based checklists within our clinic notes, we hope to improve our care of the population with COPD.

11 Controlling Atrial Fibrillation by Atrial Flutter Ablation in the Presence of Left Atrial Enlargement: A 10-Year Review

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Background: Typical isthmus-dependent atrial flutter (AFL) is a macroreentrant supraventricular tachycardia in which reentrant rhythm is entirely located in the right atrium. Based on population studies, an estimated 200,000 new cases of AFL are diagnosed in the United States each year. The management of patients with AFL is costly and associated with the inherent risk of thromboembolic disease and stroke. Radiofrequency catheter ablation targeting the isthmus between the inferior vena cava and the tricuspid annulus is an established therapy for the treatment of AFL. This therapy in lone AFL is successful in 90% of patients, but the long-term management of patients with AFL is often complicated by new coexistent AFL or new incident arrhythmia, with a reported incidence of up to 50%. Few studies in the literature have investigated the benefit of AFL ablation on new incident atrial fibrillation (AF), time of onset, or arrhythmia burden after isthmus-dependent AFL radiofrequency ablation. Left atrial (LA) dilatation, however, has been a long-known cause for AF, and we attempted to examine the benefits of AFL ablation in reducing AF, taking LA dilatation into account.

Methods: Medical records for patients seen between January 2003 and January 2013 who had isthmus-dependent AFL, had undergone radiofrequency ablation, and had dual-chamber pacemaker/defibrillator/loop recorder implanted at the time of index ablation or thereafter were included. Pregnant patients and those <18 years were excluded. Age, sex, history of smoking, and/or presence of coronary artery disease (CAD), diabetes, hypertension, or hyperlipidemia, congestive heart failure, or left ventricular dysfunction and previous stroke were summarized and analyzed. LA diameter was assessed at the time of ablation and at 12 months. Daily AF frequency before AFL ablation was extracted through device interrogation. AF delta (daily frequency before minus frequency after ablation) was the primary outcome. The correlation between these predictors and the outcome (AFL frequency per day) was tested using *t* test and generalized linear models.

Results: After reviewing medical records, 80 patients were included. Of those, the data for preablation and postablation frequency of AFL was available for 17 patients. Mean AF per day before ablation was 23.15 (95% confidence interval -9.08, 55.37) and after ablation was 4.74 (-2.69, 12.16) ($P=0.204$). Data about LA diameter were available for 14 of the 17 patients (82.35%) and showed that 10 patients (71.42%) had dilated LA (>4 cm). Patients with normal LA diameter had stable AF delta (mean 0.01, standard deviation 0.156), while patients with dilated LA had a great increase in AF delta (mean +30.19, standard deviation 73.82) ($P=0.425$). Ten patients (58.82%) did not have diabetes (mean AF delta 7.52, standard deviation 27.05), while 7 (41.17%) were diabetic (mean AF delta 33.96, standard deviation 84.67) ($P=0.351$). Similarly, 7 patients did not have CAD (mean AF delta -1.11, standard deviation 4.59), and 10 had CAD (mean AF delta 32.08, standard deviation 72.89) ($P=0.233$).

Conclusion: AFL ablation showed a trend toward reducing AF burden in this sample of patients. This effect, however, did not achieve statistical significance. We noticed that most of those patients had concomitant LA dilation, which may have reduced the efficacy of AFL ablation. When focusing on arrhythmias as multifactorial as AF, clinicians may take into account controlling other factors, especially because coexisting pathologies like CAD, diabetes, and dilated LA can increase the odds of developing AF.

12 Takotsubo Cardiomyopathy After Normal Delivery: A Literature Review

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Background: Takotsubo cardiomyopathy (TTC), also known as broken heart syndrome or apical ballooning syndrome, has been well described in the literature. First described in 1990, the term TTC (referred to as myocardial stunning), was used to delineate temporary left ventricular ischemia without evidence of coronary artery disease. Many cases have been reported after cesarean deliveries, but no review has examined it after vaginal deliveries.

Methods: We conducted a systematic literature review on TTC after normal vaginal delivery. PubMed, Cochrane, and Google Scholar databases were searched for the following terms in the titles: takatsubo, takotsubo, tako-tsubo, ballooning, stress-induced, transient cardiomyopathy + pregnant, pregnancy, postpartum, postpartal, puerperal, peripartum, and delivery.

Results: Six articles were included in the review. Onset of TTC was anywhere between 1-40 days postpartum. Ventricular fibrillation was seen in 2 cases with elevated troponin levels in 3 reports. Ejection fraction ranged from 19%-45%, with apical hypokinesis and ballooning being the major echoradiologic findings. In 5 of 6 cases, the prognosis was excellent. The literature review suggested estrogen deficiency in the postpartum period as the underlying etiology.

Conclusion: Although TTC is usually reported after cesarean sections, we highlight that it can be seen after vaginal deliveries, too. Clinical suspicion is key when treating young female patients with no medical history that can account for their cardiac symptoms and who have ischemic electrocardiogram changes. While ejection fraction can be greatly depressed initially, patients show good prognosis with conservative treatment, and invasive intervention is rarely needed. One possible mechanism for TTC can be estrogen deficiency seen during and after delivery. Compared to the literature review done by Minatoguchi, it is noticeable how TTC after cesarean section tends to occur more rapidly as opposed to cases seen after vaginal delivery. This result may be attributable to the more frequent use of tocolytics in cesarean deliveries than in vaginal deliveries. It will be interesting to examine gravidity/parity status and modes of deliveries in prior pregnancies in future case reports. It is unclear, because of the few case reports available, whether pregnancy and delivery have a cumulative stressful effect on the female body, and whether this effect is modulated by prior modes of delivery and the spacing between pregnancies.

CLINICAL VIGNETTE ABSTRACTS

13 Groove Pancreatitis

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Case Presentation: A 42-year-old man with a significant history of alcohol abuse (a pint of vodka daily) for 30 years presented with a 2-week history of nausea, vomiting, abdominal pain, and diarrhea. He was hemodynamically stable when he presented, and his physical examination was only notable for epigastric tenderness to palpation. His laboratory results were unremarkable without leukocytosis or electrolyte abnormalities except for mild elevation in lipase at 77. An ultrasound of his abdomen revealed a complex, heterogeneously echogenic area with internal cystic features (5.8 cm) in the porta hepatis/peripancreatic region. A computed tomography scan was performed to further evaluate this complex cyst and showed mixed soft tissue/cystic masses in the pancreaticoduodenal groove. There was no evidence of pancreatic or biliary duct dilatation. Magnetic resonance imaging also showed a fibrous and cystic mass centered in the pancreaticoduodenal groove that was suggestive of groove pancreatitis. The patient was treated supportively with intravenous hydration and pain management. His symptoms improved without further intervention, and he tolerated a regular diet well at the time of discharge to inpatient alcohol rehabilitation.

Discussion: Groove pancreatitis is an extremely rare form of chronic pancreatitis that is found in the superior aspect of the pancreatic head, the duodenum, and the common bile duct. Only a few descriptions of its existence are in the radiology and pathology literature, and many radiologists remain unfamiliar with the entity even in the most specialized centers. It is also extraordinarily difficult to distinguish groove pancreatitis from malignancy solely based on imaging studies, likely because of unfamiliarity of the entity and lack of adequate distinctive imaging features between groove pancreatitis and malignancy. Many patients with this entity unnecessarily undergo a pancreaticoduodenectomy (Whipple procedure) because of an inability to completely exclude malignancy.

Conclusion: Similar to traditional chronic pancreatitis, groove pancreatitis has strong association with alcohol abuse, and it is more common in middle-aged men. Patients generally present with severe abdominal pain, nausea, and vomiting as our patient did. However, patients may rarely present with acute gastric outlet obstruction. The prospective diagnosis of groove pancreatitis is difficult regardless of the radiologic modality. Groove pancreatitis is an important diagnostic consideration for any pancreatic cystic lesion, especially when it involves the duodenal wall. The pathogenesis remains largely unclear, but disturbed outflow of the Santorini duct because of chronic alcohol toxicity is a commonly regarded causative factor. Because of its rarity and difficulty distinguishing from malignancy, physicians need to be more aware of this entity when evaluating cystic pancreatic lesions. More studies are needed to find a way to differentiate groove pancreatitis and malignancy in a noninvasive way, and physicians should be more familiar with its radiographic features to avoid unnecessary aggressive procedures such as pancreaticoduodenectomy.

14 Pituitary Origin of Cirrhosis—A Surprising Link

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Case Presentation: A 19-year-old African American male presented with progressive shortness of breath over 1 month. Associated symptoms were dry cough and 40-lb weight loss. Medical history was pertinent for meningitis 4 years ago without any residual deficits. Vital signs were temperature 37°C, heart rate 70 bpm, blood pressure 93/35 mmHg, and oxygen saturation 98% on 4 L. Examination revealed fish-mouth deformity, hypertelorism, marfanoid features, loss of secondary sexual characteristics, microorchidism, and II/VI systolic ejection murmur at the left sternal border. Abnormal laboratory data included alanine transaminase 42, aspartate aminotransferase 96, alkaline phosphatase 125, and international normalized ratio 1.86. Magnetic resonance imaging (MRI) of the abdomen and pelvis revealed hepatic steatosis with associated perfusion abnormalities and absent testes. Subsequent liver biopsy showed severe steatosis accompanied by bridging fibrosis and nodule formation. As clinically suspected, intrapulmonary shunting was evidenced by a positive bubble study on echocardiogram, further confirmed by a 70% intrapulmonary shunt seen on pulmonary perfusion scintigraphy. Other important tests were undetectable testosterone, luteinizing hormone, follicle stimulating hormone, free thyroxine, and insulin-like growth factor 1 and a failed cosyntropin stimulation test. In light of these findings, a brain MRI was ordered that revealed a pituitary mass, and consequent biopsy showed fibrous tissue only. Our final diagnosis was hepatopulmonary syndrome (HPS) secondary to nonalcoholic fatty liver disease (NAFLD), the cause of which remains unclear but is likely linked to panhypopituitarism. No overarching genetic diagnosis has yet been identified on genetic testing. The patient was discharged home on hormone replacement therapy and oxygen supplementation, while undergoing evaluation for liver transplantation.

Discussion: The link between hypopituitarism and the development of NAFLD is becoming increasingly recognized, although it is not well understood. Furthermore, a few case reports suggest that HPS may actually occur at an increased frequency in patients with hypopituitarism. This case adds to the sparse literature supporting an interrelated pathogenesis of these conditions. Further studies are required to explore the link between the pituitary gland and liver and hence improve our understanding of how to manage these patients.

Conclusion: With the increasing prevalence of NAFLD alongside obesity in the United States, it is important to be aware of the link between hypopituitarism and NAFLD, particularly because these patients may have a higher likelihood of developing cirrhosis complicated by hepatopulmonary syndrome.

15 Sudden Loss of Vision After Endoscopic Retrograde Cholangiopancreatogram

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Case Presentation: A 20-year-old white female was seen in the emergency room at Emory Johns Creek Hospital in late June 2014 for epigastric abdominal pain lasting 7 days that was worsening. Computed tomography revealed cholelithiasis and cholecystitis. The patient's medical history included attention deficit hyperactivity disorder and tonsillectomy as a child. The patient had laparoscopic cholecystectomy the day of admission that she tolerated well. The second day, she was still having abdominal pain and was seen by a gastrointestinal tract physician who performed an endoscopic retrograde cholangiopancreatogram (ERCP) with no noted obstruction. Immediately after recovering from ERCP, the patient started to have blurred vision that worsened, leading to almost complete blindness the second morning. Her lipase dramatically increased, reflecting acute pancreatitis. Surgery consulted the hospital medicine service for the loss of vision, and we consulted the ophthalmologist on call and ordered brain magnetic resonance imaging (MRI). The ophthalmologist was concerned about Purtscher retinopathy, a rare condition that usually develops after pancreatitis and is an immune complex–mediated phenomenon that leads to damage of the retinal artery. Eye slit examination revealed disc edema with mild hemorrhage, and the patient was only able to see shades of black and white. Brain and orbit MRI/magnetic resonance angiography showed abnormal brain stem and bilateral edema of basal ganglia, inferior thalami, and hippocampi, with findings most suspicious for toxic metabolic event vs herpetic encephalitis. The patient underwent urgent lumbar puncture under fluoroscopy with cerebrospinal fluid culture, oligoclonal bands testing and blood anticardiolipin, lupus-sensitive activated partial thromboplastin time, and Anti-B2GP1 immunoglobulin G and immunoglobulin M. All tests were negative. The patient was immediately administered intravenous acyclovir and Solu-Medrol and was seen by the staff neurologist who diagnosed acute diffuse encephalomyelitis. The patient started intravenous immunoglobulin treatment. She had a repeat ERCP and abdominal MRI with improvement of her abdominal pain and resolution of her pancreatitis. Her visual loss improved slowly, but she was discharged home after prolonged hospitalization, still with significant visual impairment. Close follow-up with neurology and ophthalmology was scheduled.

16 Pseudohypercalcemia Multiple Myeloma: Important Inpatient Treatment Implication

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Case Presentation: A 75-year-old African American male with refractory immunoglobulin G-κ multiple myeloma progressive through 3 regimens of chemotherapy (5 bortezomib cycles, 10 lenalidomide cycles, 5 cyclophosphamide/bortezomib cycles, and currently on a pomalidomide cycle) and a medical history of iatrogenic anterior uveitis/scleritis from bisphosphonate treatment presented to the emergency room from the oncology clinic with hypercalcemia. He denied any attributable symptoms, including nausea, vomiting, confusion, nephrolithiasis, polyuria, nocturia, weakness, or bone pain. Serum calcium measured 12.8 mg/dL, and corrected serum calcium was 13.8 mg/dL (albumin of 2.8 g/dL). Other laboratory values were within normal range. Intravenous hydration with normal saline solution was started, with bisphosphonate treatment deferred because of adverse reactions to pamidronate and zoledronic acid. After several days, the patient's serum calcium was not responsive to fluid therapy or subcutaneous calcitonin treatment. For this reason, serum calcium and ionized calcium were obtained concomitantly with serum calcium of 12.0 mg/dL and ionized calcium of 0.90 mmol/L, leading to the diagnosis of pseudohypercalcemia.

Discussion: Pseudohypercalcemia is defined as persistent elevation of total serum calcium concentration in the presence of normal ionized serum calcium levels. Normally, 50% of soluble calcium is ionized, and 50% is bound to albumin. Multiple myeloma can induce pseudohypercalcemia by a monoclonal myeloma protein binding to calcium. Studies have shown that the binding site for calcium is in the Fab part of the molecule. Hazani et al theorized that the immunoglobulin G binds to excess calcium and protects the patient from the hypercalcemic effects of polyuria, polydipsia, constipation, and confusion. As many as 4 moles of calcium binding to 1 mole of immunoglobulin G have been reported in a quantitative study by Merlini et al. Evidence has not shown significant calcium binding to occur with normal immunoglobulins or with immunoglobulins in polyclonal gammopathies (ie, liver disease, connective tissue disease, and chronic infection). Pseudohypercalcemia has been described in immunoglobulin G-κ of Waldenström macroglobulinemia, immunoglobulin G-κ, immunoglobulin G-λ, and immunoglobulin G-κ paraproteins disorders. Interestingly, a study has shown that in an elevated protein state, hyperviscosity can interfere with calcium measurement by an autoanalyzer. Binding of myeloma immunoglobulin to copper and flavin has also been described.

Conclusion: This case illustrates that in an asymptomatic patient, suspicion of pseudohypercalcemia in a state of elevated proteins should be considered to avoid unnecessary treatment. In every myeloma patient with hypercalcemia but no symptoms to suggest manifestations of derangement, concomitant measurement of serum calcium and ionized calcium should be tested before starting treatment. Deproteinization of the sample before calcium and phosphate measurement to obtain comparable results has been suggested. Inpatient treatment with high volume intravenous fluids, bisphosphonates, and calcitonin is not indicated to treat pseudohypercalcemia and should be avoided to prevent unnecessary side effects of medications. Treatment of the myeloma itself to reduce immunoglobulin levels is the preferred method of normalizing calcium levels.

17 Herpes Zoster Oticus (Ramsay Hunt Syndrome) Associated with Meningoencephalitis in a Human Immunodeficiency Virus–Infected Patient

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Case Presentation: A 50-year-old African American woman with a history of human immunodeficiency virus (HIV) infection [cluster of differentiation 4 count 69 cells/mm^3] off antiretroviral therapy (ART) at the time and thoracic herpes zoster presented after 1 week of painful left ear vesicles in the auditory canal. Two days prior to admission, she developed left facial droop, difficulty swallowing, slurred speech, ataxia, fever, chills, and progressive confusion. The patient was diagnosed with Ramsay Hunt syndrome (RHS) (herpes zoster oticus and ipsilateral facial nerve paralysis) and started on intravenous acyclovir, systemic steroids, and resumption of ART. Cerebrospinal fluid analysis (CSF) was consistent with meningoencephalitis (352 RBC, 903 WBC, 242 mg/dL protein, and 39 mg/dL glucose) with positive CSF polymerase chain reaction (PCR) for varicella zoster virus (VZV) and negative CSF bacterial cultures. The left ear vesicles and erythema improved after 48 hours of treatment with resolution of confusion.

Discussion: First described by James Ramsay Hunt, an American neurologist, RHS (peripheral facial nerve palsy accompanied by an erythematous vesicular rash on the ear) is a rare but severe complication of VZV reactivation in the geniculate ganglion. Treatment with acyclovir and prednisone within 3 days of onset has been associated with complete recovery from facial paralysis in about 75% of cases. RHS is uncommonly associated with meningoencephalitis, and to the best of our knowledge, this is the first reported case of RHS associated with CSF PCR-confirmed VZV meningoencephalitis in a patient with HIV. The sensitivity/specificity of this PCR-based method for detecting VZV DNA is reported to be more than 95% in VZV meningoencephalitis. It has been reported that VZV accounts for approximately 2% of central nervous system infections in the general population vs 7% in the HIV-infected population.

Conclusion: VZV meningoencephalitis associated with RHS should be suspected and treated with intravenous acyclovir and systemic steroids in any patient presenting with herpes zoster oticus, ipsilateral facial nerve palsy, and altered mental status. In addition, ART should also be started in patients with HIV.

18 A Rare Disease on the Rise: Neurosyphilis

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Case Presentation: A 35-year-old white male with no significant medical history presented after 4 days of blurry vision in his left eye with associated pain, injection, miosis, and left-sided headache. Further history revealed that 10 months prior, he tested positive for human immunodeficiency virus (HIV) and syphilis and was treated with penicillin but developed a rash and was switched to doxycycline. He had also noted a painless penile lesion 1 month prior. Initial ophthalmic examination was significant for a right dilated pupil that was reactive to light and a left pupil that was constricted, injected, and nonreactive to light. Further ophthalmic examination revealed panuveitis of the left eye. The rest of the physical examination was significant for pustules on the palmar surface of the hands and bilateral, diffuse lymphadenopathy in the cervical, epitrochlear, and inguinal regions. Initial laboratory findings included a positive serum rapid plasma reagin test. The patient was admitted for presumed neurosyphilis with penicillin allergy. He was administered oral prednisone as well as Prednefrin Forte and atropine eye drops for his uveitis. Lumbar puncture and computed tomography of the head were also obtained on admission. The patient was transferred to the medical intensive care unit on the second day of admission for desensitization to penicillin. He was desensitized using serial dilutions of increasing levels of penicillin administered with intravenous diphenhydramine and steroids. After the desensitization protocol and monitoring, the patient was administered continuous penicillin G infusion. The VDRL from cerebrospinal fluid test came back positive at a 1:2 ratio. The patient was discharged when stable with a 14-day course of intravenous penicillin G, followed by oral penicillin VK daily, and 3 weekly Bicillin injections with close infectious disease follow-up.

Discussion: Neurosyphilis is a once common disease that was nearly erased after the introduction of antibiotics but is rising with the coexistent increase in syphilis rates. Recognizing the disease is important, especially in HIV patients, in whom neurosyphilis can manifest itself much earlier from time of onset. The rates of primary syphilis infection from *Treponema pallidum* have been increasing during the past 15 years. Neurosyphilis, unlike other stages of syphilis, may occur at any time during the course of infection and may occur much more rapidly in HIV-positive patients. It is also important to identify ophthalmic findings in patients with syphilis, including optic neuritis, iritis, uveitis, and Argyll Robertson pupil in which the affected pupil accommodates light but does not react.

Conclusion: In patients with neurosyphilis, penicillin G intravenously is the standard of care, and patients with penicillin allergy must be desensitized with appropriate safety. One must watch for a Jarisch-Herxheimer reaction in which a syndrome of fever/chills, myalgia, tachycardia, tachypnea, and mild hypotension may occur at the beginning of treatment. Obtaining a thorough history along with recognizing systemic and ophthalmic findings can be important in diagnosing and appropriately treating a patient with neurosyphilis.

19 Tissue Plasminogen Activator Myocardial Infarction Paradox: Acute Coronary Syndrome After Ischemic Cerebral Vascular Accident Treated with Thrombolytic Therapy

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Case Presentation: A 64-year-old female with a history of hypertension, diabetes, hyperlipidemia, and alcohol dependency presented with sudden right side weakness and aphasia lasting one-half hour. She denied having chest pain or dyspnea. On physical examination, she was in mild distress with right motor and sensory deficits along with aphasia. Her blood pressure was 180/90 mmHg. Initial electrocardiogram (ECG) was normal sinus with no ischemic changes. Computed tomography scan of the head did not show intracranial hemorrhage, and within 1 hour of the symptoms, tissue plasminogen activator (tPA) was administered for potential left middle cerebral artery stroke. A few hours later, she became tachypneic and tachycardiac. Chest x-ray showed pulmonary congestion. Troponin I was elevated to 38, and ECG showed inferolateral ST segment depression. Blood pressure was at the lower normal limits. Bedside echocardiogram showed global hypokinesis and inferior akinesis with ejection fraction of 30% but no thrombus in the left ventricle. Non-ST segment elevation myocardial infarction was then diagnosed. Atorvastatin was started, but aspirin was held because of the stroke, as were beta blockers and angiotensin-converting enzyme inhibitors because of relative hypotension. Three days later, left heart catheterization (delayed because of the recent tPA use) showed multivessel coronary artery disease with left main 95% and left anterior descending 70% stenosis along with total occlusion of the right coronary artery with collateral perfusion. Troponin I was trending down, and the patient's weakness improved. Coronary artery bypass grafting was high risk at that time because of the comorbidities and intermittent altered mental status; therefore, it was deferred for later evaluation. Medical therapy was initiated after a few days as indicated with heparin drip, beta blockers, angiotensin-converting enzyme inhibitors, high-dose statins, and aspirin, along with gentle diuresis for the new ischemic cardiomyopathy. The patient's hospital course was complicated with urinary tract infection, possible septic shock with multiorgan failure, and Wernicke encephalopathy, all of which were treated appropriately. The patient did not have any recurrent cardiac symptoms and was discharged to an out-patient hospice.

Discussion: Thrombolytic therapy is indicated in acute ST elevation myocardial infarction. However, although rare, administration of tPA may initiate acute coronary syndrome (ACS). This case represents an unusual case of acute myocardial infarction after tPA administration for acute ischemic stroke. A few mechanisms are suggested: first, thromboembolic mechanism from tPA-related intracardiac thrombus breakdown; second, plaque instability in the coronary arteries from the tPA effect causing plaque rupture and ACS. Echocardiogram can show intracardiac thrombus and differentiate the two. In this case, the acute myocardial infarction occurred just after the tPA administration, and echocardiogram did not show thrombus, making plaque instability and rupture the most likely cause. Our review of the literature shows only a few case reports with similar presentation.

Conclusion: Plaque instability and thromboembolic mechanism are rare but serious cardiac complications after tPA administration. Plaque stability is influenced by systemic factors that are present in a proportion of patients. Some individuals are more prone to rupture of plaques than others. Irregular plaques are usually a sign of instability and increased risk of rupture. Administration of tPA may contribute to plaque instability. Awareness of this rare complication can help physicians to diagnose this condition early and impact the management and outcome.

20 A Pain in the Glutes

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Case Presentation: A 39-year-old white male with a history of bipolar disorder was admitted to the hospital because of altered mental status and auditory hallucinations. Initial workup revealed leukocytosis, respiratory acidosis, rhabdomyolysis, and elevated liver function tests. In spite of aggressive resuscitation efforts, the patient went into renal failure requiring dialysis. A urine drug screen indicated cocaine, opiate, and barbiturate use. As his mental status improved, he started to complain of severe persistent pain in the left buttock area that required narcotics for pain relief. The physical examination showed marked swelling and difficulty in abduction and adduction of his left leg. Computed tomography scan revealed severe inflammation of the left gluteus medius and minimus muscles that further supported the diagnosis of gluteal compartment syndrome. Without further delay, emergent fasciotomy was performed.

Discussion: Gluteal compartment syndrome is a rare, often unrecognized syndrome that may manifest as renal failure, sepsis, and death. Delay in diagnosis can result in significant morbidity and possible mortality. The gluteal region has 3 osseofascial compartments: the gluteus maximus, gluteus medius/minimus, and the tensor fasciae latae. Because no major blood vessels or nerves lie in this area, the only physical finding is tense swelling of the gluteal region in a patient with altered mental status. The sciatic nerve, however, is susceptible to compression-induced neuropathy in the later stages because it lies posterior to the gluteus maximus beneath the external rotators of the hip. A fasciotomy should be performed as soon as possible to halt the ongoing ischemia and pending necrosis of viable tissue, along with prevention of further serious systemic side effects.

Conclusion: Because of its anatomic location, typical clinical features of compartment syndrome may not be evident. It can also be overlooked when psychiatric emergencies are the initial diagnosis, as this condition is common in cases of altered mental status and drug abuse. These patients may stay in one position for a prolonged period of time, leading to muscle damage, edema, and finally compartment syndrome. A high index of suspicion is required, especially in patients with altered mental status or sudden severe swelling and pain in the gluteal region, to prevent morbidity and mortality.

21 Now You See It, Now You Don't—The Disappearing Lymphoma

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Case Presentation: A 28-year-old Hispanic male with no reported medical history presented with a chief complaint of abdominal pain for 1 week associated with abdominal distention and constipation. The patient denied any weight loss, night sweats, chills, change in appetite, nausea, vomiting, or melena. He had no history of previous colonoscopy or esophagogastroduodenoscopy (EGD). No significant family history, tobacco, alcohol, or illicit drug use were reported. His vital signs were stable. The initial physical examination was remarkable for mildly tender abdomen in the right upper quadrant and moderate distension without a palpable liver edge or spleen. No lymphadenopathy was noted. Emergency room computed tomography (CT) of the abdomen/pelvis revealed extensive omental nodularity and thickening with ascites. CT of the chest showed a calcified granuloma in the left upper lobe. Paracentesis was performed, yielding a serum-ascites albumin gradient of 0.2, total protein of 3.9, cell count of 2,540 with 3% polymorphonuclear leukocytes, 79% lymphs, negative cytology/culture, and no organisms on acid-fast bacilli test. Acute hepatitis panel, human immunodeficiency virus test, thyroid stimulating hormone and purified protein derivative/QuantiFERON were negative. EGD and enteroscopy were unrevealing. Flow cytometry on the ascitic fluid yielded a 3% monoclonal population of B cells suggestive of large B-cell lymphoma. Ileocolonoscopy showed an area of thick nodular folds and an ulcer. Biopsy of this site revealed CD 20/10 strongly positive, CD 3/5/23/30 negative, B-cell lymphoma 2 weakly positive, Ki-67 positive in >90% of cells, and terminal deoxynucleotidyl transferase negative. Pathology slides had a starry sky appearance but were negative for rearrangement of the Myc gene and MYC/IGH translocation t(8;14). The patient's diagnosis was high grade B-cell lymphoma, unclassified. He was discharged to Ben Taub Hospital in Houston, where he received extensive workup of his lymphoma, and no disease was found. The ileocolonoscopy, bone marrow biopsy, and positron emission tomography scan were all negative.

Discussion: According to the 4th edition of the World Health Organization Classification of Tumors of Hematopoietic and Lymphoid Tissues in 2008, a new category of B-cell lymphoma, unclassifiable was created. This category was established because of cases of intermediate features between diffuse large B-cell lymphoma (DLBCL) and Burkitt lymphoma (BL). This case presents a unique presentation of DLBCL with an unexplained disappearance of the disease. It also epitomizes the importance of keeping a broad differential when practicing hospital medicine.

Conclusion: In hospital medicine, the identification and coordination of care are vital aspects of practice. It is exceedingly rare to identify a DLBCL with BL characteristics, but disappearance of the lymphoma without treatment has not been reported in the literature. Based on the expression profiling of Ki-67 staining in >90% of the cells, weakly positive BCL-2, and the morphologic features, not treating the patient would be unfavorable. The classification of the tumor is important given the difference in treatment of DLBCL and BL. Despite no disease or activity being noted, this patient warrants treatment given the high risk of proliferation.

22 Galloping Gammopathies

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Case Presentation: A 64-year-old African American woman presented with shortness of breath, cough, orthopnea, and lower extremity swelling that began several months prior. Her symptoms had become much worse during the past week and prevented her from performing some daily activities. Her medical history was significant for hypertension, coronary artery disease, and gastroesophageal reflux disease. All were being treated appropriately. The patient's blood pressure was 98/65 mmHg, her pulse was 115 bpm, and her respiratory rate was 18 with 96% O_2 saturation on room air. Physical examination revealed an anasarcic-appearing woman with 3+ edema to her umbilicus, jugular venous distention of the neck, several 0.5 cm papules on her forehead, tachycardia with a prominent S3, prominent inspiratory crackles bilaterally with decreased breath sounds, dullness to percussion at the lung bases, and hepatomegaly. Laboratory results showed hemoglobin of 7.1, white blood cell count of 6.5, sodium of 128, potassium of 3.9, chloride of 91, anion gap of 6, blood urea nitrogen of 18, and creatinine of 0.7. Chest x-ray revealed bilateral pleural effusions. The patient was admitted for suspected congestive heart failure (CHF) exacerbation. Because standard CHF treatment did not provide relief, a diagnostic/therapeutic thoracentesis revealed a triglyceride count of 256, diagnostic of a chylothorax, and a previous complete blood count was found to have rouleaux. On further examination, the papules were shown to be B-cell cluster of differentiation 20+ lymphoma infiltrating the dermis. The patient also admitted to substantial weight loss in the past year. A lymph node biopsy was performed, and treatment for Waldenström macroglobulinemia was initiated.

Discussion: Monoclonal gammopathies are categorized as light chain, heavy chain, or whole immunoglobulins, although many diseases may produce a combination of chain types. Whole immunoglobulin gammopathies are often seen with multiple myeloma and Waldenström macroglobulinemia. Waldenström is a rare disease with fewer than 1,500 cases occurring each year in the United States. The paraproteins of Waldenström are known to aggregate and increase blood viscosity, often leading to chronic heart failure symptoms from expanded blood volume, as well as neuropathies, skin papules, and chylothoraces from destruction of lymphatic vessels. Hepatomegaly is present in about 20% of cases. Advanced cases can prove difficult to treat, as the insidious nature of the disease can deplete a patient's physiologic reserves, as was the case with our patient. Initiation of chemotherapy in patients with a high disease burden can lead to tumor lysis syndrome that must be prepared for. Destruction of lymphatic vessels leading to chylothoraces are rare but must be treated rapidly. A dietitian is needed to assess the patient's nutritional status and create a diet low in triglycerides to reduce the buildup of chylous fluid. In advanced cases such as this, the 5-year survival rate is <36%.

Conclusion: Hyperviscotic states originating from gammopathies can mimic signs and symptoms of CHF and should be considered when patients do not respond to appropriate treatment or when patients present with atypical symptoms.

23 Tuberculosis Masquerading as Granulomatosis with Polyangiitis

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Case Presentation: A 76-year-old man with a history of granulomatosis with polyangiitis (GPA) presented with complaints of weakness, fatigue, and poor oral intake. He had visited the emergency department a week prior for similar symptoms and required fluid resuscitation. During presentation, he denied any fevers or chills, cough, shortness of breath, headache, or neck stiffness. Earlier that month, the patient had been admitted for a presumed GPA flare, including fevers, cough, dyspnea, and x-ray evidence of pulmonary infiltrates. He was discharged on a higher dose of prednisone in addition to rituximab doses. He reported living at home with his wife whom he cares for and denied any sick contacts apart from his history of multiple hospital admissions during the past 6 months. During examination, he had diffuse crackles with inspiration and a uvular lesion believed to be because of his GPA. His hospital course was complicated by a decline to delirium on day 1. Chest x-ray showed cavitary mass-like consolidations in the left upper lobe, in the left lower lobe, and in the right upper lobe that were stable from prior admission imaging. Differential diagnosis narrowed to a flare of his vasculitis vs hospital- or community-acquired pneumonia. Broad-spectrum antibiotics and Solu-Medrol 30 mg intravenously twice daily were started. A transbronchial biopsy on hospital day 2 revealed multiple acid-fast bacilli (AFB). Both AFB and Grocott's methenamine silver stains were negative for fungi, pneumocystis, and mycobacteria. The histopathologic findings, however, did not resemble the previous biopsy taken a few months earlier. The patient stabilized and was discharged to subacute rehabilitation on antibiotics and continued steroids. A couple of weeks later, the patient was readmitted for altered status following a fall. During that admission, cultures from the original bronchoscopy returned positive for *Mycobacterium tuberculosis*, and a history of childhood exposure to several family members who died from tuberculosis was discovered. Following profound side effects from rifampin, isoniazid, pyrazinamide, and ethambutol therapy, the patient opted to withdraw aggressive care and died shortly after.

Discussion: Abnormal results from chest imaging in a hospitalized patient can prompt an extensive differential diagnosis, but patient medical history may lead clinicians to narrow that differential too quickly. In the setting of known prior lung disease, due vigilance must be paid to other etiologies. Specifically, pathologies like tuberculosis necessitate aggressive treatment both for the patient and for public health. Our patient had risk factors for tuberculosis, most notable for chronic immunosuppression from medical management of his disease. While previous imaging demonstrated his vasculitis, his decline in functional and mental status should have prompted high suspicion for a comorbid condition. Appropriately digging deeper into the patient's family history would have further heightened suspicion for a reactivation of latent tuberculosis.

Conclusion: This case emphasizes the importance of being thorough and exhaustive in the creation and evaluation of the differential diagnosis in the face of a known history of lung disease. Caution should be demonstrated until tuberculosis can be effectively ruled out.

24 Inflammation to Infarction—An Overlooked Link

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Case Presentation: A 74-year-old man presented with left-sided abdominal pain. Pertinent history included biopsy-proven eosinophilic granulomatosis with polyangiitis (EGPA) complicated with mesenteric ischemia during the last admission, type 2 diabetes mellitus, stage III chronic kidney disease, and nonischemic cardiomyopathy. Vital signs were temperature 40.2°C, blood pressure 106/53 mmHg, heart rate 104 bpm, respiratory rate 18, and SpO_2 93% on room air. Examination revealed left abdominal and costovertebral angle tenderness. Laboratory findings were hemoglobin 11.8 g/dL, white blood cell count 6.7×10^9/L with 34% eosinophils, lactate dehydrogenase 521 units/L, blood urea nitrogen 27 mg/dL, creatinine 3.87 mg/dL (baseline 2.0), unremarkable urinalysis, urine protein-to-creatinine ratio of 1, erythrocyte sedimentation rate 77 mm/h, C-reactive protein 70.87 mg/L, antineutrophil cytoplasmic antibodies (ANCA) <1:20 (negative), C3 of 73 (low), C4 of 15 (normal), and rheumatoid factor 115 IU/mL. Human immunodeficiency virus, hepatitis, rapid plasma reagin, antinuclear antibody, anti-dsDNA antibody, chest x-ray, and blood and urine culture tests were negative. Computed tomography of the abdomen was unrevealing. Subsequently, magnetic resonance imaging/magnetic resonance angiography of the abdomen revealed multiple large cortical defects in the right kidney. In the absence of urinary infection, this finding represented renal infarcts. Renal biopsy showed scattered immune deposits, vascular inflammation and thickening, and thrombotic microangiopathy-type glomerular changes (endothelial injury and subendothelial widening on electron microscopy) consistent with an immune-mediated injury. In the face of ongoing abdominal pain, eosinophilia, evidence of renal infarction, biopsy findings, and known EGPA, the final diagnosis was EGPA flare complicated with focal vascular thrombosis resulting in renal infarction. This diagnosis was further strengthened by the fact that the patient's pain, eosinophil count, and renal function (creatinine peaked at 4.19 mg/dL and was 2.8 mg/dL on discharge) improved with steroid therapy (1 mg/kg/day). The patient was discharged with close nephrology follow-up.

Discussion: Abdominal pain of unclear etiology is a common admitting diagnosis for hospitalists; however, it is extremely uncommon to find renal infarction as an underlying cause. This case highlights a rare complication of EGPA. Other unusual EGPA complications range from thrombotic gallbladder necrosis to cerebrovascular accidents. EGPA is a systemic small- and medium-vessel necrotizing vasculitis that typically presents with asthma, eosinophilia, and extravascular eosinophilic granulomas. Renal complications affect one-fifth of patients with EGPA and present as glomerulonephrotic/nephritic syndromes, but renal infarction is rare (1 case reported). ANCA positivity, in particular myeloperoxidase antibody, has been associated with a higher prevalence of renal involvement. Our patient further represents an extremely small pool of ANCA-negative EGPA patients with renal involvement. On further review of the patient's history and available laboratory records, EGPA is deemed a likely culprit for his recent history of mesenteric ischemia, nonischemic cardiomyopathy (possibly eosinophilic myocarditis), and cerebrovascular accident (small pontine infarct). Steroid therapy is the mainstay therapy for active disease or flares, along with immunosuppressive treatment depending on the degree and type of organ involvement. Prognosis is poor with multiorgan disease.

Conclusion: Small to medium vessel vasculitides, such as EGPA, can lead to organ infarct that can present simply as regional pain.

25 *Legionella micdadei*—An Unsuspecting Cause of Necrotizing Pneumonia

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Case Presentation: A 59-year-old African American female with human immunodeficiency virus (HIV) on highly active antiretroviral therapy (CD4 count 278), hepatitis C, chronic obstructive pulmonary disease, and coronary artery disease with a drug-eluting stent in the right coronary artery presented with a productive cough, dyspnea, and fever for 3 days. She had a leukocytosis of 19.1×10^3/L and a chest x-ray showing opacification in the right midlung zone, concerning for pneumonia. She was treated with ceftriaxone and azithromycin but deteriorated 3 days later, becoming altered and hypoxic and requiring intubation. Computed tomography (CT) scan revealed dense consolidative changes involving the right middle lobe and areas of the right upper lobe concerning for pneumonia, with central areas of hypodensity representing developing necrosis. Bronchoscopy showed abundant purulent secretions and inflamed mucosa. Antibiotics were escalated to vancomycin/Zosyn/Bactrim. She continued to deteriorate, requiring pressor support, and had worsening gas exchange. Serial chest x-rays were suggestive of acute respiratory distress syndrome superimposed on the right necrotizing pneumonia. Antibiotics were revised, replacing Zosyn with meropenem. Repeat bronchoscopy only showed minimal secretions. *Legionella* culture from the initial bronchoalveolar lavage resulted nearly 1 month later and was positive for *Legionella micdadei*. Levofloxacin was started, to complete 4 weeks of therapy. Despite this treatment, the patient had a protracted ICU course complicated by coagulase-negative *Staphylococcus* bacteremia and candiduria. She required a short stint of epoprostenol infusion and eventually required tracheostomy with a prolonged ventilator wean. Repeat CT scan 3 months later revealed persistence of the right cavitary lesion, but with reduction in size and improvement of the consolidative process.

Discussion: *Legionella micdadei* is the second most common cause of legionellosis, accounting for 8% of cases. It causes pneumonia principally in immunosuppressed patients, with about 10% cavitating. Diagnosis is difficult because the organism stains only weakly Gram negative, requires special culture media, and is not detectable with some direct fluorescent antibody tests that are directed only at *Legionella pneumophila*. Furthermore, because it can stain acid fast, it may be confused with mycobacteria.

Conclusion: Patients diagnosed with HIV are often infected by more than one pathogen at a time; therefore, lack of response to therapy for one organism must trigger a search for additional pathogens. Culture using buffered charcoal yeast extract media remains the most sensitive and specific test for Legionnaires' disease, but acute and convalescent antibody titers can also be useful to confirm the diagnosis.

26 Immune Thrombocytopenic Purpura—Truly a Diagnosis of Exclusion

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Case Presentation: A 69-year-old white male with a history of type 2 diabetes mellitus presented with generalized abdominal pain, hematemesis, melena, hematochezia, and rash for 2 days. He had been camping at Lake George 1 month prior but denied noticing any bites. He admitted to occasional cocaine use, frequent alcohol consumption with occasional binges, and ingestion of moonshine 2 days prior. He was altered, hypothermic, and actively hemorrhaging from the eyes and external urethral meatus. A petechial rash was noted over his lower limbs. He had diffuse abdominal tenderness but no organomegaly. Laboratory workup revealed isolated thrombocytopenia: hemoglobin 11.0 g/dL, white cell blood count $5.8 \times 10^3/mm^3$, and platelets $6 \times 10^3/mm^3$. Prothrombin time and international normalized ratio were mildly elevated, but partial thromboplastin time, fibrinogen, d-dimer, bilirubin, and haptoglobin were normal. Lactate dehydrogenase was mildly elevated. Blood film was negative for schistocytes. Reticulocyte count was 1.5%, and immature platelet fraction was 10.2%. Blood urea nitrogen and creatinine were elevated with a ratio <20, but no baseline was available for comparison. The patient had lactic acidosis with wide anion and osmolar gaps. Toxicology was positive only for opiates. Ultrasound was negative for hepatosplenomegaly. Serology was positive for antinuclear antibodies (1:180, speckled pattern) and perinuclear neutrophil antibodies. Hepatitis panel and human immunodeficiency virus screening were negative. Bone marrow biopsy was not performed. He received a partial massive transfusion: 2 units packed red blood cells, 7 units fresh frozen plasma, 4 units platelets, and 1 dose DDAVP (desmopressin). Empiric antibiotic coverage was commenced with vancomycin/ceftriaxone/acyclovir. He underwent initial plasmapheresis and then dialysis. Platelet counts initially improved to $23 \times 10^3/mm^3$ but dropped to $13 \times 10^3/mm^3$. A one-time dose of methylprednisolone prompted a response, an increase to $77 \times 10^3/mm^3$, but platelet counts began plummeting again when no subsequent doses were given and reached a nadir of $14 \times 10^3/mm^3$. Platelets were again transfused, but high-dose methylprednisolone and intravenous immunoglobulin were commenced at scheduled doses to complete 3 days of therapy. He was subsequently transitioned to oral prednisone, achieving a sustained increase in platelet count to $115 \times 10^3/mm^3$ on discharge.

Discussion: Immune thrombocytopenic purpura (ITP) is characterized by an isolated thrombocytopenia of $<100 \times 10^9/L$ after exclusion of other causes for a low platelet count. Primary disease arises in the absence of other causes, whereas secondary ITP occurs as a result of an offending infection, agent, or disease.

Conclusion: For any given state, platelet metabolism is directly influenced by the equilibrium between platelet production in the bone marrow and peripheral platelet destruction/sequestration. Furthermore, management of the underlying etiology will prompt an improvement of thrombocytopenia.

27 Dyspnea on Exertion in an Otherwise Healthy Male

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Case Presentation: A 49-year-old African American male presented with worsening dyspnea on exertion (DOE) for the past year. He previously enjoyed an active lifestyle playing golf and basketball. His DOE limited daily activities but resolved with rest. He had no pertinent medical history and took no medications. The patient's vital signs and cardiopulmonary examination were normal. His prior workup included normal computed tomography chest and pulmonary function tests. Cardiopulmonary exercise testing revealed a high heart rate reserve but paradoxical bradycardia with a heart rate of approximately 40 bpm with increasing workload. His electrocardiogram (ECG) showed a 3:1 Mobitz type II heart block at peak activity with resolution at rest to a baseline normal sinus rhythm of 60 bpm with right bundle branch block. Cardiac magnetic resonance imaging demonstrated global hypokinesis of the left ventricle with an ejection fraction of 41% and no infiltrative process. A dual chamber pacemaker was implanted, resulting in immediate improvement of the patient's symptoms.

Discussion: Most patients with dyspnea can be categorized into either a cardiac- or respiratory system-related cause. Exercise-induced atrioventricular (AV) block is rare in patients who exhibit normal AV conduction at rest (0.45%). Two mechanisms have been proposed. First, normal conduction velocity increases through vagolysis, and the refractory period decreases at the AV node. However, because the His-Purkinje system is not influenced by the autonomic nervous system, the refractory period is not significantly decreased. This difference in refractoriness between the AV node and the His-Purkinje system can induce conduction disturbances. Most cases are induced through this mechanism and show tachycardia-dependent blocks because of disease of the His-Purkinje system. Second, blocks can be induced by AV nodal ischemia. Such patients may experience chest pain during exercise testing and may show ischemic changes on ECGs and atherosclerotic lesions on coronary angiograms. If, second-degree AV block is precipitated during physiologic sinus tachycardia, then the refractory period of the relevant conducting system is not under vagal influence, and the block is likely infranodal (ie, in the bundle of His proper). A lesion in the AV node giving rise to first- and second-degree AV block would be expected to retain sufficient vagal potential to shorten with vagolytic influence.

Conclusion: Our case illustrates the utility of cardiopulmonary exercise testing in patients whose etiology of dyspnea is unclear after initial evaluation. Determination of the underlying cause of this patient's dyspnea led to prompt and effective treatment.

28 Pulmonary Tuberculosis in a Human Immunodeficiency Virus-Negative Patient with Sickle Cell Trait

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Case Presentation: A 27-year-old female with a medical history of preeclampsia and hypertension presented with a cough lasting 2 weeks. The cough was productive of thick, yellow sputum but negative for hemoptysis. Her positive constitutional symptoms included malaise, headache, and an equivocal 5-lb weight loss, but she denied fever, chills, and night sweats. She also had a 5 pack-year history of cigarette smoking and frequently abused cocaine. She denied any other drug use, including via intravenous routes. Besides living in a homeless shelter several years earlier, she had no other known tuberculosis (TB) exposures and was never in jail. She tested negative for TB in 2009 and negative for human immunodeficiency virus (HIV) in 2012. Chest x-ray revealed a cavitary lesion in the left lower lobe. Computed tomography (CT) of the chest without contrast confirmed the cavitary lesion in the superior segment of the left lower lobe with a largest dimension of 6.7 cm. It also showed additional satellite lesions within the lung apices bilaterally and evidence of possible partially calcified hilar and subcarinal lymphadenopathy. Sputum smear revealed 4+ acid-fast bacilli, and polymerase chain reaction was positive for *Mycobacterium tuberculosis* complex. A repeat HIV test was negative. She was administered 4-drug TB therapy with rifampin, isoniazid, pyrazinamide, and ethambutol, plus vitamin B6. Coincidentally, she was also found to have microcytic anemia, and iron studies were consistent with iron-deficiency anemia. Follow-up hemoglobin electrophoresis was positive for sickle cell trait, and she was administered Venofer while an inpatient and discharged on oral ferrous sulfate.

Discussion: The radiologic findings of pulmonary TB differ between HIV-seropositive and HIV-seronegative patients because of the poor cellular immunity in HIV-infected patients. These findings may not be restricted to the HIV population only but may also encompass individuals who have a compromised cellular immunity for any reason. Cavitary formation is observed in immunocompetent patients, indicating cell-mediated immunity is intact. However, cavitary lesions in the mid and lower lung zones are more typical in HIV-negative patients because of poor cellular immunity. The CT finding in our case could have been influenced by the sickle cell trait. For the immunocompetent patient, cavitary lesions usually predominate in the upper lobes upon reactivation, but for immunocompromised patients there is a predilection for primary disease in the mid and lower zones.

Conclusion: HIV is the most common cause of immunodeficiency predisposing to this typical presentation. Given our patient's generally good state of health, the only factor that may account for her immunodeficiency and presentation is her sickle cell trait.

29 A Rare Case of *Nocardia-Mycobacterium avium* Complex Coinfection in a Patient with Malignancy

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Case Presentation: A 34-year-old male prison inmate who had been diagnosed with brain astrocytoma 3 months before, status post neurosurgical resection and local radiotherapy on a high dose of steroids, was admitted to the hospital because of complaint of cough, hemoptysis, and fever. Prior to admission, the patient started to have a cough that was associated with progressive shortness of breath and minimal chest pain; he also had hemoptysis approximately 20 mL that caused him to report to the emergency department. At the physical examination, he appeared cachectic but in no apparent respiratory distress. His oxygen saturation was 94% on room air, respiratory rate was 20 breaths per minute, blood pressure was 115/80 mmHg, heart rate was 90 bpm, and temperature was 38.2°C. He had no palpable lymphadenopathy; auscultation of the lungs revealed crackles and decreased air entry at the bases. The remainder of the physical examination was unremarkable. Comprehensive blood counts and basic metabolic panel were within normal limits, and human immunodeficiency virus serology test was negative. Chest radiography showed multiple cavitary lesions throughout the lungs with overlying consolidative changes, and subsequent computed tomography of the chest revealed multiple cavitary lesions and innumerable tree-in-bud opacities in addition to left pleural effusion. Bronchoalveolar lavage was done, and the transbronchial biopsy showed rod and filamentous-like bacteria. Two weeks later, sputum culture was positive for aerobic actinomycetes and acid-fast bacilli, identified as *Nocardia veterana* and *Mycobacterium avium* complex. Combination antibiotic therapy with intravenous amikacin, trimethoprim-sulfamethoxazole, meropenem, ciprofloxacin, and metronidazole was started with a goal to continue the treatment for 1 year.

Discussion: Cellular immunosuppression caused by long-term treatment with steroids and malignancies constitutes an important predisposing factor for *Nocardia* infections. Between the coinfections that these patients experience, nontuberculous *Mycobacterium* species are of special interest. Data suggest a unique association between the occurrence of nocardiosis and the subsequent development of nontuberculous mycobacteriosis, although this phenomenon may represent a chance occurrence in a population predisposed to infectious complications. There are 3 possible explanations for this coinfection: simultaneous infection by both organisms with variable clinical expression of disease; mutational or recombinant event; and induction of a state of immune tolerance, possibly via an antigen-specific mechanism. However, the exact pathogenesis of the coinfection is still unknown.

Conclusion: The possibility of concomitant infections in immunocompromised patients, as reported in this case, highlights the importance of testing for opportunistic organisms such as *Nocardia* and nontuberculous *Mycobacterium* even when the clinical presentation and radiologic features are nonspecific. Early diagnosis facilitates early treatment.

30 A Commonly Used Medication with a Rare Side Effect

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Case Presentation: A 49-year-old man presented to the emergency department with the complaint of 2 days of abdominal pain without significant nausea, vomiting, diarrhea, or constipation. He had been started on doxycycline 100 mg twice daily for tooth infection 5 days prior. His physical examination showed abdominal distention and epigastric tenderness without guarding. Medical history included seizures and chronic obstructive pulmonary disease. Home medications were pantoprazole, phenobarbital, and Tegretol. Laboratory tests were significant for mild leukocytosis, hemoglobin of 11, and hematocrit of 34; metabolic profile showed normal aspartate transaminase, alanine transaminase, alkaline phosphatase, amylase, lipase, and lipid profile. Abdominal ultrasound did not show gallstones, but computed tomography of the abdomen with contrast showed pancreatitis with peripancreatic fluid. Doxycycline was discontinued, and the patient was started on intravenous fluids, pain control, and tube feedings. The patient's symptoms improved significantly, and he was able to tolerate oral feedings. He was discharged after an uncomplicated course and was told not to take doxycycline again.

Discussion: Drug-induced pancreatitis represents 1.4% of all causes of acute pancreatitis. Diagnostic criteria include the following: pancreatitis develops during drug therapy, other possible causes of pancreatitis are eliminated, pancreatitis resolves after discontinuing the suspected drug, and pancreatitis recurs after reusing the same drug. Drug-induced pancreatitis is classified as definite, highly probable, or weakly probable in correlation with the mentioned criteria. Our patient developed acute pancreatitis 3 days after the administration of doxycycline, and the pancreatitis resolved 3 days after discontinuation of the drug. All other possible factors such as alcohol use, gallstones, hypercalcemia, hyperlipidemia, and malignancy were eliminated by physical examination, blood tests, and imaging studies. Adverse effects of doxycycline include elevation of liver and renal function tests, nausea, vomiting, and dysphagia. Doxycycline is part of the tetracycline group of antibiotics that is linked to few cases of acute pancreatitis. Suggested theories include intrinsic toxins vs idiosyncratic reactions.

Conclusion: Our patient most likely suffered from acute pancreatitis due to doxycycline because the other causes of pancreatitis were eliminated. This adverse effect is not well known and is probably quite rare. Physicians should consider acute pancreatitis in patients who develop nausea, vomiting, and epigastric pain when taking doxycycline, a drug commonly used inside and outside hospitals. If doxycycline is suspected as the causative agent, it should be discontinued, and readministration should be avoided.

31 An Unusual Presentation of Tuberculosis

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Case Presentation: A 24-year-old homosexual Filipino male with a medical history of asthma presented with a 6-week history of nonproductive cough, fevers, shortness of breath, and a 30-lb unintentional weight loss. His symptoms worsened despite the use of rescue inhalers and 2 full courses of antibiotics. He was thin and had fever and profound tachycardia. On physical examination, he had palpable bilateral axillary lymph nodes. Laboratory testing only showed hyponatremia. Chest x-ray showed a right paratracheal mass. The latter was confirmed by computed tomography (CT) scan of the chest that revealed a large hypodense anterior mediastinal mass measuring 6.3 cm $\times$ 5 cm $\times$ 5.8 cm, a large axillary lymph node measuring 3 cm $\times$ 2.4 cm, and multiple enlarged prevascular lymph nodes. The mediastinal mass demonstrated significant narrowing of the superior vena cava and almost occlusion of the left brachiocephalic vein. The mass was also described to likely have some central necrosis. The CT scan also revealed lymph nodes highly suspicious of a neoplastic process. The patient underwent an endobronchial ultrasound-guided transbronchial needle aspiration of the right lower paratracheal and subcarinal lymph nodes. Cytology revealed granulomatous inflammation and acid-fast bacilli. His *Mycobacterium tuberculosis* polymerase chain reaction test was positive. The diagnosis of tuberculosis (TB) was made, and the patient began therapy. He was concurrently diagnosed with acquired immunodeficiency syndrome with a CD4 count of 77.

Discussion: Mediastinal and lung masses are commonly seen in practice. Prompt investigation is warranted when a mass is discovered. Pathogenesis can vary from benign to highly malignant. Given our patient's age group, symptoms, and CT findings, lymphoma was initially our primary differential diagnosis. Although rare, TB can present as a mediastinal mass and usually presents as lymphadenitis or mediastinitis. What makes this case particularly interesting and unique is the significant narrowing of the superior vena cava. In the preantibiotic era, infections such as aspergillosis, histoplasma, or TB were a frequent cause of superior vena cava obstruction. In the postantibiotic era, however, malignancy is the most common cause for superior vena cava obstruction, with 95% of them because of lung cancer or non-Hodgkin lymphoma. Although our patient did not have superior vena cava syndrome, he had significant narrowing of his superior vena cava and almost occlusion of the brachiocephalic vein. He had multiple collateral vessels to compensate for the obstruction that was observed on CT imaging. The obstruction was not considered a medical emergency.

Conclusion: This case emphasizes the importance of including TB in the differential diagnosis of mediastinal masses. Although rare, TB can present as a large mediastinal mass with adjacent lymphadenopathy, especially in immunocompromised patients, and further investigation must be pursued immediately to prevent the spread of multidrug-resistant TB.

32 A Case of Symptomatic Kommerell Diverticulum

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Case Presentation: A 30-year-old African American male with no significant medical history presented to the emergency room (ER) with acute onset left-sided chest pain. The pain was pressure-like in nature, nonradiating, and 10/10 in severity; started while the patient was watching TV; and was not relieved with nitroglycerin in the ER. There was no aggravating or relieving factor. The pain lasted about 10-20 minutes and was associated with nausea, vomiting, and diaphoresis. The patient reported having heartburn for the past few months, but it was completely different in nature compared to the chest pain that brought him to the ER. Otherwise, the patient denied any history of cough, fever, or upper respiratory symptoms. Physical examination was unimpressive. Laboratory work was unimpressive. Chest x-ray was unremarkable. Electrocardiogram (ECG) showed anterior and lateral changes that were thought to be because of early repolarization. Changes were persistent on subsequent serial ECGs. Echocardiography revealed an ejection fraction of 50%-60% with moderate left ventricular hypertrophy and right ventricular systolic pressure of 36.2 mmHg. A computed tomography scan of the chest and abdomen revealed right-sided aortic arch with an aberrant left subclavian artery and an associated Kommerell diverticulum that coursed posterior to and compressed the esophagus. Chest pain resolved after admission. The patient had no risk factors or a family history of coronary artery disease. With a very low thrombolysis in myocardial infarction score, stress testing was not done. The chest pain and reflux were thought to be compression symptoms secondary to Kommerell diverticulum (radiological diagnosis). In light of a symptomatic congenital heart disease with significant risk of rupture, the patient was referred to an adult congenital heart disease clinic for repair. We are following the patient's case, and we will report further testing and interventions as they happen.

Discussion: Symptomatic Kommerell diverticulum is usually rare except when associated with aneurysmal dilation, atherosclerotic changes, or dissection, all of which usually happen in adulthood. Compression of the esophagus or trachea can cause dysphagia or dyspnea. It can also present with stridor, wheeze, cough, choking spells, recurrent pneumonia, obstructive emphysema, or chest pain secondary to compression of the surrounding structures. Aneurysms of Kommerell diverticulum are at significant risk of rupture whether they are symptomatic or not and regardless of the size of the aneurysm. Mortality has been recorded with rupture. Early diagnosis and surgical intervention decrease the mortality rate of such a rare anomaly.

Conclusion: Kommerell diverticulum is a rare congenital finding that can be found in a number of aortic arch system anomalies. One of these anomalies is right-sided aortic arch with an aberrant left subclavian artery. Kommerell diverticulum is found in 1% of the population and is more common in men than women.

33 Thrombotic Thrombocytopenic Purpura Secondary to Induced Abortion: A First Case Report

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Case Presentation: A 22-year-old African American female with a significant medical history of thrombotic thrombocytopenic purpura (TTP) and recent elective pregnancy termination (10 weeks) was admitted to our hospital with a complaint of headache and confusion. She was found to have severe thrombocytopenia (<15,000) and hematemesis. Her medical history was significant for TTP 1 year prior associated with similar pregnancy termination. Her physical examination was unremarkable, and her vital signs were stable. Vaginal ultrasound showed an empty normal-sized uterus. A peripheral smear showed schistocytes, and blood work revealed normal fibrinogen with elevated lactate dehydrogenase and low haptoglobin. A presumptive diagnosis of TTP was made, and emergent plasma exchange was employed. ADAMTS13 activity level confirmed the diagnosis with a low activity level (<10%). The patient was successfully treated with plasmapheresis and was discharged home in a stable condition.

Discussion: TTP is extremely rare, but pregnancy is a recognized risk for precipitating acute episodes of TTP. The prompt diagnosis of this disease is important because TTP in pregnancy carries a 90% mortality rate. TTP is not a known complication of induced abortion. We found only one reported case of TTP in early molar pregnancy after induced abortion and another case associated with mifepristone use. Occasionally, pregnant women have shown rapid clinical improvement after delivery or termination of pregnancy. Postpartum TTP has been described as well. Uterine evacuation has been described as a modality of treatment when plasma exchange and all other measures fail to show improvement. Patients with TTP should be treated with plasma exchange as nonpregnant patients are. Delivery is advised only for those who do not show any response to therapeutic plasma exchange. Plasma exchange should be continued even after normalization of platelet count and resolution of hemolysis is documented.

Conclusion: Little is known about recurrent TTP following induced abortion. We report the first case of recurrent TTP from induced abortion after successful dilatation and curettage in an otherwise healthy young individual. In our patient, it appears that uterine evacuation rather than pregnancy itself triggered a TTP attack. This is the first case of such association documented in the literature. As such, this case puts in question the benefit of pregnancy termination as a treatment option for TTP during pregnancy.

34 A Rare Case of Type IV Diffuse Proliferative Lupus Nephritis in a Patient with Human Immunodeficiency Virus Infection with Few Systemic Lupus Erythematosus Flares

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Case Presentation: A 27-year-old African American male with a 10-year history of human immunodeficiency virus (HIV) infection, CD4 count of 454 on antiretroviral drugs (ARVs), and bullous systemic lupus erythematosus (SLE) diagnosed 2 years ago, presented to our clinic after 3 weeks of lower extremity and abdominal swelling that had progressively worsened. He noticed that his urine had become more frothy in the past month. He reported compliance with his ARVs and was on prednisone for his cutaneous lupus that was quite controlled. During presentation, the patient's blood pressure was 147/101 mmHg, and his other vitals were within normal limits. Findings during clinical examination were alopecia; hand joint tenderness; pitting pedal edema up to the knee; moderate abdominal distension; diffuse petechial lesions in all body parts; diffuse, tense, nontender bullae; well-healed, well-defined hyperpigmented annular patches with central clearing involving both upper and lower extremities, chest, and back; and some chronic scarring. Laboratory findings were elevated creatinine, low serum C3 and C4, low serum protein and albumin, normocytic anemia, and thrombocytopenia. His urinalysis showed marked proteinuria, hemoglobinuria, and granular and hyaline casts. He had an elevated urine protein/creatinine ratio. Renal ultrasound showed slight echogenic kidneys suggestive of medical renal disease. Renal biopsy showed type IV diffuse proliferative lupus nephritis, so the patient was diagnosed with SLE nephritis with flares. The patient was immediately administered induction therapy, Cytoxan, and intravenous methylprednisolone, the first of 6 cycles. He started improving with resolving edema and increasing complement, a reducing urine protein/creatinine ratio, and a reducing creatinine. He was discharged 8 days postadmission to follow-up in the renal clinic and complete therapy.

Discussion: The coexistence HIV infection and SLE is extremely uncommon, and the occurrence of SLE after HIV infection is even less common. Our patient had HIV diagnosed 10 years prior, and he was subsequently diagnosed with SLE. He was on medication and had few flares of SLE since being diagnosed 2 years ago. However, he progressed to Type IV diffuse proliferative lupus nephritis despite being on medication for SLE.

Conclusion: Patients with HIV should be monitored as they may still have a severe form of nephritis despite being on treatment and having few flares of disease.

35 A Rare Case of Thyroid Storm with Multiorgan Failure Including Fulminant Hepatic Failure

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Case Presentation: A 32-year-old African American male with a history of hypertension who had been diagnosed with Graves disease in 2006 but was noncompliant with medications presented to our emergency department complaining of progressive bilateral pedal swelling, scrotal swelling with associated heat intolerance, and significant weight loss. During presentation, he was tachycardic in the 190s, tachypneic with elevated blood pressure, and saturating at 100% in room air. He had altered mental status and was admitted to the ICU. The patient was diaphoretic, agitated, and in acute distress. He opened his eyes to his name but did not follow commands. He was icteric, and his thyroid was normal in size without any masses or nodules. His heart had a rapid rate and an irregularly irregular rhythm but no murmurs or gallops. The patient had marked edema in both legs, his abdomen, and his scrotum. The patient was in atrial fibrillation with a rapid ventricular rate, and ultrasound showed reduced heart contractility. Chest x-ray showed small left pleural effusion with cardiomegaly. He had elevated brain natriuretic peptide and troponin, thyroid stimulating hormone was 0.090, triiodothyronine was 657.7, and thyroxine was 5.50. Thyroid stimulating immunoglobulin was sent to an outside laboratory. Lactic acid was elevated, creatinine was elevated with anuria, renal ultrasound scan was normal, and elevated transaminases were found. The patient had a score of 95 on the Burch and Wartofsky scoring system, indicating thyroid storm. Atrial fibrillation, tachycardia, encephalopathy, congestive heart failure, non-ST segment elevation myocardial infarction, acute kidney injury, and fulminant hepatic failure (FHF) were being managed for thyroid storm with multiorgan dysfunction. The patient was treated with propranolol, methimazole, saturated solution of potassium iodide, and hydrocortisone. He was also given amiodarone. He continued to deteriorate with markedly elevated liver enzymes and became hypotensive, with worsening mental status. He was intubated and started on continuous renal replacement therapy to improve renal function. He continued to be more hypotensive, requiring 4 pressors before thyroidectomy and orthotopic liver transplantation could be planned. His family asked to withdraw care, and the patient died.

Discussion: Thyroid storm is a rare and potentially fatal condition that usually occurs with exaggerated symptoms of hyperthyroidism and has a mortality rate of 20%-30%. Many unusual presentations in patients with thyroid storm have been described, but the incidence of multiorgan dysfunction is rare, especially with FHF. Our patient had thyroid storm and atrial fibrillation with rapid ventricular response. He was stuporous and icteric with significant edema. His condition was complicated by acute liver failure, acute kidney injury, lactic acidosis, and heart failure. The multiorgan dysfunction was irreversible by prompt starting of antithyroid drugs and supportive management in the ICU. The patient, however, continued to deteriorate, and care was withdrawn per his family's wishes before other options for management were implemented.

Conclusion: We report a rare case of multiorgan failure including FHF in a patient with a history of Graves disease who presented with thyroid storm.

36 Decompensated Cor Pulmonale in a Sjögren Patient with Pulmonary Hypertension and Interstitial Lung Disease

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Case Presentation: A 45-year-old African American female with a history of Sjögren syndrome, interstitial lung disease, pulmonary hypertension, and cor pulmonale presented with abdominal swelling for 1 month and worsening shortness of breath for 1 week. At home, she was on 3 L O_2 and used bilevel positive airway pressure while sleeping. She had progressive shortness of breath, wheezing, paroxysmal nocturnal dyspnea, and orthopnea. She denied cough, chest pain, fevers, chills, weight changes, and early satiety. She had sicca symptoms of xerostomia and xerophthalmia consistent with Sjögren syndrome. Home medications included prednisone, azathioprine, budesonide-formoterol, albuterol, and ipratropium. Cardiovascular examination revealed a III/VI holosystolic murmur loudest at the left upper sternal border, parasternal heave, jugular venous pressure 12 cm (big v waves), positive hepatojugular reflex, and 1+ lower extremity edema. Pulmonary examination revealed dry crackles in the lower 2/3 of the lungs bilaterally and diffuse wheezes. Abdominal examination showed distention with shifting dullness. Pertinent laboratory results included white blood cell count 3.7 kg/μL, blood urea nitrogen 20 mg/dL, creatinine 1.2 mg/dL, brain natriuretic peptide 1,356 pg/mL, anti-Ro/SSA 756 AU/mL, and anti-La/SSB 196 AU/mL. Chest x-ray showed enlarged cardiac silhouette, patchy airspace densities suggesting pulmonary edema, and small bilateral effusions. Electrocardiogram showed right axis deviation, right ventricular hypertrophy, and right atrial abnormality. Cardiopulmonary diagnostic considerations included worsening right heart failure because of the progression of interstitial lung disease, chronic pulmonary emboli, and volume overload because of right heart disease and diastolic dysfunction or worsening tricuspid regurgitation. The enlarged cardiac silhouette could have meant left ventricular failure or pericardial effusion. No pulmonary emboli were seen on computed tomography pulmonary embolus study. Echocardiogram was consistent with cor pulmonale with dilated right ventricle and atrium leading to severely reduced right ventricular systolic function. She had severe tricuspid regurgitation and paradoxical septal motion but normal left ventricular diastolic function and left ventricular ejection fraction >70%. A moderate sized pericardial effusion was present.

Discussion: This patient's symptoms were likely secondary to decompensated cor pulmonale. This case highlights the various cardiopulmonary complications of Sjögren syndrome and demonstrates how cor pulmonale can lead to an overloaded volume state. Extraglandular manifestations of Sjögren syndrome occur in 40%-50% of patients and happen because of lymphocytic infiltration of epithelial tissues, most commonly involving the lungs. Pulmonary manifestations include interstitial lung disease, airway disease, lymphoma, amyloidosis, and vascular disease. As of 2007, only 41 cases of pulmonary hypertension had been reported in patients with Sjögren syndrome. However, a study in 2014 found an incidence of 23.4% of pulmonary hypertension using Doppler echocardiography.

Conclusion: It is important to consider extraglandular manifestations of Sjögren syndrome and how they affect the pathophysiology of heart disease in these patients. Careful diagnostic workup is necessary to distinguish the etiology of cardiopulmonary findings and guide the treatment approach.

37 A Rare Case of Parvovirus-Induced Aplastic Crisis in Hereditary Pyropoikilocytosis: The Importance of Avoiding Endoscopic Tunnel Vision when Evaluating Acute Symptomatic Anemia

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Case Presentation: An 18-year-old female with sickle cell trait, menorrhagia, and iron deficiency anemia was sent to the emergency room from the gynecology clinic, where she was found to have hemoglobin (Hgb) of 4.5 after complaining of fatigue. She reported abdominal pain and recent dark stools. Laboratory tests drawn on admission showed pancytopenia with Hgb 5.0 g/dL, white blood cell count of 2.0 K/mcL, platelets of 89 K/mcL, reticulocytes of 1.4%, and serum iron of 35 with saturation of 15%. Peripheral smear was reviewed by the admitting resident, who noted hypochromic cells and bite cells but no schistocytes or sickle cells. Physical examination was significant only for left upper quadrant abdominal tenderness. Vaginal examination did not show evidence of bleeding; rectal examination showed scant red blood. Because the report of abdominal pain and dark stool raised concern for brisk gastrointestinal bleeding, the patient received an upper and lower endoscopy, significant only for external hemorrhoids. This result prompted further workup for other causes of anemia and pancytopenia, with serum lactate dehydrogenase found to be 6,379 IU/L and haptoglobin undetectable, suggestive of profound hemolysis. Additionally, a parvovirus B19 polymerase chain reaction was positive. The hematology service was consulted. Review of the peripheral smear from admission revealed bizarre red blood cells (RBCs), anisocytosis, poikilocytosis, rare elliptocytes, and fragmented RBCs read as consistent with hereditary pyropoikilocytosis (HPP). Thus, the patient appeared to have a membrane defect with an aplastic and hemolytic crisis triggered by parvovirus infection. The patient experienced resolution of her fatigue and abdominal pain after transfusion and was discharged in good condition.

Discussion: In addition to highlighting a unique pathology, our case illustrates the importance to the hospitalist of being able to interpret a peripheral smear well enough to know when to seek expert consultation. It also showcases the need to pay attention to details (eg, the existence of pancytopenia) that suggest against the primary differential diagnosis. HPP is a rare but severe form of hereditary hemolytic anemia characterized by a defect in spectrin, a protein of the RBC membrane. It may remain occult until another stressor, such as parvovirus infection, triggers a hemolytic event. Parvovirus-induced aplastic crisis, although classically associated with sickle cell anemia and hereditary spherocytosis, can occur in any condition associated with hemolytic anemia. Although HPP is rare and familiarity with it is likely reserved to hematologists, the RBC morphology is markedly abnormal.

Conclusion: Beyond recognizing schistocytes, sickle cells, and hypochromia on a peripheral smear, the hospitalist should be able to discern RBC morphology that may suggest structural defects and signs that would warrant review of the slide by hematology. For our patient, the erroneous initial peripheral slide review and failure to investigate other differential diagnoses led to unnecessary endoscopy.

38 Should We Page the Plumber or the Electrician?

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Case Presentation: An 85-year-old female with a history of Parkinson disease complicated by orthostatic hypotension on fludrocortisone, stage III chronic kidney disease, and hiatal hernia presented to the emergency department with intermittent abdominal pain and 4-5 episodes of nonbloody emesis. Her last bowel movement was the previous day. She had been admitted 2 weeks prior with a urinary tract infection, hypokalemia, and elevated troponin of 0.05 ng/mL. She underwent an echocardiogram and cardiac positron emission tomography scan revealing a 27% mostly fixed defect. She was started on aspirin and pindolol in addition to continuing carbidopa-levodopa, cholecalciferol, citalopram, and pantoprazole. At her current presentation, an abdominal and pelvic computed tomography scan demonstrated multiple prominent fluid-filled bowel loops without definite obstruction, diagnosed as an ileus. She was admitted for observation, and her troponin level was 0.07 ng/mL. Electrocardiogram (ECG) showed ST depression anteriorly with inferolateral T wave inversions. A repeat troponin level was 15.9 ng/mL, but the patient did not exhibit any cardiopulmonary symptoms. A repeat ECG demonstrated resolving ST depression and T wave inversions in leads I, aVL, and V3-V6. The patient was started on intravenous heparin, and cardiology was consulted. She was diagnosed with a non-ST elevation myocardial infarction (nSTEMI) and started on clopidogrel. Her serum troponin level peaked at 50 ng/mL, but repeat ECG and echocardiogram findings were unchanged. The ileus resolved with supportive care, but she developed acute pulmonary edema that was treated with morphine, sublingual nitrate, and intravenous furosemide. Once stabilized, the patient was discharged to subacute rehabilitation.

Discussion: Acute coronary syndrome (ACS) refers to the clinical manifestations of atherosclerotic plaque rupture and coronary artery occlusion. The term generally alludes to unstable angina, nSTEMI, and ST elevation myocardial infarction (STEMI). The distinction between unstable angina and nSTEMI is solely based upon cardiac enzyme elevation. Typical patient presentation includes chest pain after minimal exertion, with the pain lasting longer than a few minutes and not improving with medication or rest. However, the elderly may not always present with these classic signs and symptoms. They may not have any ischemia-induced pain, or it may localize to an atypical location, such as the abdomen. Therefore, our patient's ileus likely represented her atypical presentation of ACS. Regardless of the type of presentation, aggressive medical management for ACS includes aspirin, clopidogrel, heparin, and nitrates, all of which were administered to our patient.

Conclusion: Although there is an evidence-based algorithm for diagnosing and managing ACS, an elderly female suffering from unstable angina, nSTEMI, or STEMI may not present with the typical signs and symptoms of chest pain. Therefore, a high index of suspicion is required to diagnose ACS in the elderly, with clinicians needing to remember atypical signs and symptoms such as abdominal pain. Otherwise, an atypical presentation may delay the diagnosis and treatment of elderly patients with ACS, resulting in increased morbidity and mortality in this population.

39 Fool Me Twice: A Case of Recurrent Bacterial Meningitis due to a Spontaneous CSF Leak

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Case Presentation: A 60-year-old African American female presented to the emergency department with fever and altered mental status. Three months earlier, she had been hospitalized with bacterial meningitis because of *Streptococcus pneumoniae* and treated appropriately. Initial vital signs were temperature 37.5°C, blood pressure 184/77 mmHg, pulse 82 bpm, respiration 20 breaths per minute, and O_2 saturation 91%. Physical examination was notable for a lethargic female oriented to self only, neck pain with flexion, and absence of skin rashes. Initial laboratory work was notable for a white blood cell count (WBC) 26.2×10^9/L with 90% neutrophils. A computed tomography scan of the brain without contrast noted opacification of the left sphenoid sinus but no acute intracranial process. A lumbar puncture revealed 1,958 nucleated cells with 86% neutrophils, low glucose of 62 mg/dL, and elevated protein >600 mg/dL. Cerebrospinal fluid (CSF) gram stain had 4+ WBC but no organisms, and CSF culture was negative. She was treated for recurrent bacterial meningitis with ceftriaxone 2 g every 12 hours and dexamethasone 10 mg every 6 hours. Once her mental status improved, she reported a history of chronic clear rhinorrhea, and a sample tested positive for beta-2 transferrin, which has high specificity for CSF. The ear, nose, and throat department was consulted and performed nasal endoscopy that revealed a CSF leak from the left sphenoid ostium. One month later, the patient underwent successful endoscopic repair of the CSF leak. She was last seen in follow-up 2 months following the procedure and reported feeling well with resolution of her rhinorrhea.

Discussion: Recurrent meningitis is uncommon and warrants investigation for an underlying cause. Spontaneous CSF leaks are much less common than secondary leaks (traumatic, iatrogenic), accounting for 3%-4% of cases, and are often found in the setting of elevated intracranial pressure (ICP). The most commonly cited cause of CSF leak from elevated ICP is thought to be a variant of idiopathic intracranial hypertension (IIH), as there is considerable overlap in the demographic, clinical, and radiographic characteristics of patients with spontaneous CSF leaks and IIH. The first-line method for detection, if available, is the beta-2 transferrin assay. It is noninvasive, low cost, and has high sensitivity and specificity (94%-100% and 98-100%, respectively). Endoscopic repair is the gold standard for treatment, although spontaneous CSF leaks have a much higher recurrence rate following repair (25%-87%) than secondary leaks (10%). Recent evidence supports reduction of CSF pressure as a significant adjuvant treatment in this patient population that links back to the relationship with IIH. While CSF leaks are rare, the consequences of leaving one untreated can be grave, with a risk of meningitis as high as 20% in patients with persistent CSF rhinorrhea and a risk of mortality as high as 10%.

Conclusion: Spontaneous CSF leaks are rare, but the complications can be grave if left untreated. Clear rhinorrhea should raise suspicion for an underlying CSF leak, and IIH should be considered as an etiology if no secondary causes exist.

40 Poststreptococcal Glomerulonephritis in an Adult—A New Presentation of an Uncommon Illness

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Case Presentation: A 28-year-old male with no significant medical history presented to the hospital after 2 weeks of throat pain, fevers, chills, and fatigue. Initially, the patient was evaluated at another hospital for similar complaints and treated with penicillin for presumed streptococcal pharyngitis, but he did not complete the antibiotic course. During presentation, the patient also complained of presyncopal episodes, loose stools, myalgias, and unintentional 40-lb weight loss in the past 6 months. He denied sick contacts, recent travel, or recent illness. Initial evaluation was significant for serum creatinine (Cr) of 2.5 mg/dL (baseline 0.8 mg/dL), urine microalbumin-Cr ratio of 527, and microscopic hematuria. Urine microscopy revealed dysmorphic red blood cell casts. On the second day of admission, the patient developed marked periorbital edema. Complement levels, human immunodeficiency virus (HIV) antibody screen, HIV viral load, hepatitis serologies, antinuclear antibody, antineutrophil cytoplasmic antibodies, and antistreptolysin antibodies were obtained. Laboratory results were significant for high antistreptolysin titers, an undetectable complement component 3 level, and normal complement component 4 level. HIV antibody screen was negative. The nephrology consult service concluded that the leading diagnosis was poststreptococcal glomerulonephritis (PSGN), given the relationship to recent streptococcal pharyngitis and positive antistreptolysin antibody; however, other glomerulonephropathies such as focal segmental glomerulosclerosis and membranoproliferative glomerulonephritis could not be excluded. The patient did not have renal biopsy during the hospital admission because of the high likelihood of PSGN. He was treated with Bicillin for the streptococcal infection with improvement in his symptoms, and his Cr decreased to 1.3 mg/dL on the day of discharge. The patient was informed to follow up in the renal clinic to monitor for resolution of acute renal failure. Two weeks after hospital discharge, the patient's HIV-1 viral load resulted with 1,271.66 HIV ribonucleic acid copies. Because the HIV antibody screen was negative, this result indicated an acute HIV infection.

Discussion: In the setting of glomerulonephritis, low complement levels and high antistreptolysin titers suggest PSGN. This case describes a unique presentation of PSGN in an adult patient with acute HIV infection. Very few cases have a discussion of PSGN in the HIV population. A previous case report described PSGN in a pediatric patient with immune reconstitution syndrome after starting antiretroviral therapy for HIV. PSGN is usually a diagnosis of childhood and has become less common given the broad use of antibiotics for streptococcal pharyngitis.

Conclusion: Our patient had classic signs of PSGN, but because of his age and the decreased prevalence of PSGN in adults, this diagnosis could have been missed. It is important to check HIV viral load when suspecting acute HIV. The patient's initial complaints of weight loss, fatigue, and myalgias were likely symptoms of his acute HIV infection. The patient has been contacted multiple times to follow up in primary care clinic and to discuss his diagnosis; however, he has been lost to follow-up. His current health status is unknown.

41 A Unique Case of Bronchial Carcinoid Mimicking as Asthma

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Case Presentation: A 61-year-old female with no history of smoking presented with wheezing and shortness of breath of 6 months' duration. Spirometry revealed moderate obstructive ventilatory defect (forced expiratory volume [FEV1] 55%, FEV1/forced vital capacity [FVC] 63%) that was diagnosed as chronic obstructive asthma. Chest x-ray showed no evidence of cardiopulmonary disease. She was treated with Advair and albuterol but continued to have frequent exacerbations for nearly 1 year treated with azithromycin and corticosteroids with only minor relief. Along with optimizing treatment, alternate causes of poorly controlled asthmatic symptoms were evaluated. Workup, including *Aspergillus* immunoglobulin G and immunoglobulin E, allergy panel, serum immunoglobulin E, alpha 1 antitrypsin, sputum gram stain, and culture, was negative. High-resolution computed tomography (CT) revealed an ovoid 1.3 cm homogenous mass within the distal left main stem bronchus that was well defined and had no apparent tracheal involvement. Bronchoscopy with biopsy showed a typical carcinoid tumor. Complete removal of the tumor was performed bronchoscopically via snare cautery. At 1-year follow-up, the patient remained entirely asymptomatic, CT of the chest showed no lung mass or recurrent neoplasm, and spirometry was normal.

Discussion: Bronchial carcinoid tumors are a rare group of pulmonary neoplasms that are characterized by neuroendocrine differentiation and relatively indolent clinical behavior. Approximately 25% of patients are asymptomatic; the most frequent symptoms are obstructive pneumonia and hemoptysis. They uncommonly masquerade as asthma or chronic obstructive pulmonary disease by obstructing the bronchus and presenting as wheezing or dyspnea. Carcinoid tumors account for 1%-2% of all lung cancers. They are indolent tumors presenting as cough, pneumonia, hemoptysis, and rarely obstructive symptoms. The diagnosis is often delayed, and patients may receive several courses of antibiotics to treat recurrent pneumonia before the carcinoid is diagnosed. Surgery is the treatment of choice for bronchial carcinoid tumors. However, for select patients with a central polypoid bronchial carcinoid, bronchoscopic resection with a neodymium-doped yttrium aluminum garnet laser alone may provide prolonged recurrence-free survival. These select patients include those who have good bronchoscopic visualization of the distal tumor margin and no evidence of bronchial wall involvement or suspicious lymphadenopathy by high resolution CT. Our patient underwent bronchoscopic resection with cryotherapy, thus escaping the complications of lung parenchymal surgery.

Conclusion: Patients with poorly controlled asthma should be evaluated for asthma mimickers in addition to trigger identification and medication compliance. Early diagnosis and appropriate treatment of bronchial carcinoid tumors can greatly reduce morbidity and mortality.

42 K2 (Synthetic Marijuana)-Induced Altered Mental Status and Renal Insufficiency

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Case Presentation: A 48-year-old male with no significant medical history presented to the emergency department with an altered mental status. Neurologic workup, including computed tomography of the head without contrast, was negative. In the interim, the patient's renal indices continued to worsen; he became oliguric with his creatinine levels reaching 12.44 on day 7. Meanwhile, comprehensive acute kidney injury (AKI) workup including renal ultrasound with Doppler studies was unremarkable. Urine sediments showed nonspecific cells and were nondiagnostic. Dipstick testing showed a specific gravity of 1.005, pH of 6.0, small leukocytes, large hemoglobin, and 1+ proteins. Serology studies for rheumatoid factor, perinuclear antineutrophil cytoplasmic antibodies (PANCA), cytoplasmic antineutrophil cytoplasmic antibodies, antinuclear antibody, and atypical PANCA were all negative. Urine drug screen was unremarkable. He underwent two consecutive hemodialysis treatments on days 7 and 9. The patient's creatinine improved to 8.6 before eventually returning close to his baseline at 1.3 on day 33. The patient was subsequently discharged home in stable condition. Later, the patient's wife reported that he had been excessively smoking synthetic marijuana (K2) during the days preceding the altered mental status and AKI. She claimed that the patient had switched to K2 to avoid detection in drug screens at his primary care physician's office.

Discussion: K2 is a synthetic cannabinoid that is popularly known as spice. It has been available in the United States since 2009. It is not picked up on routine drug screens and has hallucinogenic properties similar to cannabis. In recent years, it has gained popularity in the United States, subsequently attracting attention from law enforcement agencies. The side effect profile of K2 is not well understood. To our knowledge, 16 cases of synthetic marijuana-induced AKI have been reported in 6 states. The substance is commonly associated with seizures, tachycardia, hypertension, and hallucinations. K2 or spice is synthesized from a mixture of naturally occurring herbs, including *Canavalia maritima*, *Nymphaea caerulea*, *Scutellaria nana*, *Pedicularis densiflora*, *Leonotis leonurus*, *Zornia latifolia, Nelumbo nucifera*, and *Leonurus sibiricus*. However, the exact composition of K2 is unknown. None of these herbs has been comprehensively studied, and their toxicities are not well understood. The ability of this compound to go undetected and inflict unforeseen damage makes its use potentially lethal. Treatment for K2 intoxication is supportive. To date, no antidote is available.

Conclusion: Our case emphasizes the need to keep K2 in the differential when caring for patients with unexplained AKI. Additional data are needed to further study the various ingredients of this compound. It is therefore imperative that such cases be reported to local and state health departments by calling the Poison Help Line at 1-800-222-1222.

43 Hemodynamic Instability from Vitamin C Deficiency

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Case Presentation: A noncompliant 18-year-old African American female with vertically transmitted human immunodeficiency virus/acquired immune deficiency syndrome presented to the emergency department (ED) with a CD4 count of 4 and a hemoglobin level of 5.7 g/dL. In the ED, she was found to have persistent low-grade bleeding from her mouth that at the time was thought to be from an upper gastrointestinal source. Her stools were dark in color and guaiac positive. She was hemodynamically unstable. Besides being transfused with packed red blood cells, she was also briefly treated with continuous norepinephrine infusion. Her initial coagulation studies were noncontributory with an international normalized ratio of 1.1 and prothrombin time of 35. Esophagogastroduodenoscopy and a colonoscopy were both unremarkable. Bone marrow biopsy showed normocellular marrow with 80% cellularity and trilinear hematopoiesis. Her vitamin C level was zero. She was diagnosed with scurvy and treated with vitamin C supplementation.

Discussion: Vitamin C deficiency can lead to an often-forgotten medical condition called scurvy. It can cause defective collagen synthesis leading to fragile capillaries, gingival bleeding, and cutaneous changes. Unrecognized, this condition can lead to significant bleeding and can be lethal in select patient populations. Our case is unique in that it shows that vitamin C deficiency can masquerade as upper gastrointestinal bleeding and may present with significant hemodynamic instability requiring blood transfusions and vasopressor support. It is therefore imperative to keep in mind the diagnosis of scurvy as a potential cause of hemodynamic instability even in an industrialized nation such as the United States.

Conclusion: Vitamin C deficiency is a rare and underdiagnosed medical entity in the hospital setting that can lead to hemodynamic instability. Scurvy patients can present with melena and oral bleeding, mimicking hematemesis.

44 A Headache That Breathes: A Rare Case of Inflammatory Myofibroblastic Tumor with Malignant Features

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Case Presentation: An 18-year-old female presented with headaches after a recent trip to high altitudes. She was initially thought to have sinusitis-related headaches and was treated conservatively, but she continued to have symptoms with additional visual changes. She was reevaluated by neuroophthalmology and found to have papilledema. Laboratory work was essentially normal. She underwent a computed tomography (CT) scan of the brain that revealed 2 extra-axial lesions with mild vasogenic edema and midline shift. Magnetic resonance imaging of the brain revealed 4 lesions, with the largest one being 5.2 cm $\times$ 3.7 cm $\times$ 4 cm. During further workup, she was found to have a large 4 cm $\times$ 3.5 cm right middle lobe heterogeneous pleural-based mass on chest CT that was thought to be the primary mass. She underwent craniotomy with resection of the largest mass followed by gamma knife therapy of the remaining lesions. At this time, a second large central nervous system (CNS) lesion with rapid growth was identified and resected. Both specimens were evaluated by multiple pathologists and diagnosed as inflammatory myofibroblastic tumor (IMT) with malignant features and activin receptor-like kinase-1 (ALK-1) positive mutation. She was started on chemotherapy and underwent right middle lobe resection that revealed identical histologic features.

Discussion: IMT includes a spectrum of pulmonary lesions. In addition, it has been reported at various body sites, including the CNS. Generally, this tumor is benign with a favorable prognosis. However, in very rare circumstances it can have malignant features/transformation as in our patient. The most consistent pathologic feature is a background proliferation of spindle cells associated with a variably dense polymorphic infiltrate of mononuclear inflammatory cells, including lymphocytes, plasma cells, histiocytes, and eosinophils. Its origin remains unknown with many microorganisms, including Epstein-Barr virus, human herpesvirus-8, and *Eikenella* being hypothesized as triggers, but recent studies have shown that it is a true tumor rather than just an inflammatory reaction. Treatment generally entails a complete surgical resection with or without chemo- and radio-therapy. ALK-1 tyrosine kinase inhibitors such as crizotinib are useful in patients with this genetic rearrangement. Prognosis is favorable except for malignant histology and widespread lesions where recurrences have been reported.

Conclusion: IMT of the lung is a rare tumor that represents $<1\%$ of all surgically resected masses and is more common in the pediatric age group. First described by Brunn in 1939, it generally is a benign condition, and very few cases of malignant IMT have been described. However, one must always be vigilant of the possibility of the malignant variant, especially in patients with persistent symptoms.

45 Ten-Year Fever Resolved by One Medicine

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Case Presentation: A 26-year-old Caucasian female with a medical history of repeated fevers since age 15 presented to our clinic after 3 days of fevers to 101°F, sweating, nausea, and vomiting accompanied by back pain, conjunctivitis, and diffuse body aches. The patient had a history of similar attacks for which multiple empiric diagnoses of viral upper respiratory infection had been rendered. She denied a history of oral ulcer, joint pain, diarrhea, sinusitis, or abdominal pain. The patient was married. Her maternal grandfather was an Ashkenazi Jew from the Middle East. During physical examination, her blood pressure was 130/80 mmHg and her heart rate was 75 bpm. Cardiovascular, chest, and abdominal examinations were unremarkable. No joint tenderness or rash was present. Given the high index of suspicion for familial Mediterranean fever (FMF), C-reactive protein (CRP), complete blood count, and metabolic profile were initially ordered along with blood cultures. Except for an elevated CRP at 15.5 and mild leukocytosis, all laboratory tests were normal. The patient was started on colchicine and asked to monitor her temperature. Several hours after colchicine administration, her temperature decreased with overall symptomatic improvement. CRP normalized after treatment with colchicine, and the genetic sequence analysis for the Mediterranean fever (MEFV) gene showed a heterozygous p.V726A mutation in the coding exon 10 of the MEFV gene, thus permitting a diagnosis of FMF.

Discussion: FMF is a hereditary disorder that is characterized by unpredictable paroxysmal attacks of fever and serositis. Early recognition and management can avoid multiple ER visits and prevent devastating complications such as chronic kidney disease. FMF is caused by mutation in the MEFV gene. Mutation of this gene can result in an uncontrollable inflammatory process. Most patients have their first attack in very early childhood. Approximately 95% of patients present with an acute abdomen, and approximately 50% of patients may complain of chest pain that is usually pleuritic and unilateral. In our patient, the repeated history of fever and back pain without the typically experienced abdominal pain made the diagnosis elusive. Diagnosis of FMF can be made clinically by patient response to colchicines or by genetic testing. Daily colchicine administration is the cornerstone of the treatment. Colchicine therapy can lead to complete resolution of an attack or decrease the duration, severity, and frequency of an attack. FMF is a commonly missed diagnosis. Lack of familiarity with the disease can lead to unnecessary tests and wrong treatment and can preclude the prevention of a devastating outcome of the disease: renal amyloidosis and eventual end-stage renal disease.

Conclusion: With the increasing presence of patients with various ethnic backgrounds, FMF needs to be considered in the appropriate clinical setting.

46 A Rare Case of Adverse Cutaneous Drug Reaction Limited to Scar Tissue in a Man with Human Immunodeficiency Virus after Initiation of Ritonavir-Boosted Darunavir and Emtricitabine/Tenofovir: Hospital Observation Without Admission

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Case Presentation: A 48-year-old African American man with human immunodeficiency virus (HIV) presented to the emergency department with new onset rash of 12-24 hours in duration. The patient's history of present illness was unremarkable except for having started ritonavir-boosted darunavir and emtricitabine/tenofovir the day prior to presentation. He had a medical history of angiosarcoma of the right lower extremity status post resection and total knee replacement with skin graft in 1996. During examination, the rash was bullous with surrounding erythema and warmth and was limited to a well-healed scar on the patient's right shin at the site of the prior surgery. The rest of the physical examination was unremarkable, including absence of mucocutaneous or genital involvement. The bulla was negative for Nikolsky sign and involved <10% of body surface; the patient had a SCORTEN (SCORe of Toxic Epidermal Necrosis) of 0. Laboratory analyses were remarkable for a white blood cell count of 4,800/μL, CD4+ count of 404/μL, and C-reactive protein of 0.65 mg/dL. X-ray of the right knee and tibia showed evidence of prior proximal tibial resection and total knee replacement but otherwise was unremarkable; lower extremity Doppler was also negative. The patient was managed with intravenous volume replacement and discontinuation of his current antiretroviral therapy. He was observed in the clinical decision unit for 12 hours, and after evaluation by orthopedics, was discharged with cephalexin for follow-up with the health department. He reported rapid, complete resolution of the rash when next seen in clinic.

Discussion: Darunavir may cause adverse cutaneous drug reactions, including mucocutaneous reactions, Stevens-Johnson syndrome (SJS), erythema multiforme, and toxic epidermal necrolysis (TEN). Moreover, HIV-positive patients are at high risk for protean mucocutaneous presentations. Patients presenting with SJS or TEN may warrant admission to burn units or nonspecialized hospital units depending on SCORTEN and clinical severity. A reaction limited to scar tissue (in patients with or without HIV) has not been reported previously in the literature. Because this patient's reaction was limited to scar tissue, observation was deemed appropriate; with improvement, he was discharged without admission.

Conclusion: An adverse cutaneous drug reaction to darunavir limited to scar tissue in a man with HIV was managed successfully with observation rather than admission. Future cases of scar-limited drug reactions may potentially be managed with initial observation rather than initial admission.

47 To Treat or Not to Treat? That Is the Paraneoplastic Cerebellar Syndrome Question

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Case Presentation: An 80-year-old female with a history of small cell lung carcinoma and peripheral vascular disease was admitted for workup of persistent vertigo. She had been diagnosed with small cell lung carcinoma in 2010 and received chemotherapy. During a follow-up visit in February 2014, a positron emission tomography-computed tomography scan confirmed that her lung cancer had relapsed, and she resumed her chemotherapy. However, she developed gradual onset of dizziness and unstable gait consistent with vertigo. Her oncologist stopped her chemotherapy for 3 months prior to admission, as he suspected the medications were potentially a cause of her vertigo. However, her vertigo continued to worsen. During physical examination, Dix-Hallpike maneuver was negative, and a down-beating nystagmus on bilateral lateral gaze was noted. Magnetic resonance imaging of the brain revealed no visible intracranial abnormality. The patient had no response to symptomatic treatment of vertigo with scopolamine and meclizine. Because of suspicion of paraneoplastic cerebellar syndrome, a serum paraneoplastic panel was ordered. However, no informative autoantibodies were detected in this evaluation. Because of a high pretest probability for paraneoplastic syndrome, the patient was started on a 5-day course of high-dose intravenous methylprednisolone that did not provide relief to her vertigo. The patient was discharged to follow-up with her oncologist and expeditiously resume her chemotherapy treatment.

Discussion: Paraneoplastic cerebellar syndrome is uncommon and often misdiagnosed and can affect both the central and peripheral nervous systems. Acute recognition of paraneoplastic syndrome is essential because patients have prolonged debilitating central nervous system symptoms if diagnosis is delayed. Although the paraneoplastic panel for autoantibodies in our patient was negative, the patient presented with previously described signs and symptoms of a paraneoplastic syndrome; specifically the patient had a nonclassical neurologic syndrome of down-beating nystagmus bilaterally in the setting of a recent cancer diagnosis. Most central nervous paraneoplastic syndromes respond poorly to immunomodulatory treatment. However, there may be improvement when the underlying tumor is treated. Therefore, paraneoplastic syndrome should always be on the differential for a patient with new neurologic symptoms, especially in light of a recent cancer diagnosis.

Conclusion: Patients who present with sudden onset of neurologic symptoms with a recent cancer diagnosis should receive a careful workup for paraneoplastic syndrome. Many patients with paraneoplastic syndromes will not respond to immunomodulatory treatment and will require treatment of the underlying tumor for improvement of their neurologic symptoms.

48 Beware, For Sarcoidosis Might Be There

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Case Presentation: A 34-year-old African American male with a history of chronic sinusitis and recurrent otitis media presented to the emergency department with 3 days of isolated atraumatic right fifth finger pain and swelling. Further inquiry revealed several years of chronic sinusitis, fatigue, the development of an intermittent cough productive of brown sputum, and pleuritic chest pain in the past 6 months. He reported subjective fevers and night sweats and noted a nonpruritic rash on his face and neck in recent weeks. His vital signs were within normal limits, and his examination was notable for a painful swollen proximal interphalangeal joint on the right fifth finger without other joint abnormalities and diffuse prominent anterior and posterior cervical and inguinal lymphadenopathy. A subtle papular rash was located on the nose, eyelids, and nape. The patient's extended chemistry and hemogram were normal except for mild normocytic anemia. Chest x-ray revealed bilateral hilar fullness confirmed by computed tomography to be extensive mediastinal and hilar lymphadenopathy accompanied by several small parenchymal nodules. X-ray of the finger showed a mixed lytic and sclerotic lesion of the right fifth metacarpal. Bronchoscopy with ultrasound-guided transbronchial lymph node biopsy revealed well-organized granulomatous inflammation suggestive of sarcoidosis. Additional test results included serum angiotensin-converting enzyme of 300; a negative purified protein derivative; and negative antinuclear antibody, cytoplasmic antineutrophil cytoplasmic antibody, and perinuclear antineutrophil cytoplasmic antibody.

Discussion: Sarcoidosis is an idiopathic granulomatous disease affecting 10-35 per 100,000 persons aged 20-40 years in the United States. Most frequently associated with pulmonary disease, sarcoidosis can affect nearly every organ system with variable cardiac, central nervous system, eye, and skin involvement. At the time of diagnosis, many patients describe an assortment of nonspecific symptoms including fever, cough, chest pain, and fatigue. Diffuse lymphadenopathy, as seen in our patient, occurs in just 10%-15% of cases, with inflammatory arthritis less common still ($<1\%$ of cases). Thousands of patients present each year to the emergency department with complaints of acute joint or extremity pain, and most are treated symptomatically without the need for further workup. This case demonstrates the value of obtaining a careful history, especially for a young patient in whom arthritis is relatively uncommon.

Conclusion: Sarcoidosis frequently presents with a constellation of variable nonspecific symptoms involving multiple organ symptoms. This patient's painful fifth finger arthritis represents a particularly uncommon presenting complaint but afforded the opportunity to uncover an otherwise classic presentation for a new diagnosis of sarcoidosis.

49 A Case of Plunging Gastrointestinal Stromal Tumor Presenting as Intermittent Dysphagia

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Case Presentation: A 71-year-old woman with a medical history of melanoma presented to the hospital with progressively worsening intermittent dysphagia mainly for solid foods over the past year. Associated symptoms included reflux without significant weight loss. She typically had to chase solid food down with liquids to prevent any type of impaction. She had never had any food impaction that required a food bolus removal. Esophagogastroduodenoscopy (EGD) 6 months prior was unremarkable. Endoscopy revealed a large 4-5 cm subepithelial lesion in the mid esophagus at approximately 30 cm. The lesion appeared smooth with normal overlying smooth tissue and no obvious ulcerations. Biopsies were not taken at that time. Computed tomography (CT) scan of the chest confirmed the presence of a large submucosal mass in the distal esophagus. During subsequent endoscopic ultrasound and biopsy, no extraesophageal masses were identified, and biopsy was proven for the gastrointestinal stromal tumor (GIST). The patient was started on neoadjuvant chemotherapy with Gleevec with future plans for surgical resection.

Discussion: GIST presentation is generally vague and varies depending on which part of the gastrointestinal tract is affected. Because GISTs are mass-occupying lesions, they may present as an obstruction. In the esophagus, the condition may present as dysphagia and may even mimic symptoms of gastroesophageal reflux disease. In this case, when the tumor was in the esophagus, it presented as dysphagia, and when it plunged into the stomach, the patient was asymptomatic. EGD first performed 6 months prior to diagnosis must have missed the mass, as it had most likely plunged into the stomach. GISTs may often present simply as abdominal discomfort with weight loss, as 75% of these tumors arise from the stomach. Some of the tumors are found incidentally, and in about two-thirds of cases the size of the tumor is <4 cm at diagnosis.

Conclusion: GISTs have a wide array of symptoms, the differential is vast, and modalities for diagnosis depend on which part of the gut is affected. Generally, these tumors may be visualized on imaging, such as barium swallow, computed tomography, and magnetic resonance imaging, and they may also be visualized and biopsied via EGD in the upper gastrointestinal tract or colonoscopy in the lower gastrointestinal tract. Treatment for GIST is surgical resection when possible. Pharmaceutical therapies such as imatinib, sunitinib, and regorafenib all act as tyrosine kinase receptor blockers.

50 A Case of Gastrointestinal Histoplasmosis

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Case Presentation: A 52-year-old male presented with abdominal pain and weight loss >20 lb during the previous 1½ months. Associated symptoms included dyspepsia, diarrhea, and epigastric discomfort associated with eating. The patient reported occasional episodes of nausea but denied vomiting or hematemesis. He had never had an endoscopic evaluation. A recent abdominal ultrasound showed evidence of cholelithiasis. Hepatobiliary iminodiacetic acid scan, carbohydrate antigen 19-9 test, and carcinoembryonic antigen test were negative. During this presentation, he reported an additional 10-lb weight loss. His physical examination was significant for mild diffuse abdominal tenderness without rebound but with voluntary guarding. Rectal examination revealed brown stool that was hemoccult positive. An esophagogastroduodenoscopy revealed diffuse gastritis, esophagitis, and scattered flat polypoidal lesions in the distal duodenum. Colonoscopy revealed several ulcerated focal lesions in the ascending colon and cecum. Biopsies taken from the esophagus, stomach, and duodenum revealed acute and chronic inflammation that was negative for malignancy. Duodenal biopsies showed numerous yeast consistent with histoplasmosis. Right colonic biopsies of various ulcer margins were also consistent with histoplasmosis. A definitive diagnosis of gastrointestinal histoplasmosis (GIH) was made. The patient was treated accordingly with itraconazole with improvement in his symptoms and will ultimately need testing for human immunodeficiency virus (HIV).

Discussion: Histoplasma usually causes a benign, self-limited respiratory disease. In patients with cellular immune deficiency, histoplasmosis may present as a disseminated disease. The most common clinical setting for disseminated histoplasmosis is HIV infection, especially with CD4 counts <200 mm^3. Immune suppression secondary to drugs, malignancy, or corticosteroids is another common predisposing factor for disseminated histoplasmosis. Gastrointestinal tract involvement with histoplasmosis can occur in patients with a disseminated form of the disease. The lesions of GIH occur predominantly in the ileocecal region, presumably because of an abundance of lymphoid tissue. It most commonly presents as fever, diarrhea, abdominal pain, gastrointestinal tract bleeding, or hepatosplenomegaly. The upper gastrointestinal tract can also be involved in the form of oropharyngeal ulceration, although perforation and obstruction have also been described. Histoplasma colitis should be considered in residents of endemic areas presenting with unexplained diarrhea.

Conclusion: GIH may be misdiagnosed as inflammatory bowel disease, malignancy, or other intestinal diseases, leading to inappropriate therapies and unnecessary surgical interventions. Patients with bowel obstruction, perforation, or bleeding and systemic findings suggestive of histoplasmosis should be evaluated for GIH. This is especially true for immunosuppressed patients, especially those with acquired immune deficiency syndrome. Diagnosis first requires consideration of histoplasmosis in the differential for patients with the above types of gastrointestinal abnormalities and, second, familiarity with a battery of mycologic and serologic tests. Progressive disseminated histoplasmosis is lethal if left untreated, while treatment is highly effective.

51 Holding Your Breath: A Vital Sign in Heart Failure

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Case Presentation: A 63-year-old male with a history of hypertension, atrial fibrillation with rapid ventricular response, non-ST segment elevation myocardial infarction, and left ventricular ejection fraction (LVEF) of 45% on last echocardiogram was admitted to our hospital with 1 day of worsening shortness of breath and chest tightness. The patient reported that he had not been taking his medications except for warfarin. He had been prescribed metoprolol 100 mg, lisinopril 10 mg, rosuvastatin 10 mg, aspirin 325 mg, and clopidogrel 75 mg daily. Repeat echocardiogram showed a decline in LVEF to 25%. During physical examination, he was in moderate respiratory distress with blood pressure 140/100 mmHg, pulse 130 bpm and irregularly irregular rhythm, respiratory rate 25 breaths per minute, and temperature 98.4°F. His respiratory pattern was notable for a striking examination of Cheyne-Stokes respiration (CSR), with an apnea length (AL) of 45 seconds. He had jugular venous pressure elevation to 10 cm, displaced apical impulse, holosystolic murmur at the left lower sternal border, bibasilar crackles, and lower extremity edema. Electrocardiogram showed atrial fibrillation with rapid ventricular response and signs of demand ischemia. After metoprolol and 80 mg of furosemide, his lower extremity edema and shortness of breath improved significantly. His clinical improvement correlated well with a downtrending AL that decreased from 45 to 30 seconds during a 3-day period. While one small study showed some promise with correlating various aspects of the CSR cycle with clinical improvement in CHF, the data-averaged findings from 15 patients and did not look at single-patient trends. To further highlight the importance of physical examination, we watched our patient's oxygen saturation and heart rate throughout multiple CSR cycles. While his heart rate remained stable throughout, his oxygen saturation varied from 80%-96%. In the chart, his SpO_2 was recorded as 94%-97%, which demonstrates the limitations of point-in-time testing.

Discussion: CSR is a well-documented respiratory pattern in congestive heart failure (CHF) patients. While the apnea-hypopnea index is a classic prognostic indicator in CSR, the measurement requires the patient to undergo a sleep study. Other CSR measures such as cycle length, AL, and ventilation length may prove useful in monitoring the short-term progress of patients with CSR-CHF during hospital admissions and can be measured at the bedside. Furthermore, care should be taken in interpreting reported oxygen saturations and respiratory rates in these patients given the wide variations over a short period of time.

Conclusion: To our knowledge, no studies have looked at the significance of various CSR measurements in the same patient over time. Given the improvement in AL over the course of our patient's hospital admission, future studies would be important in addressing the positive predictive value of decreasing AL to clinical improvement in CHF.

52 Acute Withdrawal Delirium: The Grady Memorial Adult Alcohol Withdrawal Protocol Revisited

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Case Presentation: A 41-year-old man with a known history of alcoholism and a documented history of withdrawal seizures presented to Grady Memorial Hospital in acute alcohol withdrawal. The patient reported drinking >12 beers daily for 20-25 years, with his last drink 36 hours prior to admission. He presented with nausea, vomiting, diaphoresis, agitation, and auditory hallucinations. During examination, his blood pressure was 160-180/90-110 mmHg, his heart rate was 120-140 bpm, his temperature was 37.2°C, his respiratory rate was 25 breaths per minute, and his SpO_2 was 99%. The patient was in moderate distress, diaphoretic, and tremulous throughout the examination without focal sensory motor deficits. Laboratory results were the following: white blood cell count 10.2, hemoglobin 15.4, hematocrit 45.7, platelets 135, sodium 134, potassium 3.7, chloride 100, PCO_2 23, anion 8, glucose 93, blood urea nitrogen 10, creatinine 1.0, total prolactin 6.3, albumin 3.5, calcium 8.1, bilirubin 1.1, aspartate transaminase 117, alanine transaminase 65, alkaline phosphatase 65, and ethanol <10. The patient was admitted to the stepdown intermediate care unit and initiated on the Grady Memorial Adult Alcohol Withdrawal (GAWAS) protocol. His assessment scores ranged from 21-37, and he received a total of 66 mg of Ativan during a 24-hour period. On day 2 of admission, the patient became violent, breaking restraints, and his Ativan drip was titrated to 12 mg/h at 12:00 pm. At 7:00 am the following day, the physician was notified that the patient desaturated to 90%. During examination, the patient had shallow breaths at 35 respirations per minute. Arterial blood gas showed pH 7.40, PO_2 81, PCO_2, 38, and base excess -1.7. Drip was titrated off, and the patient was monitored on the floor and placed on modified protocol Ativan 2 mg every 2 hours. He improved during the subsequent 48 hours and was alert and oriented ×4; he was transitioned to librium taper and discharged with follow-up.

Discussion: Alcohol withdrawal delirium (AWD), delirium tremens, is a syndrome of rapidly escalating symptoms of agitation, disturbed consciousness, disorientation, and autonomic hyperactivity, occurring in 10% of patients with alcohol withdrawal syndrome. The GAWAS protocol is designed for management of AWD in the intensive and intermediate care unit. Adapted from DeCarolis et al, the Minneapolis Detoxification Scale (MINDS) clinical assessment and treatment protocol has been shown to decrease the time to symptom control and decrease total benzodiazepine dosing over continuous infusion. The MINDS protocol was studied solely in the intensive care unit setting. The protocol criteria for a MINDS score >20 are that a patient is to be assessed every 15 min and assigned to 1:1 nursing care. During the course of treatment, our patient was reassessed in the stepdown unit every hour on average, receiving boluses and up-titration of his Ativan drip 4 mg/h. Nursing staff was concerned for respiratory depression, but the patient likely suffered from aspiration, a common finding in alcoholic abuse under benzodiazepine sedation.

Conclusion: Persistent delirium and disorientation may be perceived as prolonged AWD but are actually attributable to high-dose benzodiazepine therapy. The protocol tolerates some degree of confusion or disorientation during the recovery phase of the syndrome to minimize benzodiazepine exposure. In the symptom-driven protocol for AWD, frequent assessment and a low nurse-to-patient ratio are crucial to avoid adverse events.

53 An Uncommon Presentation of Dizziness: The Story of Glutamic Acid Decarboxylase

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Case Presentation: A 61-year-old female with insulin-dependent diabetes and hypothyroidism was admitted after 1 month of intermittent diplopia and nausea. Three months earlier, she had experienced sudden onset of ataxia, dysarthria, and dizziness that had remained persistent and caused severe disability. After 2 months of these symptoms, a saccadic defect consistent with pontine dysfunction was identified, and the patient was admitted for suspected paraneoplastic cerebellar degeneration syndrome. The testing for malignancy included magnetic resonance imaging (MRI) of the head and computed tomography of the abdomen, chest, and pelvis, all of which showed no evidence of malignancy. The patient's laboratory results showed an elevated glutamic acid decarboxylase (GAD) antibody of >250 IU/mL and anti-GAD65 of 411 nmol/L. For her new diplopia, an MRI of her orbits was normal. At this point, an idiopathic autoimmune etiology of her gait ataxia, dysarthria, and diplopia was favored, and a 5-day course of intravenous methylprednisolone was initiated. A lumbar puncture was also performed, and her cerebrospinal fluid showed elevated GAD65 antibody, consistent with the preliminary diagnosis. With immunotherapy, she experienced improvement of her dysarthria, and she was able to ambulate with a walker. She was discharged on a course of oral prednisone. Two weeks later, her nausea and dizziness had resolved, but she continued to have intermittent diplopia and cerebellar ataxia.

Discussion: GAD converts glutamic acid into gamma aminobutyric acid, the major inhibitory transmitter of the central nervous system. Low levels of GAD65 antibody are commonly found in type 1 diabetes. When neurologic symptoms such as muscle rigidity or gait ataxia are accompanied by high levels of GAD65 antibody, a spectrum of neurologic disorders, including stiff person syndrome and cerebellar ataxia, should be considered. Patients with acute onset of these symptoms will often present to the emergency department with concern for a stroke, whereas those with a more progressive onset often undergo an inpatient paraneoplastic workup.

Conclusion: Patients with a history of autoimmune disease and new onset of neurologic sequelae require exploration of a possible autoimmune etiology and treatment with immunotherapy. Suspicion for GAD65 antibodies should be held for females with a history of type 1 diabetes, particularly if patients present with cerebellar ataxia and additional symptoms of brainstem dysfunction such as dysarthria and ophthalmoplegia. While an underlying paraneoplastic process is rare in patients with prior autoimmune disease, a thorough workup for a source of a potential neoplastic process should be pursued.