NEW JERSEY CHAPTER
AMERICAN COLLEGE OF
PHYSICIANS
SCIENTIFIC MEETING

RESIDENT/FELLOWS
AND STUDENT
ABSTRACT COMPETITION

MARCH 2023
PARTICIPATING INSTITUTIONS

Thank you to all the programs who submitted abstracts for this year’s abstract competition.

Abstracts were received from the following programs:

Residency Programs

- Capital Health Regional Medical Center (Saba Hasan, MD, MACP)
- CarePoint Health Bayonne Med Center (John T Dedousis, Jr, MD)
- Cooper University Hospital (Rachel S. Nash, MD)
- Hackensack University Medical Center (Marygrace M Zetkulic, MD)
- HM Jersey Shore University Medical Center (Arman Mushtaq, MD)
- HM JFK Medical Center/ Raritan Bay Medical Center-Perth Amboy (Mayer Ezer, MD)
- HM Mountainside (Bijal, Mehta, MD)
- Jefferson Health New Jersey (Yvette Wang, DO)
- Monmouth Medical Center (Doantrang Du)
- Newark Beth Israel Jersey City Medical Center (Srinivas Gongireddy, MD)
- New York Medical College at St Michael's Medical Center Program (Theodore DaCosta, MD)
- Ocean Medical Center (Pramil Cheriyath, MD, MS)
- Prime Health Care Consortium (Dr. Stanley Walker)
- Rutgers Health- Community Medical Center (Vinod Nookala MD, FACP)
- Rutgers New Jersey Medical School Program (Daniel Matassa, MD)
- Rutgers Robert Wood Johnson Medical School Program (Ranita Sharma, MD, MACP)
- Saint Francis Medical Center (Sara Wallach, MD, MACP)
- Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

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- Rowan University School of Osteopathic Medicine
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DISCLAIMER

It is assumed that all participants adhered to the rules as stated in the original abstract submission form. It is also assumed that the abstracts submitted were original works, represented by the true authors. Judging was performed in a manner to minimize bias. Judges were unaware of the authors unless they were directly involved with the associate. Although there were many excellent abstracts submitted, those selected to be presented as posters or oral presentations were chosen based on content and quality. This content was felt to be intriguing from a clinical education standpoint, thought-provoking, or could stimulate debate regarding our current practice of medicine.
ORAL PRESENTATIONS
Postprocedural Complications in Patients With Cirrhosis: 
An Analysis of the National Inpatient Sample 2012-2018

Research
Neethi Dasu
Jason John DO, Kirti Dasu DO, Herman Suga DO, Brian Blair DO, C Jonathan Foster,
Christopher Chhoun, DO- Department of IM- Jefferson

Jefferson Health New Jersey (Yvette Wang, DO)

Introduction: Patients with cirrhosis undergoing procedures can be vulnerable to complications, as side effects are common in the post-procedural period. There are minimal studies on the influence of sex, race, and insurance status on mortality, hospital length of stay (LOS), and total hospital charges for patients with cirrhosis undergoing endoscopic retrograde cholangiopancreatography (ERCP). The objective of this study was to identify risk factors in a national population cohort (in the USA) admitted to hospitals in the years 2012-2018.

Methods: All patients aged 18 years and above with cirrhosis undergoing ERCP were identified from the US Nationwide Inpatient Sample (NIS), a large publicly available all-payer inpatient care database in the USA. Multivariate regression analysis was used to estimate the odds ratios of in-hospital mortality, the average length of hospital stay, and hospital charges, after adjusting for age, gender, race, primary insurance payer status, hospital type and size (number of beds), hospital region, hospital teaching status, and other demographic characteristics.

Results: Our study identified approximately 235,970 patients who had been discharged, 8,014 with cirrhosis undergoing ERCP and 227,956 undergoing ERCP without cirrhosis from 2012-2018. For these patients, the average age was 61.4. The analysis revealed that increases in mortality [OR 3.32 (2.96-3.73), P < 0.0001] and length of stay [OR 1.03 (1.02-1.04), P < 0.0001] were statistically significant but there was no statistically significant difference in total hospital charges [OR 1.00 (1.00-1.01), P < 0.001] for patients with cirrhosis undergoing ERCP compared to patients without cirrhosis undergoing ERCP. Additionally, the presence of ascites [OR 1.78 (1.40-2.27), P < 0.0001], acute liver failure [OR 2.11 (1.45-3.07), P < 0.0001], respiratory failure [OR 2.04 (1.11-3.75), P < 0.022], and hepatorenal syndrome (HRS) [OR 4.06 (2.90-5.70), P < 0.0001] were positive predictors for mortality for patients with cirrhosis undergoing ERCP.

Conclusion: In patients with cirrhosis undergoing ERCP, higher mortality and LOS were noted compared to patients without cirrhosis who underwent ERCP. It is important to identify these patients and treat them aggressively and earlier on as they are likely to have higher post-procedural complications and mortality.
Interstitial Lung Disease: Gender and Region Variations in Mortality Over Two Decades

Mahrukh Khan
Muhammad Tayyeb; Gaurav Mohan; Siva Yarrarapu; Jayashree Ravilla; Du Doantrang; Patton Chandler; Sharon Weiner

Monmouth Medical Center (Doantrang Du)

Introduction: Interstitial Lung Disease (ILD) is characterized by inflammation of the alveoli, distal airways, and parenchyma/interstitial tissue that can cause progressive fibrosis over time. Differences in gender and environment can affect disease progression and outcomes hence assessment of gender-based geographical mortality trends across the United States (U.S.) needs to be explored. We hypothesized that there might be gender and regional differences in mortality rates of ILD over the last two decades.

Methods: For this retrospective observational study, death certificate data for ILD including alveolar and parietal-alveolar conditions, ILD with fibrosis, and other specified & unspecified causes of ILD (ICD-10 Codes: J84.0, J84.1, J84.8, and J84.9) were retrieved from Center for Disease Control and Prevention's Wide-Ranging Online Data for Epidemiological Research (WONDER) database. The data was analyzed from 2001-2020 and further stratified into 5-year periods. Crude Mortality Rate (CMR) and Age-Adjusted Mortality Rate (AAMR) per 100,000 deaths (with a 95% confidence interval) were calculated between male and female gender in the four U.S census regions (CR-1 Northeast (NE); CR-2 Midwest (MW); CR-3 South; CR-4 West) to explore gender and regional variations.

Results: The overall CMR per 100,000 deaths revealed an upward trend in both genders in all 4 U.S. census regions, the highest in MW. In NE, AAMR in males increased from 5.1 to 6.2 per 100,000 deaths from 2001-2020. In Midwest, AAMR in males increased from 6.2 to 7 per 100,000 deaths from 2001-2015 but decreased to 6.8 per 100,000 deaths from 2016 to 2020. In the South, AAMR in males increased from 2001 to 2020 from 5.9 to 6.3 per 100,000 deaths. In the West, AAMR for males initially increased from 6.2 to 6.6 per 100,000 deaths from 2001 to 2010 with no increase seen after. Overall for females, minimal change in AAMR was seen across all 4 census regions.

Discussion: From 2001 to 2020, CMR and AAMR showed an upward trend for the male gender in all census regions. Cigarette smoking is higher in males compared to females. Increased accessibility to vaping products, lung-toxic drugs, environmental exposures, and increasing pollution can contribute to the above results. Minimal change in AAMR was seen in both males and females from the year 2011-2015 to 2016-2020 which can be due to decreased smoking rates, more smoking-free places, and newer tyrosine kinase inhibitors which can help prevent the progression of ILDs but more data is required to establish a cause. Misclassification of mortality causes can lead to under-reporting of ILDs as a cause of death which is an inherent weakness of the online mortality databases and is a limitation of our study.
Mortality Predictors of Hospitalized Clostridium Difficile Infection (CDI) Patients

Research
Muhammad Tayyeb
Gaurav Mohan; Aamir Shahzad; Ali Jaan; Seemab Fatima; Shefali Shah
Monmouth Medical Center (Doantrang Du)

Background: The prevalence of Clostridiodes Difficile infection (CDI) has been rising in the developed world over the past decade. In a recent study, CDI patients were twice as at risk of dying as patients admitted for all other diagnoses. While there is data characterizing hospitalizations for CDI in the recent past, our study contributes current estimates from the NIS database to look for mortality predictors in patients admitted with a primary diagnosis of CDI.

Methodology: We looked at hospitalizations during 2019 from the National Inpatient Sample (NIS), Healthcare Cost and Utilization Project, and Agency for Healthcare Research and Quality. We identified Adult patients admitted for Clostridium Difficile (C.diff) infection using the International Classification of Diseases, 10th revision, clinical modification codes: A04.71 and A04.72. StataCorp Stata was used to perform logistic multivariate regression analyses to compare demographic factors such as sex, age, race, and payer status. Clinical parameters such as a history of, or concurrent HIV, Colon Cancer, and Sepsis were also Analyzed.

Results: A total of 73,799 adult patients were admitted with C. diff as a primary diagnosis on a non-emergency basis. Among them, 47090 (63%) were females. The mean age of the patient population was 66.6 years and the mean length of hospital stay was 5.3 days. Among the total hospitalized patients, 1024 (1.3%) died. The patient’s race didn’t have a statistically significant association with CDI. Female gender was associated with decreased mortality when compared to males with an odds ratio (OR) of 0.6 (95% CI: 0.5 to 0.9; p< 0.01). Interestingly, no statistically significant association was found between a history of or concomitant colon cancer and HIV. A remarkably strong correlation was seen in the mortality of C. diff patients with sepsis when compared to patients with no sepsis (OR - 18.5; 95% CI:13.5-25.2; p=<0.01).

Conclusion: Clostridiodes Difficile infection (CDI) is a major cause of healthcare-associated diarrhea with high mortality. The known CDI risk factors are antibiotic use, age older than 65 years, inflammatory bowel disease, organ transplantation, chemotherapy, chronic kidney disease, and immunodeficiency. In our study, CDI hospitalization rates were highest in the elderly. The average age for patients admitted with CDI as a principal diagnosis was 66 years, almost 19 years older compared to hospitalizations due to other causes. Sepsis was associated with higher mortality and the female gender was associated with lower mortality. Contrary to the common perception, HIV and underlying colon cancer did not predict mortality. Although in previous studies, patients admitted with CDI were more likely to be females, gender was not an independent risk factor for mortality in our study.
Health Outcomes of Hospitalized COVID-19 Patients on Truvada

Research
Jeffrey Kantor

Prime Health Care Consortium (Dr. Stanley Walker)

Introduction: This study attempted to explore the health outcomes of hospitalized COVID-19 patients on Truvada and to look at the comorbidities of those patients who died.

Background: On 10/6/2020, a Spanish study published in the Annals of Internal Medicine found that Truvada patients were half as likely to be hospitalized with COVID-19 and none of the hospitalized COVID-19 patients taking Truvada died. This study attempted to see if those results could be replicated.

Methods: This study was a retrospective study looking at data from the 48 Prime Healthcare hospitals over a two year period from the start of COVID-19 in March 2020. The study initially looked at a group including all hospitalized COVID-19 patients: 59,972 patients hospitalized with COVID-19. 4399 of these patients expired, representing a mortality rate of 7.33%. Of those hospitalized with COVID-19, 50 patients had a variant of Tenofovir (TDF or TAF). 6 of these patients expired, representing a mortality rate of 12%. And within this group, 28 patients had TDF + ETC (the components of Truvada). 2 of these patients expired, representing a mortality rate of 7.14%. Therefore, the mortality rate of TDF + ETC patients hospitalized with COVID was similar to the general death rate for all hospitalized COVID patients. A subset of TDF + ETC patients were on Atripla, which also contains Efavirenz. None of these 5 Atripla patients died.

Another interesting finding is when the study examined the comorbidities. One of the Truvada patients who expired had quadriplegia. So the study looked at quadriplegia as an independent risk. Of the 176 hospitalized COVID patients with quadriplegia, 47 expired. This equates to a 26.70% mortality rate (a 3.73 times higher relative risk). Given that quadriplegia resulted in a drastically higher death rate, this raises the question that perhaps the next major advancement in treating COVID is not a drug, but perhaps some form of intense physical therapy? Other comorbidities analyzed in the study included interstitial emphysema and ESRD. Of the 309 hospitalized COVID patients with interstitial emphysema, 218 expired. This equates to a 70.55% mortality rate (a 9.88 times higher relative risk). Of the 1547 hospitalized COVID patients with ESRD, 387 expired. This equates to a 70.55% mortality rate (a 3.50 times higher relative risk).

Conclusion: The study was unable to find data supporting improved survival rates of hospitalized COVID-19 patients with Truvada. However, future research may be warranted to analyze the survival rates of hospitalized COVID-19 patients receiving Atripla. Furthermore, future research may want to analyze the survival rates of hospitalized COVID-19 patients receiving high intensity physical therapy.
Association of Nonthyroidal Illness Syndrome and Adverse Outcomes in Patients with Acute Coronary Syndrome: A Meta-analysis

Research
Song Peng Ang
Jia Ee Chia; Vikash Jaiswal; Tong Hong Chia; Masih Lali; Manan Parikh; Jose Iglesias

Rutgers Health- Community Medical Center (Vinod Nookala MD, FACP)

Background: Thyroid dysfunctions are common in patients with acute coronary syndrome (ACS) but its effect on the clinical outcomes in this subset of patients are not well-studied. We aimed to assess the association of non-thyroidal illness syndrome (NTIS) and clinical outcomes in patients with ACS by means of a meta-analysis.

Methods: We performed a literature search in PubMed, Embase and Cochrane databases through October 2022 for studies comparing the outcomes between NTIS and euthyroid patients with ACS. Outcomes of interest were in-hospital mortality, long-term cardiovascular mortality and long-term all-cause mortality. Study endpoints were pooled using DerSimonian and Laird random-effects model and were expressed as odds ratio (OR) with 95% confidence intervals (CI).

Results: 8 studies with 5,931 ACS patients (629 NTIS, 5,302 euthyroid patients) were included in the final study. Median follow-up period was 1.7 (1.0-3.9) years. Results of meta-analysis showed that patients with NTIS had a significantly higher odds of in-hospital mortality (OR 6.01, 95% CI 4.05-8.95, p<0.001), long-term cardiovascular mortality (OR 2.14, 95% CI 1.55-2.96, p<0.001) and long-term all-cause mortality (OR 2.86, 95% CI 1.85-3.28, p<0.001) compared to euthyroid patients. Results of all outcomes remained significant after sensitivity analysis via leave-one-out method. Meta-analysis using adjusted estimates showed that NTIS remained as a significant predictor of long-term cardiovascular mortality (OR 2.04, 95% CI 1.42-2.93, p<0.001) and all-cause mortality (OR 2.01, 95% CI 1.56-2.60, p<0.001).

Conclusion: NTIS is a predictor of adverse short and long-term prognosis in patients with ACS. Further studies should explore the risk factors of mortality and evaluate whether thyroid replacement therapy could yield benefit in this group of patients.
**Prognostic Value of Neutrophil-to-Lymphocyte Ratio in Patients with Acute Decompensated Heart Failure: A Meta-Analysis**

*Research*

Song Peng Ang

Jia Ee Chia; Vikash Jaiswal; Tong Hong Chia; Masih Lali; Manan Parikh; Jose Iglesias

*Rutgers Health- Community Medical Center (Vinod Nookala MD, FACP)*

**Background:** Inflammation plays a pivotal role in the pathogenesis in both acute and chronic heart failure. Recent studies showed that neutrophil-to-lymphocyte ratio (NLR) could be related to adverse outcomes in patients with cardiovascular diseases. We sought to evaluate whether NLR can predict mortality in patients with acute heart failure by means of a meta-analysis.

**Methods:** A comprehensive literature search were performed in PubMed, Embase and Cochrane databases through October 2022 for studies evaluating the prognostic value of NLR on mortality in patients with acute heart failure. Primary outcomes were in-hospital mortality and long-term all-cause mortality. Endpoints were pooled using random-effects DerSimonian-and-Laird model and were expressed as odds/hazard ratio (ORs/HRs) with corresponding 95% confidence intervals.

**Results:** A total of 9 studies with 10,154 patients with acute heart failure were included in the final study. Median age was 67.7 years and patients were predominantly male (56%). Results of meta-analysis showed that elevated NLR was associated with a significantly higher in-hospital mortality (HR/OR 1.77, 95% CI 1.36-2.30, p<0.001). Likewise, pooled analysis of studies with a median follow-up period of 2.14 years showed that higher NLR was associated with a significantly higher long-term all-cause mortality (HR/OR 1.66, 95% CI 1.46-1.90, p<0.001). Results of primary outcomes remained significant after sensitivity analysis via leave-one-out method. Subgroup analysis stratified by tertiles-based and cutoff-based NLR showed that there was no significant subgroup difference between studies on both in-hospital and all-cause mortality.

**Conclusion:** Elevated NLR was associated with an increased risk of short and long-term mortality and could be a useful tool or incorporated in the risk stratification.
The Role of Primary Prophylaxis In Asymptomatic aPL Patients: A Meta-Analysis

Research
Vishali Moond
Moond; Phuyal; Chaudhry; Patel

Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

Introduction: Antiphospholipid syndrome which is also known as Hughes syndrome is one the autoimmune disorder which is associated with a high morbidity and lethality rate, preventing the incidence of primary and secondary thrombosis is imperative. As seen, multiple pathological processes seem to be involved in causing APS while analyzing the nature of the clinical manifestations of this disease. Patients who show antiphospholipid antibodies should immediately be treated to prevent thrombosis events. However, limited evidence regarding the adequate primary prevention of thrombosis in aPL carriers exists. And most of the existing treatments focus on controlling the anticoagulation process. Nevertheless, several effective therapeutic methods have been documented in clinical studies.

Methods: Through our study, we intend to combine all the existing information on the effectiveness of treatment methods that are available for the prevention of primary thrombosis in aPL patients with and without risk factors. The investigators searched various search engines namely, PubMed, EMBASE, MEDLINE, and the Cochrane Database of Systematic Reviews for original articles that examined the efficacy and safety of primary prophylaxis in aPL patients. Out of the included studies 9 were prospective and 4 were retrospective cohort studies and 4 randomized controlled trials were included. The studies took into account two outcomes namely, thrombosis and fetal loss in patients without any prior history of these in aPL+ patients.

Results: By pooling the 12 included studies, we found an overall RR of 0.71 for the risk of the first thrombosis in aPL+ patients treated with aspirin versus those who were not treated (95%CI: 0.38 to 1.33) and RR of 0.55 for the risk of fetal loss in aPL+ patients treated with aspirin and anticoagulants vs the control group (95%CI: 0.13 to 2.22).

Conclusion: Our study provides updated information on APS morbidity and mortality characteristics in this decade. It can be seen that patients with APS still develop significant morbidity and mortality despite current treatment (which comprises mainly, oral anticoagulants and/or antiaggregant agents). These findings call for an increased effort in determining optimal prognostic markers and therapeutic measures to prevent these important complications in the APS in patients with acute heart failure.
A Quality Improvement Project to Improve Early Sepsis Care in Hospitalized Patients

Quality Improvement
Fariba Basali
Fariba Basali, MD; Amy Puliyel, MD; Ekaterina Vypritskaya, MD

Capital Health Regional Medical Center (Saba Hasan, MD, MACP)

Background: Sepsis causes substantial morbidity and mortality in hospitalized patients. Sepsis is potentially life-threatening when the body's response to an infection damages its tissues. Sepsis may progress to septic shock. This dramatic drop in blood pressure can lead to severe organ problems and death. Septic shock is a serious illness, and despite all the advances in medicine, it still carries a high mortality, exceeding 40%.

Objective: To improve compliance with the 0-3 hours and 3-6 hours reassessment bundles, to investigate the impact of a quality improvement intervention for severe sepsis and septic shock focused on IV fluids and antibiotics, to assess the impact of goals of care discussions

Design: Pre and Post implementation analysis

Methods: We used 289 patients' data from two different hospitals from August 2021 until December 2021 who were diagnosed with sepsis/septic shock as our pre-interventional data. A retrospective cohort study was undertaken to determine the intervention's impact on compliance with recommended sepsis management, including serum lactate measured in the ED or after admission, 30 ml/kg of intravenous fluid administered within two h of triage, antibiotics administered within three h of triage and blood cultures drawn before antibiotic administration. In this study and research, we have also included age, gender, ethnicity, length of stay, code status at the time of admission, final code status, palliative care consults, and primary data related to sepsis. In addition, we want to check how many of the providers used sepsis bundle, dot sepsis, appropriate antibiotics, and IV fluid, completed blood culture before starting the sepsis bundle or dot sepsis if the patient had any limitation for getting the proper amount of IVF that was provided on the hospitals' electrical medical record, co-morbidities, source of infection, refractory hypotension requiring vasopressors and mortality rate. Multiple interventions consisted of a computer-assisted screening algorithm that generated a 'Sepsis Alert' pop-up screen in the electronic medical record for treating clinical healthcare providers; an automated suggested sepsis-specific order sets for initial workup and resuscitation, antibiotic selection and goal-directed therapy, Sepsis patients case review every two weeks for the residents and attendings, lectures regarding appropriate antibiotic therapy providing by infectious disease specialists and pharmacists, two advance goals of cares workshops, a questioner on Monkey survey to assess the residents' pre interventions knowledge of sepsis/septic shock definition and management as well as the importance of goals of care discussion.

Conclusion: Resuscitation bundle compliance in severe sepsis and septic shock improved survival. The preliminary result of this project shows that we had a total increase in resuscitation bundle compliance from 60.00% to 63.33%, 62.34% to 67.21%, and a decrease in mortality rate from 24.20% to 21.48 %, 23.39% to 21.28% in the campus A and campus B respectively. This study is still ongoing.
A Case Of Crowned Dens Syndrome Mimicking Meningitis

Clinical Vignette
Hafsa Anwar
Sehris Khawaja

Capital Health Regional Medical Center (Saba Hasan, MD, MACP)

Introduction: Crowned dens syndrome (CDS) is a presentation of calcium pyrophosphate deposition (CPPD) disease consisting of acute neck pain, fever, and elevated inflammatory markers, accompanied by specific radiographic findings of CPPD in the cruciform and alar ligaments surrounding the dens of the axis. CDS is often underdiagnosed due to limited knowledge about the disease.

Case: An 82-year-old female with a history of atrial fibrillation, diabetes, hypertension, and gout was admitted with fever, chills, and neck pain. She reported pain extending from her shoulders to her feet and constant right foot aching causing difficulties in ambulation for 2 days. She also reported increased urinary frequency, shortness of breath, poor appetite, and nausea. Vital signs were temperature 38.1 C, HR 112 bpm and BP 122/60 mmHg. Physical exam revealed positive nuchal rigidity, palpable lymph nodes in the cervical region and Kernig’s test was not feasible due to severe pain. There was right foot warmth, and limited range of motion in the right lower extremity due to pain. Labs revealed leukocytosis of 19,000 and elevated D dimer. Blood cultures were negative. CT right foot and ankle showed osteoarthritis changes and calcification of the Achilles tendon, plantar fascia, and tibialis posterior tendon. Despite broad-spectrum antibiotics, she had persistent neck rigidity and fever. CRP was 34.3 mg/dl, and ESR 116 mm/hr. CT neck showed soft tissue inflammation and calcifications posterior to the odontoid process and along the cruciform and alar ligaments suggestive of CDS. The patient was started on colchicine 0.6 mg daily and oral prednisone 40 mg for 3 days with marked improvement in her symptoms. She was discharged on steroid taper, colchicine, and allopurinol.

Discussion: CDS accounts for approximately 2% of acute neck pain cases. The main cause of CDS is crystal deposition disease, including calcium hydroxyapatite and CPPD diseases. The diagnostic criteria for CDS include a history of acute neck pain and limited cervical activity, elevated inflammatory markers, and calcium deposition around the odontoid in cervical CT scans. CT scan of C1-C2 segments of the neck showing calcification deposits around the odontoid process is the “gold standard” for clinical diagnosis. Treatment options include corticosteroids, NSAIDs, and colchicine. Patients with CDS can mimic meningitis based on the findings of fever, neck pain, and raised inflammatory markers but other diagnostic clues such as CT findings of CPPD in the foot or ankle can suggest CDS. Therefore, our case highlighted the importance of considering CDS in the evaluation of neck pain and fever as it may prevent expensive and invasive investigations.
Brash Syndrome: A Syndrome of Shock In Renal Failure

Clinical Vignette

Nader Amini
Mohammad Abu-Abaa; Manish Gugnani

Capital Health Regional Medical Center (Saba Hasan, MD, MACP)

Background: The term BRASH syndrome (Bradycardia, Renal failure, Atrioventricular (AV) nodal blocking agent, Shock, and Hyperkalemia) was first coined in 2016 by Dr. Josh Farkas.

Aim: We are presenting two cases to highlight BRASH syndrome as a clinical entity that needs to be recognized. We aim to review recommended therapeutic interventions as the syndrome beyond a certain point may be irreversible and hence, fatal.

Cases: 70-Y old male with PMH of CAD on Carvedilol and Entresto presented with AMS and AHRF. Found to be bradycardic with HR of 30-40, K level of 6.5 and hypotensive, AKI on CKD with GFR: 13. Patient was digressed and BB and ARNI stopped. A temporary pacemaker was placed and Epinephrin drip started. Intubated for AHRF. As diuresis failed hemodialysis started and shock, hyperkalemia, and bradycardia resolved.

64-Y old male, case of ESRD on HD, has been on Cardizem CD for PAF, also metoprolol 37.5 mg bid which dose has been increased recently and losartan, presented with generalized weakness and AMS. Had HR of 20/min with A-fib rhythm, hypotensive, and K level of 6.5, Atropine and treatment of hyperkalemia received, no improvement, Epinephrin drip started. Urgent HD started which improved shock and HR and hyperkalemia resolved.

Discussion: It is well established that both hyperkalemia and AV blocker agents may cause bradycardia. BRASH Syndrome occurs in patients taking an AV blocker agent (commonly beta-blockers or calcium-channel blockers) who subsequently develop acute renal injury. As the renal injury progresses, patients become hyperkalemic, and the AV-nodal blocking agent begins to accumulate. These two factors, hyperkalemia and AV-nodal blockade, act synergistically to cause bradycardia and hypotension. This leads to end organ hypoperfusion, which further worsens renal function, and the vicious cycle continues. The typical patient will be an elderly individual who clinically appears much better than expected for the degree of bradycardia. The most common triggering factor is dehydration. The threshold to use epinephrine in case bradycardia fails to respond to IV calcium should be low. Treatment of bradycardia remains important to re-establish systemic perfusion and renal function. The front-line therapy for elimination of potassium from the body is usually an aggressive attempt at diuresis using potassium-wasting diuretics. Patients with marked hyperkalemia who fail to produce urine in response to high-dose diuretics and hemodynamic stabilization will often require emergent dialysis as definitive treatment of hyperkalemia. More advanced therapies usually used to reverse beta-blocker or calcium channel blocker toxicity (e.g., lipid emulsion, glucagon, or high-dose insulin infusion) could be considered in a patient taking beta-blockers, which are renally cleared and thus accumulate in the context of BRASH syndrome. Another stimulus to consider these treatments might be a patient who is on unusually large doses of multiple AV-nodal blocking agents.
Autoimmune Polyglandular Syndrome II in a Young Female with Severe Weight Loss,
DKA, and Psychiatric Features

Clinical Vignette
Gelareh Wintermyer
Cristine Arcilla; Erika Villanueva

Capital Health Regional Medical Center (Saba Hasan, MD, MACP)

Introduction: Autoimmune polyglandular syndrome type II (APS II) is combination of multiple endocrine diseases in a patient. The most common associated diseases are diabetes type I, Hashimoto thyroiditis, and Addison’s disease. Most patients present with nonspecific symptoms. Here we describe a 19-year-old female with APS II.

Case: A 19-year-old female with history of depression presented to hospital with severe nausea, vomiting and chest pain. She was diagnosed with pneumomediastinum secondary to hyperemesis. The symptoms were assumed to be secondary to ziprasidone that she was then taking. As her nausea and vomiting continued, patient experienced 20-pound weight loss in a short period. Patient went to ED again for excessive weight loss. She was diagnosed with DKA for the first time and was admitted to ICU (Glucose level above 500 mg/dL and A1C 7.1%). After discharge, patient came to the endocrinology clinic for management of type 1 diabetes. Her BMI was 17 kg/m2. Vital signs were normal. Since the start of insulin therapy, patient’s BMI increased to 18.5 kg/m2. Patient was clinically well for 1 year. She had periodic complete blood tests, including TSH, A1C and CMP, all of which remained normal with A1C’s of 6.3% and 6.8%. Approximately 1 year later, her TSH was 8.230 uIU/mL and free T4 was 0.92 ng/dL with subsequent TPO of 27 IU/mL. Diagnosis of Hashimoto’s hypothyroidism was made. she was started on levothyroxine. Even though patient was on treatment for hypothyroidism, she complained of fatigue. CMP showed sodium 133 mEq/l and bicarbonate 17 mEq/l. Cortisol AM and ANA were ordered. Before patient had the lab tests done, she was admitted to psychiatric hospital due to psychosis and spontaneous crying and laughing. Shortly after, patient was transferred to medical hospital for nausea and vomiting. Her labs were as follow: Sodium 100 mEq/l, Potassium 6.5 mEq/l, Bicarbonate 12 mEq/l, anion gap 19, Glucose 157 mg/dl. Stat cortisol and ACTH were 1.3 mg/dL and 332 pg/mL, respectively. Patient was admitted to ICU with adrenal crisis. She was started on Fludrocortisone and IV Hydrocortisone and IV fluid for hyponatremia. She was discharged from hospital with resolution of her psychiatric features. Her final diagnosis was APS II. She was started on Fludrocortisone 0.1, Hydrocortisone 20 mg in the morning and 10 mg at night.

Conclusion: Clinicians should think of this disease when assessing a patient who has presented with other autoimmune endocrinologic diseases, especially diabetes type I or adrenal insufficiency. Frequent visits, complete metabolic panel, and routine antibody screening tests including GAD antibodies, anti-adrenal antibodies, and TPO antibodies help in diagnosing this syndrome earlier. Clinicians also should first try to rule out medical causes before diagnosing a patient with psychiatric disease as profound hyponatremia can cause acute psychosis.
When a Systemic Issue Leads to Disseminated Disease:  
A Case of Disseminated Mycobacterium Avium Complex  

Clinical Vignette  
Justin Panthappattu  
Noreen Ahmed, Marcella Katsnelson  

Hackensack University Medical Center (Marygrace M Zetkulic, MD)

Introduction: In the era of highly active antiretroviral therapy (HAART), the prevention of AIDS-defining illnesses such as disseminated Mycobacterium avium complex (DMAC) has improved dramatically in the developed world. However, the social determinants of health impact efficacy of treatment. In such cases the primary care provider becomes a necessary advocate and component of successful treatment.

Case: A 34 year old HIV-positive man who has sex with men presented with chronic abdominal pain, weight loss and bloody diarrhea. He was diagnosed with HIV in 2018 after which he was disowned by family. He endorsed inconsistent follow up with a primary care physician (PCP) and adherence with HAART. In the absence of a trusted PCP, he sought care in acute care settings. Prior to presentation to our team, he had been evaluated at another hospital where he was found to have profound pancytopenia, CD4 count of <50 cells/mm3, indeterminate QuantiFERON, and diffuse abdominal lymphadenopathy on imaging before leaving against medical advice. Examination revealed a cachectic, ill-appearing male with abdominal tenderness and scattered petechiae. Stool studies and blood cultures were negative. Thrombocytopenia was refractory to transfusion, raising concern for immune thrombocytopenic purpura however treatment was ineffectual, prompting bone marrow biopsy which revealed hypocellularity and decreased megakaryocytes. Marrow culture grew MAC for which azithromycin, ethambutol and rifabutin were initiated. Course was further complicated by shock from Clostridium difficile colitis and Streptococcus mitis bacteremia. He developed progressive hyperbilirubinemia, prompting a change from rifabutin to levofloxacin. Despite treatment, he developed worsening shock causing multi-organ failure before ultimately expiring.

Discussion: In recent years, the rate of infection with nontuberculous mycobacterium (NTM) has risen in North America. Typically manifesting as pulmonary infections in immunocompetent hosts, the pathogen can cause disseminated infection in the immunocompromised. Despite this risk, HAART usage has mitigated the incidence of DMAC. Constitutional symptoms are characteristic of DMAC. Isolated symptoms of undifferentiated etiology in an immunocompromised host, however, can create a diagnostic puzzle. The pursuit of alternate etiologies and presence of conditions such as thrombocytopenia may delay tissue procurement and diagnosis. Anticipated initial response to antibiotics is variable, ranging from two to four weeks when added to HAART therapy. Consequently, patients may succumb to comorbidities in an extreme immunocompromised state before an adequate response can be appreciated.

Conclusion: This case serves as a cautionary tale, highlighting the role of a therapeutic alliance in addressing treatable complications of treatable illnesses. Establishing and maintaining a regular relationship with a primary care doctor can be the difference between early intervention, medication adherence and minimal morbidity, and as this case illustrates, mortality. The dearth of primary care resources across the country sets an ominous tone for similar, preventable complications in advanced disease.
Introduction: Postpartum posterior reversible encephalopathy (PRES) is a well-recognized disease process that can present in a variety of patient populations. A diagnosis is made based on presenting clinical picture and diagnostic neuroimaging. However, in pregnancy PRES can be difficult to distinguish from other disease processes such as Eclampsia. Initial presentation with new-onset seizure activity is seen in approximately 74-87% of patients who are diagnosed with PRES. The acute onset of this disease process can result in significant maternal and fetal morbidity and mortality. We present a rare case of a healthy 28-year-old gravid patient with a prenatal course complicated by new-onset seizure activity, with an ultimate diagnosis of PRES.

Case: A 28-year-old nulligravid at 29 weeks and 1-day gestation with no medical history presented to the emergency department following a witnessed seizure. Initial vitals revealed a blood pressure of 168/108 mm/Hg. She was treated with 20 mg intravenous Labetalol and continuous Magnesium Sulfate infusion. Following transfer to labor and delivery, an additional 140 mg intravenous Labetalol was required for persistent severe-range blood pressures. Upon stabilization, a primary cesarean section was performed without complication. Postpartum course was complicated by acute agitation and persistent severe-range blood pressure. The patient was transferred to the intensive care unit for continuous intravenous Clevidipine infusion. Computed tomography (CT) of the head revealed decreased attenuation in the occipital lobes bilaterally. Magnetic resonance imaging (MRI) of the brain demonstrated areas of increased signal in the subcortical white matter of the bilateral occipital lobes, left temporal lobe, and left frontal cortex. The patient was ultimately diagnosed with PRES. Mentation improved to baseline with strict blood pressure control and she was eventually discharged with referral for outpatient neurology follow-up.

Discussion: PRES was first described by Hinchey et al. in 1996, which analyzed 15 patients. This study included three postpartum patients who developed Eclampsia. Initial symptoms include seizures, encephalopathy, and neurological deficits. The two most used diagnostic modalities are non-contrast CT scan and T2-MRI. Neuroimaging reveals vasogenic edema, located primarily in the parieto-occipital regions, which is largely symmetric, bilateral, and subcortical. As the density of the autonomic nervous system is present in the anterior circulation, the posterior blood-brain barrier remains vulnerable to hyperperfusion, resultant cerebral dysregulation, and vasogenic edema. While this condition can be reversible, prompt intervention is necessary. In pregnant patients, intervention is through immediate maternal stabilization with the administration of Magnesium Sulfate and use of anti-hypertensives as indicated. If there is minimal disruption of the maternal-fetal oxygenation pathway, maternal stabilization is achieved prior to immediate cesarean delivery.

Conclusion: The diagnosis and management of PRES rely on a successful interplay between specialties. This case highlights the importance of this relationship which results in both decreased fetal and maternal morbidity and mortality.
Double-Trouble: Pembrolizumab Induced Acute Myocarditis and Thyroiditis

Clinical Vignette

Anmol Johal

Steven Imburgio; Ndausung Udongwo; Anton Mararenko; Medin Tafa; Sowmya Dandu; Hira Akhlaq; Joseph Heaton; Arman Mushtaq

HM Jersey Shore University Medical Center (Arman Mushtaq, MD)

Introduction: Novel immune checkpoint inhibitors (ICPi) have revolutionized the field of immuno-oncology. Pembrolizumab targets the programmed death (PD) pathway by binding to cancer cells that overexpress PD-1 ligands [1]. The immunotherapy blocks the PD-1/PD-L1 pathway that certain tumors utilize to inhibit the host immune system; however, this effect can also lead to severe or fatal immune-mediated adverse reactions. We present the first documented case of concurrent myocarditis and thyroiditis associated with pembrolizumab therapy.

Case: A 69-year-old female with past medical history of hypertension, hyperlipidemia, anemia, diabetes mellitus, recently diagnosed triple-negative breast cancer status post lumpectomy, neoadjuvant chemotherapy and immunotherapy, presented to the emergency department (ED) with a two-week history of generalized weakness and anasarca. Symptoms of weakness, swelling, and fatigue started after chemotherapy was initiated. Patient was receiving carboplatin/paclitaxel and cyclophosphamide/doxorubicin for chemotherapy and pembrolizumab for immunotherapy. The patient last received chemotherapy four months and immunotherapy two months prior to presentation. The patient was hemodynamically stable with elevated d-dimer of 2069 ng/mL, hemoglobin 7.7 g/dL, leukopenia of 3.1, and an elevated high sensitivity troponin I of 83 ng/L (ref range: <34 ng/L). Electrocardiogram was significant for sinus rhythm with first-degree atrioventricular block and low voltage QRS, <5 mm in leads II and III. A chest computed tomography angiogram revealed pulmonary venous congestion with trace pericardial effusion. Echocardiography showed a reduced ejection fraction of 51-54%, physiologic pericardial effusion, and global longitudinal strain of -14. Further investigation with cardiac magnetic resonance imaging (MRI) revealed findings consistent with myocarditis based on 2018 Lake Louise criteria. Thyroid stimulating hormone was elevated at 87.08 ulU/mL and free T4 was decreased at 0.14 ng/dL, with previous values being 1.365 ulU/mL and 1.37 ng/dL respectively. Hypothyroidism was suspected to be secondary to pembrolizumab and thyroid peroxidase antibodies were found to be elevated. The patient was started on five days of prednisone 80 mg daily for myocarditis and levothyroxine 125 mcg daily for thyroid hormone replacement. The patient’s symptoms resolved and she was discharged with outpatient follow-up.

Discussion: Mortality of 25-50% is associated with ICPI myocarditis and sequelae, including arrhythmias and cardiomyopathy, making this an important adverse effect to recognize [4]. Recognizing these potentially fatal side effects of ICPIs may increase patient safety, and also have additional clinical importance as the rate of response to immunotherapy was found to be higher in patients with reported immune-mediated adverse reactions [5]. While immune checkpoint inhibitors have served as a major breakthrough in managing a multitude of cancers, it is important to be aware of the increasing incidence of immune-related adverse events. To our knowledge, this is the first reported case of concurrent myocarditis and thyroiditis associated with pembrolizumab. Patients may benefit from cardiac and thyroid function screening before and during the initiation of ICPIs.

Conclusion: Further studies are needed to assess for prevalence and timely treatment of complications to help better patient outcomes.
Dolichoectasia with Bilateral Internal Carotid Artery Involvement: A Rare Cause of Encephalopathy

Clinical Vignette
Kameron Tavakolian
Sarah Esposito; Ally Ferber; Savannah Nightingale; Kameron Tavakolian; Anton Mararenko; Sherif Eltawansy; Joseph Heaton

HM Jersey Shore University Medical Center (Arman Mushtaq, MD)

Introduction: Dolichoectasia is an exceedingly rare disorder of the cerebral vasculature characterized by arterial elongation and widening. Long-standing hypertension in which the increased pressure exerts stress on the connective tissue of the vasculature results in a compromised tunica intima. The overall prevalence is estimated to be around 0.05-0.06% and it is usually found incidentally; most commonly, it affects the vertebrobasilar artery, though the internal carotid artery can also be affected. We present an interesting case of an 85-year-old male patient with altered mental status who was found to have dolichoectasia with bilateral internal carotid artery involvement. Our aim is to shed light on a rare etiology of encephalopathy.

Case: An 85-year-old male with a medical history significant for hypertension, hyperlipidemia, chronic kidney disease, and mild dementia presented to our hospital from rehab with worsening altered mental status over a period of 2 days. History was limited secondary to the patient’s altered mental status and collateral information from the rehab facility revealed no further pertinent information. The patient was hypertensive with a blood pressure of 197/108 mmHg. Physical exam was largely unremarkable aside from being alert and oriented to person only. Laboratory studies including but not limited to complete blood count, serum glucose, calcium, ammonia, and arterial blood gas were within normal limits. There were no signs of infection. A computed tomography scan of the head without contrast demonstrated chronic microvascular ischemic changes. On the second day of admission, the patient’s encephalopathy persisted and further imaging was performed. Magnetic resonance imaging of the brain without contrast showed diffuse dilation of the vertebrobasilar system and internal carotid arteries, as well as elongation and compression of the left lateral pons. Follow-up magnetic resonance angiography of the brain confirmed a diagnosis of dolichoectasia measuring up to 7 mm in diameter. After conservative hemodynamic management, the patient was discharged to rehab once his mentation improved.

Discussion: Dolichoectasia is an incredibly rare arteriopathy that, when found, is often localized to the vertebrobasilar circulation and rarely involves the anterior cerebral circulation. The prevalence of dolichoectasia is low, however, the implications of a missed diagnosis can lead to increased morbidity and mortality. The progressive vascular wall distension and luminal widening compounded by age-related cerebral atrophy propagate further ballooning of the vascular wall. In the setting of uncontrolled hypertension, the effects of vascular dilation are much higher and can result in spontaneous hemorrhage events, ventricular compression, and hydrocephalus. Our patient was found to be in hypertensive crisis on admission and, in the setting of dolichoectasia, was likely contributing to changes in mentation.

Conclusion: Our case adds to a limited but growing body of literature that dolichoectasia can involve the ICA and contribute to encephalopathy in the elderly population.
Two L’s: Linezolid Induced Lactic Acidosis

Clinical Vignette

Anmol Johal

Steven Imburgio; Brandon Nightingale; Alejandro Cruz-Ponce; Anton Mararenko; Ndausung Udongwo; Joseph Heaton

HM Jersey Shore University Medical Center (Arman Mushtaq, MD)

Introduction: The use of powerful antibiotics in severe drug resistant infections becomes limited in certain cases due to the adverse effects associated with treatment options. Linezolid is an oxazolidinone that inhibits bacterial protein synthesis, used mainly for gram positive infections including vancomycin-resistant enterococcus [1]. Severe complications such as serotonin syndrome, Clostridium difficile infection, and lactic acidosis can occur with use [1]. We present a case of lactic acidosis after a course of linezolid.

Case: Patient is a 70-year-old female with a past medical history of epilepsy, liver cirrhosis, diabetes mellitus, prior hepatic encephalopathy, morbid obesity, and uterine cancer who presented with confusion and shaking from home after her concerned husband called emergency medical services. In the emergency department (ED) the patient had a Glasgow coma scale of 4 and was intubated for airway protection. Workup at the time of admission revealed septic shock secondary to Escherichia coli urinary tract infection (UTI) and bacteremia. Patient was started on ceftriaxone for the UTI and moved to the neurological intensive care unit for multifactorial encephalopathy and further work-up including video EEG for potential seizures. Patient was eventually extubated and transferred to medicine floors after a course of antibiotics. The patient’s hospital course was complicated by multiple rapid responses for hypotension and altered mental status that ultimately lead to her care being escalated to the medical intensive care unit (ICU) due to intubation. Patient was found to have toxic metabolic encephalopathy and also found to be bacteremic with vancomycin-resistant enterococcus faecium (VRE) and Candida. Patient was started on fluconazole and linezolid. After six days of linezolid, the patient was found to have elevated lactic acid of 7.8 mmol/L from a previous lactic acid of 2 mmol/L and an anion gap of 18. Linezolid was stopped and there was a significant improvement of the lactic acid to 6.3 mmol/L and anion gap to 15. Lactic acid continued to downtrend after discontinuation of linezolid and without any other significant intervention. Patient was not hypoxemic, anemic or in a low cardiac output state during this time. The patient’s condition continued to deteriorate, however, and the decision was made to transition to comfort care.

Discussion: The first line agent for VRE infections and bacteremia in the majority of cases is linezolid. Lactic acidosis results from interactions between linezolid and mitochondrial ribosomes causing a decrease in aerobic energy production and increasing anaerobic glycolysis and generation of lactate [3]. It was found that the incidence was ~6.8%, mortality associated with linezolid lactic acidosis was 25.5% and found that male gender may be related to increased mortality [4-5]. Due to the highly lethal nature of this adverse reaction, close monitoring and prompt discontinuation of linezolid is paramount in lactic acidosis.

Conclusion: Further studies on risk factors and interactions that may exacerbate lactic acidosis in patients on linezolid may potentially lead to better patient outcomes.
A Case of Blood Patch for Headaches
Clinical Vignette
Ann Kozlik
Ndusung Udongwo; Mohammad Hossain; Shuvendu Sen

HM Jersey Shore University Medical Center (Arman Mushtaq, MD)

Introduction: Spontaneous intracranial hypotension (SIH) is a rare and under-diagnosed condition with an estimated incidence of 5 in 100,000. It is classically associated with a postural headache. Often patients have minimal headaches lying down with exacerbation upon standing. It can also be associated with nausea, vertigo, or tinnitus. We present a case of an unusual cause of headaches requiring management with a blood patch.

Case: Our patient is a 41-year-old Hispanic male with no past medical history who presented to the emergency department with 2-3 weeks of dizziness and headaches. His symptoms were also associated with feelings of head congestion or heaviness, fogginess, confusion, and “feeling intoxicated”. Furthermore, he endorsed blurred vision, balance instability, bilateral tinnitus, and diminished hearing describing it as “feeling like I am underwater”. The symptoms were exacerbated by turning his head from side to side and standing up. The headache was located in the frontal region and at the top of his head, 7/10 in intensity, and described as a dull ache. He denied any recent head trauma or upper respiratory tract infection. Vital signs were BP 155/86 mm Hg, HR 86, RR 16 bpm, afebrile, and SpO2 99% on ambient air. Physical examination notable for bilateral nystagmus and diminished hearing bilaterally. Labs were unremarkable. Meclizine was initiated for the initial concern of Meniere’s disease. Magnetic resonance imaging (MRI) of the brain revealed diffuse pachymeningitis. MRI cervical, lumbar and thoracic spine showed intracranial hypotension with cerebrospinal fluid (CSF) collections most prominent throughout the cervical spine. Computed tomography myelogram did not show an obvious source of leakage. He underwent a blood patch procedure with dramatic improvement in all symptoms the following day. He endorsed a 1/10 headache and was discharged home in stable condition.

Discussion: SIH with an incidence rate of 0.005%, is a rare cause of headaches with a classic presentation of a new headache worsening with upright posture along with other neurologic complaints. The cause is related to a tear or hole in the dura allowing for a leakage of CSF which causes symptoms worse with standing. Imaging with MRI can show diffuse meningeal enhancement. Mild cases may respond to bedrest, fluids, and caffeine intake while more severe cases respond well to blood patch procedures involving injection of the patient’s blood into the epidural space to close the defect.

Conclusion: The purpose of our case is to bring awareness to a case of headaches, hearing loss, vertigo, and other neurologic complaints which could be mislabeled as Meniere’s disease or benign paroxysmal positional vertigo.
Hepatic Abscesses as a Complication of Xanthogranulomatous Pyelonephritis

Clinical Vignette

Matthew Balatbat

Vishal Ramjas, MD; Bijal Mehta, MD, FACP; Roveena Goveas, MD, MS

HM Mountainside (Bijal, Mehta, MD)

Introduction: Xanthogranulomatous pyelonephritis (XGP) is a rare variant of chronic pyelonephritis in the setting of recurrent nephrolithiasis. Due to its ability to spread to adjacent structures, XGP must be differentiated from malignancy. Early diagnosis can prevent complications, and nephrectomy remains the definitive treatment. Here, we present an atypical case of XGP with hepatic infiltration.

Case: A 58-year-old woman with multiple sclerosis, neurogenic bladder with indwelling catheter, and recurrent nephrolithiasis presented with worsening malaise and dizziness. Vitals signs were stable and physical exam was remarkable for baseline lower extremity weakness. Blood work identified leukocytosis (14.2 x 10⁹/liter) and severe anemia (6.6 grams/deciliter). Urinalysis showed pyuria and calcium oxalate crystals. CT imaging revealed bladder calculi, largest 3x2cm², and right renal calculi, largest 2x2cm², with communicating hepatic abscesses, largest collection 13x9cm². CT appearance of the right kidney showed the “bear paw” sign indicating fatty infiltration, consistent with Xanthogranulomatous Pyelonephritis. Hepatic abscesses were drained, totaling 700cc. Post-drainage CT revealed near total resolution. Cultures grew S. anginous and B. fragilis. Following two-week treatment with levofloxacin and metronidazole, the patient was scheduled for nephrectomy and cystolithotomy with placement of suprapubic catheter.

Discussion: XGP is a rare complication of chronic obstructive nephrolithiasis, accounting for 0.6% of renal infections. Granulomatous tissue with lipid-laden macrophages destroy the kidney, which can be mistaken for renal cancer. In one study, all XGP patients had renal calculi, 34% with staghorn calculi and 85% were female. Typical XGP symptoms include fever, malaise, anorexia, flank pain, and a renal mass. Workup reveals pyuria, anemia, elevated ESR, and liver function abnormalities, indicating biliary retention. XGP is usually unilateral and is associated with gram negative organisms, commonly E. coli; however, cultures may be sterile. Because this entity can be diffuse or focal, it is crucial to distinguish XGP from renal carcinoma, septic emboli, renal abscess, and malacoplakia. Recurrent nephrolithiasis induces a prolonged immune reaction. Three layers are observed: an inner layer of necrosis caused by lymphocytes, plasma cells, and lipid-laden macrophages, a middle layer of granulation tissue, and an outer layer of giant cells and cholesterol clefts. These inflammatory processes lead to fistula formation. Hepatic and intrathoracic extension have been rarely reported in the literature. In one case following total nephrectomy a hepatic abscess was incidentally discovered. In cases with extrarenal extension, treatment consists of nephrectomy, fistula closure, and abscess drainage.

Conclusion: XGP is commonly caused by recurrent nephrolithiasis and indwelling urinary catheters. In patients presenting with hepatic abscesses and a history of chronic nephrolithiasis, it is critical to consider XGP with extrarenal abscess formation for appropriate treatment.
Shock, shock, shock... ? Pyridostigmine: 
Recurrent Ventricular Tachycardia as a Presenting Symptom of Myasthenia Gravis

Clinical Vignette
Soroush Seifirad
Zaza Cohen, David Blady, Bijal Mehta and Ali Elsayed

HM Mountainside (Bijal, Mehta, MD)

Introduction: Non ischemic recurrent ventricular tachycardia (VT) can be a rare presentation of Myasthenia Gravis.

Case: A 72-year-old male with past medical history of diabetes mellitus Type 2 and granulomatosis with polyangiitis presented after a VT arrest; patient was shocked and intubated in the field. ECG revealed normal sinus rhythm with no evidence of heart block or ischemia. Echo revealed an ejection fraction of 55-60% with no regional wall motion abnormalities. The patient had another episode of VT in the Intensive Care Unit (ICU) which was medically managed with amiodarone. Subsequent coronary catheterization showed normal coronary arteries without occlusion. Computed tomography (CT) Angiogram of the Chest was negative for proximal pulmonary emboli, revealing only atelectasis in both lower lobes and right upper lobe. The patient had an Implantable Cardioverter-Defibrillator (ICD) placed as definitive treatment for refractory VT. Further history from the patient’s wife revealed weeks of fatigue and generalized weakness, 2 weeks of poor oral intake, difficulty swallowing fluids and solids with spells of coughing/choking, 10 lb weight loss and one episode of fall due to weakness. She did not report any shortness of breath, recent fever, loss of consciousness, diarrhea, droopy eyelids, diplopia or seizures. Given the findings of nonspecific weakness, dysphagia, atelectasis on CT scan, and normal coronary angiography and normal electrolytes, myasthenia gravis was considered as a unifying diagnosis. The patient was found to have very high Acetylcholine receptor (ACHR) binding protein and high Acetylcholine blocker and Acetylcholine modulator antibodies. The patient was referred to a neurologist, treatment was started for myasthenia gravis, and amiodarone was discontinued. Further follow up with the family revealed that the treatment stopped VT attacks, and the patient had a significant functional improvement. Further work ups revealed Anti Kv 1.4 antibody and Anti striational antibodies both specific for cardiac involvement in myasthenia gravis.

Discussion: This case demonstrates the importance of a thorough and complete history, as that is what ultimately elucidated the cause of refractory VT, a very rare cardiac manifestation of myasthenia gravis.
Introduction: Hepatocellular carcinoma (HCC) is a significantly common cancer worldwide however remains among those with poor prognosis despite advances in treatment. Previous studies have shown that patients usually present signs and symptoms pertaining to the liver. While HCC metastases are reported as low as 5% the most common locations of HCC metastases are the lung, lymph nodes, bone and adrenals. Herein, we describe a case of HCC that presented with skull metastases with orbital invasion as the initial manifestation.

Case: A 40-year-old male with a past medical history of B-cell non-Hodgkin lymphoma in remission since the age of 15 and chronic untreated Hepatitis C presented complaining of a right temporal mass. Initially, the patient noticed a painless right temporal swelling which enlarged rapidly over several weeks and later became associated with right eye pain. He denied any history of head trauma. Within the following weeks, the patient experienced rapidly worsening symptoms, including right eye proptosis, eye pain, blurry vision, and headache. On physical evaluation, the patient exhibited gross deformity of the right upper face, significant right eye proptosis, fixed eye movements, and upper and lower eyelid erythema and edema. MRI identified a 7.5 cm right frontotemporal destructive mass involving the sphenoid orbital region extending into intracranial and extracranial soft tissue. Biopsy demonstrated cells positive for hepatocyte specific antigen (HSA), Arginase, and Glypicans 3 with few cells positive for alpha fetoprotein and CD10. Serum alpha fetoprotein level was 1280. Retrograde diagnostic workup and whole-body computed tomography (CT) were performed to identify a primary lesion. CT of the abdomen revealed significant liver cirrhosis with ill-defined enhancing lesions in hepatic segments 7 and 8 with no evidence of metastasis. Liver MRI showed liver cirrhosis with four right lobe lesions, with the largest in segment 7 measuring 2.5 centimeters. Peritoneal tapping did not reveal any malignancies. A diagnosis of hepatocellular carcinoma with metastasis to the skull and orbit was made. During the hospital course, the patient suffered from a sudden onset of massive upper GI bleeding and passed away before receiving any treatments for HCC.

Conclusion: This case requires special attention because our patient initially presented with signs and symptoms pertaining to a skull mass without any other complaints. We hope that physicians consider HCC metastasis as a differential diagnosis in patients presenting with skull lesions.
Marked Sinus Bradycardia in a COVID-19 Patient

Clinical Vignette

Carlos Va1ladares

Temitopé Kofi; Adam Kaplan

Rutgers Health- Community Medical Center (Vinod Nookala MD, FACP)

Introduction: There have been reports in the literature of cardiac manifestations of COVID-19, including bradyarrhythmia. Nevertheless, the association between COVID-19 and bradycardia has only been observed in hospitalized patients with moderate to severe infection and those on treatment with Remdesivir or Tocilizumab.

Case: A 33-year-old female presented to the emergency department with a 1-day history of intermittent dizziness and light headiness. She had never received a COVID-19 vaccine and had tested positive for COVID-19 four days before her admission which prompted her to come to the ED. Review of systems was negative for fever, fatigue, SOB or chest discomfort. She had no past medical history and was not taking any prescribed or over the counter medications. On arrival to the Emergency Department (ED), BP 115/61, heart rate of 59 BPM, oxygen saturation (SpO2) 99% on room air and temperature was 97.5 F. Physical examination was unremarkable for central nervous, cardiovascular, respiratory and gastrointestinal systems. Chest X-ray was unremarkable and EKG was remarkable for sinus bradycardia with a heart rate of 50 BPM. Patient was not started on any COVID-19 specific therapy (e.g., Remdesivir, Paxlovid, Tocilizumab) as she has no symptoms or risk factors. On day 2 of admission, telemetry alarm showed heart rate of 45, EKG performed revealed sinus bradycardia with short PR and heart rate of 42 BPM. SpO2 was 98%, troponin-I levels were normal. CTA was also obtained but was unremarkable. On day 3, nurse reported a heart rate of 32 BPM, another EKG was obtained and showed marked sinus bradycardia of 35 BPM. Cardiology was consulted and performed an echocardiogram which showed normal heart structure with preserved ejection fraction. No therapeutic intervention was required at the moment. Patient continued to have transient episodes of asymptomatic bradycardia and was discharged on day 3 of hospitalization and advised to follow-up with their PCP and cardiology.

Discussion: Patients with COVID-19 are increasingly presenting with bradyarrhythmia, especially those with moderate to severe disease and those on treatments such as Remdesivir or Tocilizumab. It appears, however, that covid-19 can cause these conditions on its own. The specific mechanisms fundamental to the development of bradyarrhythmia in these patients remain indistinct, and they may be multifactorial. The development of bradyarrhythmia can be considered a clinical feature of COVID-19, which could imply cardiac involvement. Therefore, cardiac rhythm monitoring should be performed on these patients and cardiac and inflammatory biomarker monitoring should also be considered. Regardless of the severity of the patient’s condition, we recommend a baseline ECG for patients hospitalized due to COVID-19.
Mortality Rates from Heart Diseases Are Decreasing in Younger Men but Not in Younger Women in US, 2000-2020: Population Analysis

Research
Meet Shah
Benjamin Simmons; Yazan Abboud

Rutgers New Jersey Medical School Program (Daniel Matassa, MD)

**Background:** Heart diseases (HD) remain the leading cause of mortality in the US with 697,000 deaths in 2020. With the improvement in healthcare, HD mortality rates have been steadily decreasing over the last decades. However, there are limited data on recent age and sex-specific HD mortality trends. The aim of this study was to conduct a time-trend analysis of recent HD mortality rates using the CDC’s National Canter of Health Statistics (NCHS) database.

**Methods:** Data were obtained from the NCHS database, which nearly covers 100% of deaths attributed to HD in the US, between 2000-2020. HD mortality rates were age-adjusted to the standard 2000-US population and categorized by age and sex using SEER*Stat Software (v.8.4.0.1, National Cancer Institute “NCI”). Time-trends were calculated using Joinpoint Regression software (v.4.9.0.1, NCI) which utilizes Monte Carlo permutation analysis to generate the simplest segmented trend. Trends were reported as annual percentage change (APC) and average APC (AAPC) over the entire period. Pairwise comparison was performed to evaluate for identicalness (test of coincidence) and parallelism (test of parallelism). AAPC absolute difference was evaluated as well using parametric estimations and Taylor series expansion. The population was then subdivided into older and younger adults, defined by a cutoff at age 55 years, and the aforementioned analysis was reconducted. A 2-sided p-value cutoff at 0.05 was used for statistical significance.

**Results:** Between 2000-2020, there were a total of 13,508,063 deaths attributed to HD in the database (48.6% women). Overall, HD mortality rates were decreasing in women (AAPC=-2.55, P<0.001) at a significantly greater rate compared to counterpart men (AAPC=-2.14, P<0.001) with an absolute AAPC-difference of 0.41 (P=0.004). Sex-specific data were non-parallel nor identical data (both P-values <0.001). Similar findings were seen among older adults (12,409,169 deaths, 50.3% women) in whom the AAPC was decreasing in women (AAPC=-2.69, P<0.001) at a significantly greater rate compared to counterpart men (AAPC=-2.32, P<0.001) with absolute AAPC-difference of 0.37 (P=0.01). However, when looking at younger adults (1,083,531 deaths, 29.6% women), HD mortality rates were significantly decreasing in men (AAPC=-0.63, P<0.001) but not in women who experienced a stable trend (AAPC=-0.39, P=0.05). Sex-specific trends were not identical nor parallel (both P-values<0.001) suggesting that HD mortality rates in younger men are different and decreasing at a significantly greater rate compared to the stable trend in younger women.

**Discussion:** Nationwide data from the CDC’s NCHS, covering 100% of deaths attributed to HD in the US, shows that HD mortality rates have been declining in the US over the past two decades. However, when evaluating younger adults, aged <55 years, HD mortality rates have been improving in men but not in women. Future studies are needed to evaluate the disparity in HD mortality outcomes among younger adults.
Ethnic Differences in Use of Peer Recovery Services for Substance Use Disorders in New Jersey

Aayush Visaria
Ranita Sharma; Neil Basumallik; Payal Dave

Rutgers Robert Wood Johnson Medical School Program (Ranita Sharma, MD, MACP)

Background: Substance use disorders led to more than 90,000 hospitalizations in NJ in 2019. Nearly 77% of patients discharged in 2019 were readmitted within 30 days. To combat this, a large NJ healthcare system established a Peer Recovery Program (PRP) aimed at providing multi-disciplinary care and support services after discharge. We sought to describe the racial/ethnic differences in the characteristics of patients offered these services, with particular attention to SAs, a fast-growing but understudied group.

Methods: This was a cross-sectional descriptive study of English-speaking, ED or hospitalized patients referred to PRP services in 2021 at one of 21 participating hospitals. We described differences in demographic and clinical characteristics by race/ethnicity (non-Hispanic White [NHW], non-Hispanic Black [NHB], Hispanic, South Asian [SA], Other Asian). Statistical comparisons across race/ethnicity were done using Fisher’s Exact test for categorical variables and one-way ANOVA for continuous variables. The main outcome was acceptance of PRP services upon discharge, defined dichotomously as yes/no. Using multivariable logistic regression, we estimated odds of accepting PRP services by race, adjusting for age, gender, education, substance type, referral year, county, history of prior overdose, and psychotropic medication use.

Results: Among 19,360 patients (average age 45y [SD, 14], 31% women, 51% NHW, 0.8% SA, 28% in Essex County) referred to PRP services, 86% accepted PRP services. SA patients were more likely than NHW to be younger (avg age 40y vs. 46y), male (83% vs. 65%), have college education (22% vs. 12%), have access to transportation (59% vs. 50%), be experiencing their first overdose (2% vs. 12%), and present to a facility in Middlesex County (44% vs. 15%). Although SAs (OR [95% CI], unadjusted: 1.06 [0.62, 1.82], adjusted: 1.33 [0.76, 2.34]) had similar odds of refusing PRP services as NHWs, NHBs (unadjusted: 2.15 [1.94, 2.37], adjusted: 1.50 [1.34, 1.69]), Hispanics (unadjusted: 1.56 [1.36, 1.79], adjusted: 1.26 [1.09, 1.46]), and Other Asians (unadjusted: 2.22 [1.31, 3.77], adjusted: 2.74 [1.55, 4.83]) had increased odds of refusing PRP services compared to NHWs.

Conclusion: SA patients with substance use disorders were younger, male, and of higher socioeconomic status than other races/ethnicities. NJ non-Hispanic Black, Hispanic, and Non-SA Asian patients have increased likelihood of refusing PRP services and may benefit from targeted, culturally aware interventions.
Severity of Acute Pancreatitis in patients with and without COVID-19 infection:  
A Systematic rView and Meta-Analysis.  

Research  
Ahmed Ali Aziz  
Maleeha Saleem; Karan Hiro Pahuja; Rehan Shah.  

Saint Francis Medical Center (Sara Wallach, MD, MACP)  

Introduction: There is increasing literature mentioning severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection (COVID-19 infection) causing acute pancreatitis (AP). Pancreatic involvement has been hypothesized to be mediated by the expression of angiotensin-converting enzyme 2 (ACE2) receptors on the pancreatic acinar cells which are the main receptors of SARS-CoV-2 rendering the pancreas a potential target for SARS-CoV-2. We conducted a systematic review and meta-analysis to evaluate if COVID-19 infection affects the severity and outcomes of acute pancreatitis.

Methods: We performed a systematic review and meta-analysis according to PRISMA and Cochrane guidelines. We searched for articles in PubMed (MEDLINE), Cochrane library and clinicaltrials.gov and studies comparing the outcomes of AP amongst patients with and without COVID-19 were included. The initial search strategy yielded 264 articles. After removing duplicates 262 articles were left. A total of 123 articles were excluded on the basis of title, 133 articles were excluded on abstract read and one article was excluded on full-text read as they did not meet the inclusion criteria of our study. Hence, 5 articles were included in the meta-analysis. Our outcomes were mean age of occurrence of acute pancreatitis, Charlson Comorbidity Index (CCI) idiopathic etiology of acute pancreatitis, severity of acute pancreatitis, incidence of necrotizing pancreatitis, need for ICU admission and mortality between the two cohorts.

Results: We included five observational studies with a total population of 2,608 patients in our review. Our results showed that AP in patients with COVID-19 infection is more likely to have an idiopathic etiology (OR 3.14, 95% CI 1.36–7.27), be more severe (OR 3.26, 95% CI 1.47–7.49), have a higher incidence of pancreatic necrosis (OR 2.40, 95% CI 1.62–3.55), require ICU admission (OR 4.28, 95% CI 2.88–6.37) and have a higher mortality (OR 5.75, 95% CI 3.62–9.14) than in patients without COVID-19 infection. We also found that there was no statistically significant Standard Mean Difference (SMD) (SMD 0.15, 95% CI -0.09 - 0.38) in the age of occurrence of AP and no statistically significant difference in the CCI in the two population groups (OR 1.68, 95% CI 0.41 - 6.83).

Conclusion: Our study shows that AP in patients with COVID-19 infection is more severe with increased morbidity and mortality than in patients without COVID-19 infection. Hence, regardless of age or associated co-morbidities when present together in a patient; prompt and aggressive measures should be taken to treat both AP and COVID-19 infection to reduce the severity of AP, prevent pancreatic necrosis and mortality. Some viruses such as cytomegalovirus, Ebstein-Barr virus, and herpes simplex virus have been associated to cause AP and SARS-CoV-2 might be one of them however, further larger-scale clinical trials with more population size are needed to confirm or refute this hypothesis.
Comparison of Coronary IVL and Rota-Atherectomy in Heavily Calcified Coronary Lesions: A Systematic Review and Meta-Analysis

Research
Karan Pahuja
Maleeha Saleem; Muhammad Haseeb-ul-Rasool; Ahmed Ali Aziz; Rola Ali; Deep Mehta; Rehan Shah; Shakil Shaikh; John Caplan

Saint Francis Medical Center (Sara Wallach, MD, MACP)

Introduction: Severe coronary artery calcification which is seen in about 20% of patients undergoing percutaneous coronary intervention is associated with poor procedural and clinical outcomes. This is due to vessel injury during lesion preparation, failure of stent delivery and suboptimal expansion. Currently, Rotational atherectomy (RA) which uses a rapidly rotating burr for plaque modification is regarded as the standard of care for lesions not responding to balloon based therapies. Intravascular Lithotripsy (IVL) is a novel technique which uses sonic waves to cause intraplaque fractures with benefits of reduced vascular intimal injury and a shallow learning curve. Although single-armed studies have shown IVL to be safe and effective for heavily calcified coronary lesions, their comparative safety and efficacy remain unknown.

Methods: A comprehensive search of databases like Medline, Embase, Cochrane and Google Scholar were performed. Only studies pertinent to the main topic and peer reviewed articles were included. All studies [1,2,3] which met the common inclusion criteria of in hospital major adverse cardiovascular events (MACE) and coronary artery perforation were included in the analysis. RevMan 5.4 was used to calculate risk ratios using inverse variance method and random effects model. Results: A total of three retrospective analysis studies which included 469 participants met the inclusion criteria. Number of patients who underwent IVL was 118 (15.14%) and RA was 351 (74.84%). There was no statistically significant difference between the in-hospital MACE between the two groups [RR: 1.30 (95% CI: 0.62 - 2.72, p=0.49)]. There was also no statistically significant difference between the periprocedural coronary artery perforation rates between the two groups [RR: 0.55 (95% CI: 0.14 - 2.13, p=0.39)].

Conclusion: Our analysis did not show any significant difference between the two procedures in terms of in hospital MACE and perforation. However, individual studies like Wong et al showed a higher incidence of in hospital and 30 day MACE in the IVL group, which may be due to high risk profile of the patients and a small cohort size. Both Rola et al and Moussa et al showed that both the procedures are safe and effective with no significant difference in the in-hospital and 6 month follow up MACE. Due to the small sample size in the currently available observational studies, a randomized clinical trial is needed to establish the difference in safety and efficacy between Rotational atherectomy versus intravascular lithotripsy.
Direct Stenting Versus Conventional Stenting In St-Segment Elevation Myocardial Infarction: A Systematic Review

Research

Tehreem Fatima

Ayesha Fatima; Blain Taffesse; Sara Wallach

Saint Francis Medical Center (Sara Wallach, MD, MACP)

**Background:** ST-segment elevation myocardial infarction (STEMI) has a large thrombus burden. Conventional stenting involves balloon pre-dilation followed by stent placement, with this there is a higher chance of distal embolization, especially in STEMI. One emerging PCI technique is direct stenting without balloon pre-dilatation. This technique prevents distal embolization as it traps thrombus behind the stent and theoretically is associated with better outcomes in STEMI patients. We sought to compare conventional stenting (CS) with DS in patients presenting with STEMI in a systematic review of randomized controlled trials.

**Methods:** Studies were identified from PubMed database. Only those studies were included that compared DS with CS in patients with acute myocardial infarction. Data were extracted and articles were critically appraised by two authors. The primary endpoint was injury to myocardium and overall prognosis.

**Results:** Six trials (n = 1100) met the eligibility criteria. Some studies mentioned significant improvement in left ventricular parameters, which was associated with favorable clinical outcomes [lower incidence of heart failure hospitalizations and mortality] as compared to CS, on the other hand, few studies mentioned no significant difference in outcomes between DS and CS.

**Conclusion:** DS is an interesting approach and more studies should be done to further investigate this technique.
Double Sequential External Defibrillation For Refractory Ventricular Fibrillation
Cardiac Arrest: A Systematic Review

Research
Tehreem Fatima
Muhammad Owais, Natale Wasef, Sara Wallach

Saint Francis Medical Center (Sara Wallach, MD, MACP)

Background: Refractory ventricular fibrillation (RVF) is estimated to be seen in around 10-25% of cardiac arrest cases. It is described as ventricular fibrillation that does not convert with three or more single defibrillation attempts. Recent literature suggests that double sequential external defibrillation (DSED), where two electrical currents are delivered to the patient in quick succession from two defibrillator devices, may provide an effective therapy for RVF. This systematic review aims to identify the literature surrounding the use of DSED in RVF and assess whether this intervention improves survival outcomes.

Methods: The database PubMed was searched for the term Double sequential external defibrillation. We included studies that were either randomized control trials or observational studies.

Results: The search yielded 24 records, of which 3 observational studies and 1 Randomized Control Trial was selected to be included. 226 patients received DSED. Two studies showed favorable outcomes, on the other hand, two studies mentioned no difference between DSED and standard resuscitation protocols.

Conclusion: The effectiveness of DSED remains unclear. Further clinical trials and prospective studies are needed to further investigate the role of DSED in RVF.
Influence of Anemia on Clinical Outcomes in Patients on DAPT after PCI: A Systematic Review And Meta Analysis

Research
Maleeha Saleem
Karan Pahuja; Muhammad Haseeb ul Rasool; Deep Mehta, Rola Ali; Rehan Shah
Saint Francis Medical Center (Sara Wallach, MD, MACP)

Introduction: Anemia is a significant cause of morbidity and mortality among acute coronary syndrome (ACS) patients. The adverse effects of anemia on cardiovascular outcomes in patients with ACS have been established but little is known in the literature about anemia as a mortality predictor and its impact on cardiovascular outcomes in patients undergoing percutaneous coronary intervention with contemporary DAPT. We conducted a systematic review and meta-analysis of the impacts of anemia on cardiovascular outcomes in patients on DAPT.

Methods: A thorough literature search of Medline, Cochrane, Embase, and Google Scholar was conducted. A total of 7 studies meeting inclusion criteria involving the influence of anemia on all cause mortality, major adverse cardiac events, major ischemic events and in the context of DAPT usage were included in the analysis. These studies comprised of observational prospective and retrospective cohorts with total participants of 19918. RevMan 5.4 was used to calculate risk ratios using the inverse variance method and random effects model.

Results: 2190 (10.9%) participants had anemia and 17728 (89%) had normal hemoglobin. There was an elevated risk of mortality in anemics as compared to non-anemics with RR of 2.41 (95% CI: 1.93-3.01, p-value of <0.0001). The reinfarction rates were higher in anemic as compared to non-anemics with RR of 1.58 (95% CI: 1.23-2.03). MACE were also higher in anemics (RR: 1.42, 95% CI: 1.25-1.61). We did a subanalysis of the three studies that specified the number of participants on DAPT at admission and follow-up after PCI to determine whether participants that were more anemic were more likely to have DAPT discontinuation as compared with non-anemics. But the results were statistically not significant with pooled RR: 0.98, 95% CI: 0.88-1.10, p-value: 0.78.

Conclusion: Anemia is a significant risk factor for mortality and adverse cardiovascular outcomes among patients who have PCI and are on DAPT. Data is scarce on the effect of anemia on choice of DAPT. Effects of anemia on DAPT tolerance as compared to non-anemics needs to be further studied through RCTs.
Acetaminophen with Warfarin: A Critical yet Overlooked Interaction

Clinical Vignette
Ankita Vaidya
Auon Hamadani
Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

Introduction: Acetaminophen is a common analgesic agent used worldwide. Many patients on oral anticoagulation are frequently taking acetaminophen. Adverse drug-drug interaction between acetaminophen and warfarin has been described in the literature. The resultant supratherapeutic INR may result in life-threatening bleeding. Despite the potentially dire consequences, the interaction may not be well appreciated. We present one such case of potentially mortal interaction.

Case: An 80-year-old male presented to the hospital with right leg pain. It started after he tripped on a mat 2 weeks ago and landed on his right knee. He felt well at that time and was able to mobilize. Hence, he self-medicated with store-bought Extra-Strength Tylenol (Acetaminophen) and used 1 gram every 6 hours. Over the next 10 days, his right leg became more painful, swollen, and bruised. He could no longer mobilize, which prompted a hospital visit. His past medical history was significant for atrial fibrillation controlled on oral Metoprolol, and he was on warfarin for many years with no recent change in dosage and consistent therapeutic INR including the last INR check 1 month ago. At presentation, his vitals were within limits except for a pulse rate of 104/min. The examination was significant for an irregularly irregular pulse, diffuse right lower extremity swelling with patchy ecchymoses, especially over the thigh region, and multiple bruises on the trunk. Initial INR was 22.21 confirmed twice. aPTT was 86.5 seconds and platelets were 460,000/μL. CT right lower extremity without contrast showed a large hematoma in the right thigh measuring 16 x 9 x 4 cm³. With the large hematoma and high INR, the patient was given Prothrombin Complex Concentrate and the INR was lowered to 1.12. Warfarin was discontinued and the hematoma was managed conservatively in conjunction with vascular surgery. The patient improved and was eventually discharged with anti-coagulation held for the next 2 weeks. He was explicitly advised to discuss any new drug use including over-the-counter medications with his physician at the outset.

Discussion: Acetaminophen is regarded as one of the most popular analgesic agents in the world and is considered safer as compared to NSAIDs. Its use is more rampant in older populations, many of whom are on anticoagulation. In patients on warfarin, concurrent use of acetaminophen may cause pharmacodynamic interaction to increase the INR in a dose-dependent manner which increases the potential for life-threatening bleeding if not apprehended timely. In our patient, the INR rose to more than 20 with clinically significant bleeding. Close monitoring of INR is needed for patients starting or ending acetaminophen courses.

Conclusion: This case serves as a reminder for an internist to remember this critical yet overlooked interaction and reinforce patient education!
Development of Novel Electronic Record System to Facilitate Addressing Social Determinants of Health

Harshdeep Acharya
Ton Miras Neira; Angela Scott; Matthew Sanner; Kevin Sykes; Christina Pacheco; Sarah Finocchiaro-Kessler

Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

Background: The COVID-19 pandemic amplified the already existing disparities in the community in terms of social determinants of health (SDoH). In efforts to address these, we realized that existing Electronic Medical Record systems and community-based documentation systems have limitations like exclusive focus on medical needs without documenting social barriers, focus on implementing a referral system but do not track client goals and progress, programs that lack a structure for effective progress evaluation and reporting, and limited customization for specific project needs.

Methods: We used the principles of human-centered design (HCD) to develop a database to support the varied needs of the COPE (Communities Organizing to Promote Equity) project and serve as a data tracking, quality improvement, and evaluation platform. The HCD approach leverages active involvement of users, iterative development, and multidisciplinary team design. We assessed the documentation needs of the community health workers (CHWs) at the ground level and developed and refined features tailored to those needs. Development started on a local environment deployed to the cloud, and after attaining targeted functionality, and adding industry-standard network isolation, data encryption and access control, it was deployed on the production environment for use under the project.

Results: The COPE Database development process spanned 5 months, and in May 2022 went live for community-based piloting among COPE CHWs. The development involved 613 cumulative working hours of the engineering team in addition to approximately 150 person-hours in active discussions with the COPE team. At the time of launch, the database had 60 active users in 20 counties, with flexibility to add more as the project progresses. The COPE database was effectively able to track partnerships developed in the community further identified by organization, contact information, location, and type of services offered. It also allows for tracking events in the community organized by the COPE team, which can be searched by name and location of the organization(s) hosting the event, services provided, intended beneficiary populations, and number of attendees. For client interactions, the system organizes client demographics, insurance status, and SDoH needs assessments. Based on client goals and care plans assessed by CHWs, protocols were outlined to assist clients for each needed service identified through the assessment. These time-bound goals with the resources provided by the CHW were trackable in database and followed up on until completion.

Discussion: The strong community-engagement strategies employed by the COPE Project required the development of a new and more comprehensive database to enhance workflow and facilitate documentation for this innovative approach to address health inequities and social determinants of health across the state. The data captured by this system goes beyond the conventional medical needs captured by existing electronic medical records, while providing the required flexibility necessary for everchanging needs.
What Factors Determine Patients’ Engagement with the Electronic Medical Records: Evidence from a National Survey

Research
Emmanuel Adeyemi
Oluwabunmi Oke; Chinedum Enete; Kim Dixon

Saint Peter’s University Hospital (Nayan Kothari, MD, MACP)

Background: Electronic medical records (EMR) can facilitate patient-centered care by allowing patients to engage with their records and providing a mechanism for health communication. The goal of this study is to identify some of the factors that predict patients’ engagement with EMRs.

Methods: This is a cross-sectional study that used the Health Information National Trend Survey (HINTS 5 Cycle 4, January 2021). The study included all adults aged >=18 years that participated in the HINTS survey and visited a non-emergency healthcare provider in the last twelve months prior to the survey. Independent variables used from the survey include age, gender, race, income, highest level of education, general state of health, presence of chronic conditions (hypertension, diabetes, and lung diseases), cancer status, availability of health insurance, and use of electronic devices to search for health information. Univariate analysis was done with frequencies. Bivariate analysis was done with chi-square and significant variables on chi-square were used as the dependent variables on multivariable logistic regression. The dependent variable was “use of (interaction with) electronic medical records in the last twelve months”. All analyses were weighted and were done using SAS studio. Variables were only considered to be significant when P<=0.05.

Results: There were 55,231,330 weighted survey participants. On bivariate analysis (chi-square) exploring association between the dependent variable and each of the independent variables, the significant variables include highest level of education (P=0.0050), income (P=0.0096), general health (P=0.0073), health insurance status (P=0.0138), history of hypertension (P=0.0106), use of electronic devices to search for health information (P=0.0103). On multivariable logistic regression, those with a history of hypertension had 100% (AOR:2.00 95% CI 1.06-3.76) increase in the odds of interaction with EMR compared with those without hypertension. Other significant variables on bivariate analysis included in the multivariable logistic regression model were not significant.

Conclusion: Some authors have identified presence of chronic conditions as a potential predictor of interaction with the EMR and this study has specifically identified hypertension as one of such chronic conditions. Primary care physicians may leverage this information to optimize the engagement of this demographic with the EMR with a goal to help control hypertension and chronic conditions that are often associated with hypertension.
Call to Action! Prediabetes as a Risk Factor for Myocardial Infarction - A Nationwide Study

Research
Geethika Thota
Kavin Raj, Keerthana J Pillai, Dr. Shuang Xu, Dr. Hongxiu Luo

Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

Introduction: Prediabetes is an intermediate metabolic state and includes those with impaired glucose tolerance and impaired fasting glucose. As we know Diabetes mellitus (DM) is a well-established risk factor for atherosclerotic cardiovascular diseases (ASCVD). The current guidelines recommend high-intensity statin therapy in addition to lifestyle modifications and management of other risk factors to reduce the risk of ASCVD and mortality in patients with DM. However, despite mounting evidence, clinicians are unaware that Prediabetes is also a major risk factor for ASCVD. Our objective is to add to the current growing body of evidence about the hazards of Prediabetes and the risk of cardiovascular events.

Methods: We conducted a retrospective observational study of adult patients who had a primary diagnosis or secondary diagnosis listed as “myocardial infarction” from the 2016, 2017 and 2018 NIS (National inpatient sample). We created a multivariate logistic regression model with outcomes as myocardial infarction (MI) and different risk factors including prediabetes as predictors.

Results: A total of 1,794,149 (95% CI 1,753,742-1,834,556) weighted hospitalizations had MI and 330,814 (95% CI 313,189-348,440) patients had prediabetes. Out of the 1.79 million patients with MI, 1% had Prediabetes. On univariate analysis, Prediabetes was greatly associated with increased odds for MI (OR 1.41, 95% CI 1.35-1.47, P=0.000). Despite adjusting for Age, Gender, Race, Family history of MI, Dyslipidemia, HTN, DM, Nicotine dependence, and Obesity, Prediabetes was significantly associated with increased odds of MI (OR 1.25, 95% CI 1.20-1.31, P=0.000), PCI (OR 1.45, 95% CI 1.37-1.53, P=0.000) and CABG (OR 1.95, 95% CI 1.77-2.16, P=0.000).

Conclusion: Prediabetes - an independent risk factor for MI despite adjusting for the well-established risk factors (OR 1.25, 95% CI 1.20-1.31, P=0.000). Coronary interventions such as PCI and CABG were highly associated with Prediabetes, suggesting macrovascular Coronary artery Disease.

Discussion: In the present study, we explored the impact of prediabetes on myocardial ischemia. We found that patients with Prediabetes had significantly higher event risks compared to those with normoglycemic despite adjusting for the obesity and other risk factors for MI. Although our study underestimates the prevalence of prediabetes in MI because it is usually missed while coding. Our study serves as a wake-up call for clinicians and patients to shift the focus to preventing Prediabetes, not just Diabetes. Our findings reinforce the importance of early recognition through screening and early intervention to aggressively manage the cardiovascular risk factors to prevent MI.
Humoral and Cell-Mediated Immune Responses in Hemodialysis Patients Post-SARS-CoV-2 mRNA Vaccination: A Systematic Review

Research
Jesus Catahay

Kin Notarte; Princess Peligro; Jacqueline Velasco; Abbigail Ver; Brandon Henry; Cesar Fernandez-de-las-Penas

Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

Introduction: Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection imposes significant morbidity and mortality in hemodialysis patients (HDP) due to their altered immunologic response. Hence, optimizing vaccination strategies is important but requires a thorough understanding of how humoral and cellular immune responses provide immunoprotection to this sentinel population post-vaccination.

Methods: This study focuses on investigating both humoral and adaptive immune responses mRNA post-vaccination on hemodialysis patients. A systematic search of literature was performed through PubMed, Cochrane CENTRAL, Google Scholar, Science Direct, medRxiv, and Research Square. Studies were included if they reported humoral and/or adaptive immune responses to COVID-19 mRNA vaccines. A total of 19 studies were identified and reviewed, and the percent differences of means of reported antibody levels were calculated for comparison. T cell responses were also noted post-vaccination.

Discussion: Findings revealed that despite substantial immune response following vaccination, longitudinal data reporting antibody measurement exhibited progressive decline of antibody titers and T cell responses in HDP compared to the general population.

Conclusion: Thus, this study highlights the importance of improving vaccination strategies to address waning immune responses in HDP.
Shewanella SPP: An Emerging Pathogen In Skin And Soft Tissue Infection
Clinical Vignette
Betsy Ann Joseph
Solanki; Kinjal

Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

Introduction: Shewanella spp are saprophytic, motile gram-negative rods that are ubiquitous, particularly in proteinaceous fish, iced fish, and marine habitats. Over the last several years, Shewanella spp has been implicated in skin and soft infections in humans, especially in those with peripheral vascular disease, diabetes, chronic kidney disease, and chronic leg ulcers. In addition to skin and soft tissue infection, Shewanella spp are implicated in bacteremia, septic arthritis, osteomyelitis, ear infection, and eye infections.

Case: A 76-year-old male with a history of type 2 diabetes and hypertension was brought to the ED with complaints of swelling and redness of the left lower extremity for 2 days duration. In addition, he also reported having chills for a day before his ER visit. The patient was an avid gardener and reported getting frequent abrasions and lacerations on his skin in the lower and upper extremities. On admission, the patient was in sepsis and was noted to have swelling and redness of the left lower extremity consistent with cellulitis. He also had elevated white counts with a shift to the left and after drawing blood cultures, he was empirically started on Vancomycin and Piperacillin-Tazobactam. Subsequently, his blood cultures came back positive for Shewanella algae which were pan-susceptible and he was continued on Piperacillin-Tazobactam. At this juncture on probing further, we were able to ascertain that the patient had had seawater exposure a few days before the onset of symptoms. He improved clinically on the antibiotics and repeat blood cultures demonstrated clearance of the bacteremia. Given the organism was pan susceptible antibiotic was de-escalated to oral ciprofloxacin to complete a 14-day course from the day of clearance of the bacteremia. He also had a venous duplex of the lower extremities which was negative for chronic venous insufficiency.

Conclusion: This case illustrates that Shewanella spp, is increasingly being recognized as a causative agent in skin and soft tissue infections. The setting of exposure to marine habitat and the break of the skin barrier due to the recurrent abrasions and lacerations from the gardening put our patient at risk for Shewanella infection. This case highlights the importance of looking into risk factors and exposure histories other than the common ones. It is also imperative to note that the isolation of this organism in the blood culture is always a true pathogen.
A Curious Case of Cryptogenic Organizing Pneumonia

Clinical Vignette
Niraj Ballam Nagaraj
Vishali Moond; Douglas Frenia

Saint Peter's University Hospital (Nayan Kothari, MD, MACP)

Introduction: Cryptogenic organizing pneumonia (COP), formerly known as bronchiolitis obliterans organizing pneumonia, is a form of interstitial lung disease arising due to lung injury or due to cryptogenic causes. Although the pathogenesis is not clear, it is a form of organizing pneumonia that responds well to glucocorticoids and is a reversible inflammatory and fibroproliferative form of injury.

Case: One such case presents is a 69-year-old female, who initially was infected with COVID-19 and developed ‘long-COVID’. She had chronic shortness of breath on exertion and had ultimately stabilized to the point of being able to perform her day-to-day activities and her ADLs with ease. However, due to worsening respiratory status for a few days, nearly one year after her infection, she presented to the hospital and was admitted for a possible pneumonia. Pulmonary embolus was ruled out. Radiographic evidence at this time gave rise to the suspicion of given that there were ground-glass opacities which were either inflammatory or infectious in nature. These opacities were worsened in the same region as the opacities from her initial COVID infection. Given these findings, it was determined that it was less likely an acute infection, and more likely COP. She was treated with glucocorticoids, and the imaging showed improvement in just a few days of treatment, as well as clinical improvement in the form of reduced oxygen requirements at rest and on ambulation. The patient was ultimately discharged on a 3-week course of steroids with outpatient follow up.

Conclusion: This case illustrates that in situations where patients present with worsening of chronic shortness of breath after recovering from an initial insult of COVID-19 pneumonia, health care workers need to create a wide net of differentials and consider the possibility of cryptogenic organizing pneumonia that can be treated and hopefully reversed with glucocorticoids.
Students
Bringing Bridging the Gaps to Camden: A Student Led Initiative

Research

Nitya Dhanaraj
Emily Chiacchiaro; Mara Gordon MD

Cooper Medical School of Rowan University

Introduction: The Bridging the Gaps (BTG) Community Health Internship Program was established in 1991 at multiple health professions schools in the mid-Atlantic region to help create a more community-oriented healthcare workforce. The program pairs an annual cohort of medical students with a variety of community organizations in Camden, NJ for a seven-week summer internship. Our medical school chapter of BTG started in the summer of 2020 as a student-led initiative with faculty partners. The purpose of our study was to determine the strengths and weaknesses of the BTG program from both the student and community organization perspectives. We hypothesized that the new BTG program had a positive impact on the medical student participants and increased student interest in pursuing careers that integrate community health. We also hypothesized that hosting medical students would have a positive impact on the community organization participants and their services in the Camden community.

Methods: A survey was distributed consisting of five questions to the summer 2021 BTG student interns from our institution, with four open-ended questions and one multiple choice. There were 8 interns in the summer of 2021 and 8 responses were received. A separate survey was distributed to the summer 2021 community preceptors, employees of Camden-based community organizations, who supervised students during their internships. Four questions were open-ended and two were multiple-choice. Five organizations participated and five responses were received. Both surveys were carried out on the Google Forms platform and all responses were anonymous. There were no incentives to completing the survey.

Results: Overall, both student interns and community preceptors reported a positive experience with the Bridging the Gaps internship program, and provided constructive feedback for future improvement. The students overwhelmingly responded that the program enhanced their understanding of social issues relating to medicine, and the organizations felt the program was valuable for both them and the students. For example, when asked “How do you feel the BTG has changed your medical education experience,” 5/8 students responded that it made them more aware of community needs and resources. Additionally, 8/8 students responded that they were very likely to recommend BTG to another medical student at our institution. When asked how much community organizations benefited from their partnership with BTG 4/5 organizations responded that they benefited in “meaningful and lasting ways”. All 5 community organizations also stated they would be likely or very likely to recommend BTG to another organization.

Conclusion: The incorporation of the Bridging the Gaps program into our medical school, a student-led initiative, had a positive impact on the 2021 student interns' medical education, as well as community organization participants.
Comorbidities and Risk Factors Associated with Insomnia in the Elderly Population: A Retrospective Chart Review

Clinical Vignette
Neil Mookerjee

Cooper Medical School

Introduction: Sleep disorders affect around 50-70 million Americans, with chronic insomnia being the most common, especially in the elderly population. With an 11-fold increase in the U.S. office visits, from 800,000 to 9.4 million, between 1993 and 2015, it is imperative to identify the modifiable risk factors. The aim of our study was to examine the association of risk factors and comorbid medical conditions with insomnia in patients 65 years, or older.

Methods: We performed a retrospective electronic medical record review of patients aged 65 years and older, who visited our internal medicine office between July 1, 2020 and June 30, 2021. For statistical analysis, patients were divided into two groups: patients who had insomnia and patients who did not have insomnia. Univariate analysis was performed with independent t-test, and Mann Whitney U-test. Chi Square test and Fisher exact test were applied to analyze the categorical variables. We used a logistic regression to model the outcome of insomnia.

Results: Among 2431 patients, 247 patients (10.2%) had insomnia. Mean ages of the patients in insomnia group and without insomnia group were comparable (77+8.1 year vs 76+7.5 year; P=0.211). There was significantly greater frequency of women in the insomnia group compared to the group without insomnia (63.2% vs 55.5%; P=0.022). In the insomnia group, there were significantly higher frequencies of association of certain comorbidities compared to the group without insomnia, such as dementia (6.5% vs 3.4%; P=0.015), depression (30.8% vs 14.9%; P<0.001), anxiety disorder (34.4% vs 17.4%; P<0.001), atrial fibrillation (19.4% vs 13.4%; P=0.01), and chronic pain disorders (32.8% vs 18.9%; P<0.001). Logistic regression analysis showed significantly greater odds of insomnia in patients who had depression (OR 1.860, 95% CI 1.342-2.576; P<0.001), anxiety (OR 1.845, 95% CI 1.342-2.537; P<0.001), and chronic pain disorders (OR 1.901, 95% CI 1.417-2.549; P<0.001).

Conclusions: Female sex, dementia, depression, anxiety, atrial fibrillation, and chronic pain disorders are associated with insomnia in the elderly patients. Presence of depression, anxiety and chronic pain disorders are associated with greater odds of having insomnia in the elderly patients. Optimal management of the comorbidities, such as dementia, depression, anxiety, atrial fibrillation, and chronic pain disorders, may prevent or improve insomnia in this population.
Severe Vitamin C Deficiency in a Patient with Crohn’s Disease

Clinical Vignette
Gianna Antinori
Krysta Contino MD; Navjot Jain, DO

Cooper Medical School of Rowan University

Introduction: Several micronutrient deficiencies have been observed in patients with Crohn’s disease (CD). Vitamin C deficiency, known as scurvy, is primarily caused by severe lack of vitamin C in the diet. While vitamin C deficiency has been reported in developing countries affected by malnutrition, it has not been well described amongst patients with CD. We review a case of a patient with CD who presented with purpura found to have severe vitamin C deficiency.

Case: A 57-year-old female with a history of CD s/p small bowel resection and tobacco use presented to the ED with a two-week history of progressively worsening left lower extremity edema and purpura. Vital signs showed a blood pressure of 94/47 and pulse of 107. Physical examination revealed 2+ pitting edema in the left lower extremity and purpura extending medially from the left knee to the inguinal region. CTA of the left lower extremity was negative for hematoma or fluid collection and left lower extremity ultrasound was negative for DVT. Patient was placed on IV vancomycin due to concern for cellulitis and was admitted. Laboratory studies showed a hemoglobin of 7.8 with MCV 100.8. Iron was low at 35. Ferritin, reticulocyte count, LDH, CRP, and ESR were elevated. Haptoglobin, vitamin B12, and folate were normal. Her hemoglobin decreased to 6.8 and she received two units of blood. Dermatology was consulted and punch biopsy of the left thigh showed perifollicular purpura consistent with scurvy. A vitamin C level was ordered and was less than 0.1 L (0.3-2.7 mg/dL). She was started on vitamin C 500 mg twice daily and discharged home on supplementation.

Discussion: This case highlights the importance of vitamin C intake and absorption in a patient with underlying CD with history of small bowel resection and long-term tobacco use. Patients with CD are encouraged to follow low-residue diets minimizing intake of fruits and vegetables rich in vitamin C. This patient is at increased risk for deficiency due to her history of small bowel resection. Vitamin C is absorbed in the jejunum and ileum which are anatomical sites affected by CD. Additionally, this patient had a 60-pack-year tobacco use history. Vitamin C is an important antioxidant and smoking increases oxidative stress and vitamin C turnover. In patients who use tobacco, higher daily vitamin C intake is recommended. This case suggests that patients with small bowel CD should be screened routinely for vitamin C deficiency and supplementation should be considered if additional risk factors are present (i.e. tobacco use). Furthermore, vitamin C promotes iron absorption. Patients with vitamin C deficiency may be prone to bleeding. This case also suggests iron levels should be evaluated, particularly in patients with CD who are at risk for iron deficiency.
Mysterious Recurrent Urticarial Rash and a Life Altering Metal

Clinical Vignette

Adam Friedman
Olga Schweiker-Kahn, MD; Satyajeet Roy, MD, FACP

Cooper Medical School of Rowan University

Introduction: Systemically reactivated allergic contact dermatitis (ACD) occurs in sensitized individuals after exposure to the allergen via skin, or systemic route.

Case: A 34-year-old woman with a history of peripheral artery disease and transient ischemic attack, presented with generalized itchy hives for one week. She denied exposure to potentially new allergens. She had tried topical antihistamines, emollients, and steroids without much relief. Prior to the onset of her symptoms, she had a left carotid artery stent placement, and was started on apixaban and carvedilol. Her vital signs were within normal limits. Physical exam revealed erythematous patches with hives on the palms. The patient was started on methylprednisolone and hydroxyzine for symptomatic treatment. In subsequent office appointments, there was concern that her rash might have been due to apixaban, which was switched to rivaroxaban. However, her urticarial rash continued to worsen and became generalized despite adherence to medications. Subsequently, she became hypotensive with a blood pressure of 89/62 mmHg. She was stabilized with intravenous fluids and underwent an extensive allergy testing, which concluded that she was allergic to nickel. Her left carotid stent was a nitinol stent, a nickel-titanium alloy. Her carotid artery stent was removed. Within a week her generalized urticarial rash resolved.

Discussion: ACD has a prevalence of about 20.1% in the general population, the most commonly identified metallic allergen affecting individuals is nickel. Nickel is commonly found in watches, earrings, belt buckles, and bracelets. Typical acute presentation includes erythema, edema, vesicles, bullae, and scaling in the affected areas of skin, such as ears, wrists, and infrapubic region. If left untreated, lesions can progress to a chronic phase consisting of hyperkeratosis, dryness, fissuring, and lichenification. Differential diagnosis should include more life-threatening allergic reactions, and systemically reactivated ACD as in our patient; hence anaphylaxis should be ruled out immediately upon presentation. In addition to contact allergens and fungal infections, systemic inflammatory conditions, such as systemic lupus erythematosus, psoriasis, and dermatomyositis should also be considered due to the increased risk of ACD in this subgroup. Management of nickel allergy primarily consists of avoiding exposure to nickel-based compounds and removal of the device or piercing. Conservative measures like moisturizers and emollients can be used, however if these are ineffective, the first line pharmacotherapy is topical or systemic corticosteroids. The overall prognosis for nickel-induced contact allergy is excellent, and in the case of our patient, she has experienced complete resolution of her urticarial rash upon removal of the nickel-based stent.

Conclusion: Our case highlights a rather atypical presentation of systemic urticarial rash and anaphylaxis secondary to a nickel-based nitinol carotid stent, which required high index of suspicion and early management by removal of the offending nickel-based agent, which lead to a favorable outcome.
History to the Rescue: “Dry-scooping,” Odynophagia, and Esophageal Ulcers

Clinical Vignette

Russell Caratenuto
Briette Karanfilian, MD; Ranita Sharma, MD

Rutgers RWJ Medical School

Introduction: Esophageal ulcerations are defined as distinct breaks in the esophageal mucosa with clearly defined margins. Esophageal ulcers can cause upper gastrointestinal symptoms including odynophagia, nausea, vomiting and bleeding. There are well established causes of esophageal ulceration, including GERD, medications, caustic ingestions, Candidiasis, CMV, HSV, HIV, Crohn’s disease, neoplasms and radiation therapy. We report the practice of “dry-scooping,” a Tik Tok trend promoting the intake of pre-workout powders without water, as the etiology of esophageal ulcerations in this case.

Case: A 22-year-old male with no medical history presented to the emergency department with a 4-day history of fevers and odynophagia which progressively prevented intake of solids and liquids. He reported associated shortness of breath with pleuritic chest pain. He appeared nontoxic with sputum collecting in a bedside cup. He had a fever of 101°F and was tachycardia at 110. The rest of the exam was unremarkable. Labs revealed a creatinine of 1.5 and a D-dimer of 595. CT angiogram of the chest showed no evidence of pulmonary embolism but noted abnormal circumferential distal esophageal thickening. An EGD was performed and revealed severe esophagitis with punctate esophageal ulcerations, linear ulcers, and linear gastric erosions. HIV, EBV, CMV and HSV tested negative. The fevers subsided, the tachycardia improved with IV hydration and his creatinine decreased to 1.2. Upon further questioning, it was discovered that the patient was a competitive weightlifter and often ingested pre-workout supplement powder. Normally, this caffeine rich powder is diluted in liquid and ingested prior to weightlifting. In the week leading up to his admission, he had run out of the solvent he normally used to dissolve the powder and had begun “dry-scooping.” The patient explained that he put a dry scoop of powder (8 grams per scoop) directly into his mouth and would swallow it with a sip of water. The patient noted that the powder was not completely dissolved when swallowing, and pockets of dry powder was ingested. He did this thirty minutes before exercising 3-4 times per week for two weeks prior to admission. The powder he reported using had ingredients that included L-citrulline, Beta-alanine, malic acid, sodium citrate, citric acid, and tartaric acid. “Dry-scooping” causing mucosal injury leading to esophageal ulcers is the most plausible etiology. The pathology report described basal cell hyperplasia, focally increased intraepithelial eosinophils (up to 15 cells/hpf) and superficial erosions with fibrinous exudate on the surface. The sample was negative for goblet cells. It is likely that these findings represent damage done to the esophageal mucosa from “dry-scooping” of pre-workout powder.

Conclusion: Counseling against this increasingly popular practice was provided. The patient was initiated on a proton pump inhibitor for 2 weeks with progressive improvement noted after the first week.