

Oral # 1

Category: CQI/EBM

Institution: Beaumont Hospital – Dearborn

Program Director: Ruaa Elteriefi, MD, FACP

Presenter: Adnan Malik

Additional Authors: Hassan Alsabbak MD, David Sengstock MD, Robin Chirillo, Joyce Mitchell, Gino Tapia-Zegarra MD

### **Evaluation of Ova and Parasite Stool Testing in Nosocomial Diarrhea**

#### **BACKGROUND:**

Stool testing for ova and parasites (OP) is routinely used in hospitalized patients with nosocomial diarrhea (ND), which is a diarrheal illness arising  $\geq 72$  hours of hospitalization. ND incidence range between 12-32% among hospitalized patients mostly caused by clostridium difficile.

#### **AIM:**

To assess stool testing for positive OP in at a teaching community hospital after 3rd day of hospitalization over a period of 10 years to reduce its utilization rates.

#### **METHODS:**

Microbiological records of stool samples tested for Ova and Parasites were obtained and reviewed from health records of hospitalized patients from 08/26/2007 till 05/01/2016. A total of 7021 patients were tested for Ova and parasite. Admission, discharge, sample collection and test results dates were verified by chart review.

#### **RESULTS:**

Total sample size (N)= 7021; Total OP positive patients = 30; Out of 5191 patients tested for OP before day three, only 25 were found to be positive. Among 1830 patients tested for OP at or after day 3 of admission only 5 were positive including blastocystis hominis, strongyloides stercoralis and Dientamoeba fragilis. Blastocystis and Strongyloides cases presented with diarrhea/weight loss and hyper-infection syndrome respectively on admission while Dientamoeba is considered to be a normal intestinal flora. Hence it can be said with confidence that these positive OP did not contribute towards nosocomial diarrheal infections.

#### **Conclusion:**

Yield of stool testing for OP after 3rd day of hospitalization is unlikely to be informative or may lack clinical value while incurring unnecessary expenses.

Oral # 2

Category: Clinical Vignette

Institution: Beaumont Hospital – Royal Oak  
Program Director: Sandor Shoichet, MD, FACP  
Presenter: Rebecca Chacko  
Additional Authors: Matthew Sczepanski, DO

### **That's Nuts!: Acquired Peanut Allergy Following Hematopoietic Stem Cell Transplant**

Transplant acquired allergy (TAA) is a well-known but uncommonly reported occurrence. The phenomenon has been mostly described in patients following solid organ transplant, however has not been fully evaluated after hematopoietic stem cell transplantation. We report a case in which a patient acquired a non-anaphylactic peanut allergy after receiving hematopoietic stem cell transplant.

A 58-year-old male, with no known food or drug allergies and past medical history of acute myeloid leukemia (AML) with relapse, had recently undergone hematopoietic stem cell transplant as part of induction therapy. The patient presented with a chief complaint of a generalized pruritic rash with mild angioedema, there was no evidence of airway compromise. The patient admitted to eating peanuts prior to presentation and his symptoms began shortly thereafter. The stem cell donor, the patient's son, had a known non-anaphylactic allergy to peanuts. The patient was treated with oral steroids and diphenhydramine, his symptoms resolved.

Though the pathophysiology of TAA has not been fully described, IgE has been widely hypothesized as the main culprit of this inappropriate immunologic response. The most immediate type of allergic reaction is typically induced by IgE antibodies, formed by plasma cells and B/T cell interactions. Passive transfer of food-specific IgE-producing lymphocytes can cause a hypersensitivity reaction in the recipient to those same food allergens, as in the case presented herein. Awareness of this phenomenon following hematopoietic stem cell transplant can help guide clinician assessment and decision-making.

Oral # 3

Category: Research

Institution: Beaumont Hospital – Royal Oak

Program Director: Sandor Shoichet, MD, FACP

Presenter: Aaron Fisher

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### **Appropriate Treatment of Clostridium Difficile in Patients with Active Malignancy**

Clostridium difficile infection (CDI) is a leading cause of hospital-associated gastrointestinal illness and places a high burden on our health-care system, with costs of 3.2 billion dollars annually. Previous studies have reported that patients with solid cancers and hematologic malignancies, as well as post-chemotherapy patients, who have reduced immunity, are at high risk for CDIs leading to substantial morbidity and increased health care cost. The objective of our study is to compare outcomes in patients with clostridium colitis with active malignancy treated with oral vancomycin, metronidazole, or combination of both metronidazole and vancomycin. All adult patients who were admitted at William Beaumont Hospital Royal Oak with underlying malignancy from January 2008 to December 2014 were identified by running a query using ICD 9 codes. Inclusion criteria included age >18 year old, patients with documented CDI, and patients with active malignancy (termed as patients treated with radiation, chemotherapy, or surgery within six months of CDI diagnosis). 197 patients with CDI and active malignancy were identified. Results identified a statistically significant difference in need to escalate antibiotic therapy from metronidazole to vancomycin or combination compared to those in the vancomycin group. Our rationale for the study was to determine if patients with active malignancy should be treated differently than the average patient. According to ACG guidelines, they should be treated in the same manner. Yet, our data argues for the initial use of vancomycin or combination (vs. metronidazole) as the appropriate initial treatment for clostridium difficile in active cancer patients.

Oral # 4

Category: Research

Institution: Beaumont Hospital – Royal Oak

Program Director: Sandor Shoichet, MD, FACP

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### **To Biopsy or Not to Biopsy: Risk of Surgical Lung Biopsy in Patients with Honeycombing on Chest Imaging**

**Background:** Latest guidelines recommend surgical lung biopsy in patients suspected with “possible”-usual interstitial pneumonia (UIP) pattern or a “non-UIP pattern”. In an earlier analysis, we noted that patients, who had non-elective surgical lung biopsies (SLB), had a higher mortality compared to elective SLB.

**Aim/Hypothesis:** The specific aim of this study was to identify risk factors related with higher risk in patients, who had non-elective/emergent SLBs. We hypothesized that patients with honeycombing (HC) on CT scan has a higher risk of death with non-elective SLBs.

**Methods:** We reviewed SLB performed at an academic health system from Jan 2011 to Dec 2016. All CT scans of included patients prior to biopsy were re-reviewed for the presence of HC. 113 SLBs were included for analysis.

**Results:** 54 patients (52%) had biopsies done on an emergent basis (non-elective). A non-UIP pattern was seen on CT scan of 87 patients (76%), but HC could be visualized only in 40 patients (35%). Non elective biopsy was associated with higher mortality compared to elective SLB (28% vs. 7%,  $p=0.04$ ). When delineating patients, who had non-elective vs. elective SLBs, neither UIP pattern on CT scan or on pathology was associated with increased 30-day mortality. Multivariate ordered logistic regression analysis showed an older age and presence of HC on CT were associated with a higher risk of death after non-elective biopsies.

**Conclusion:** Our series indicates that in patients undergoing SLBs on an emergent basis, presence of HC on CT scan is associated with higher 30-day mortality.

Oral # 5

Category: Clinical Vignette

Institution: Beaumont Hospital – Royal Oak  
Program Director: Sandor Shoichet, MD, FACP  
Presenter: Hira Iftikhar  
Additional Authors:

### **Beta Blocker Overdose, Management with a Sweet Alternative?**

Overdose with beta adrenergic antagonists can lead to profound hemodynamic instability. First line therapies include atropine, intravenous fluids, glucagon and vasopressors. These measures are not always sufficient and alternative therapies are sought. One such intervention is high dose insulin-euglycemic therapy.

A 55-year-old Caucasian male presented to the ED with slurred speech and lethargy. He reported taking 200 tabs of 50mg metoprolol in an attempt to end his life. His vitals were within normal range except for sinus bradycardia at a rate of 59. Physical examination revealed cool extremities. After intubation, his blood pressure (BP) and pulse dropped to 80/40 and 25, respectively. He was given atropine and glucagon with slight improvement initially but became increasingly bradycardic so a glucagon infusion was initiated. This was followed by an infusion of regular insulin at 2 units/kilogram/hour with a dextrose infusion to maintain euglycemia for a goal mean arterial pressure above 60. His BP improved to 122/49 and pulse to 57. Glucagon was weaned off and the insulin was decreased by 0.5 units every two hours until it was stopped. The patient returned to baseline mental status before discharge home.

Multiple studies have demonstrated the utility of insulin-euglycemic therapy in calcium channel blocker intoxication. Our case demonstrates that this therapy can also be an effective adjunct to standard treatment for beta blocker overdose. This is consistent with other published case reports, but more investigation is needed to elucidate the true role of insulin in managing beta blocker overdose.

Oral # 7

Category: Clinical Vignette

Institution: Beaumont Hospital – Royal Oak

Program Director: Sandor Shoichet, MD, FACP

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### **Central Nervous System Vasculitis? Better Reverse the Course**

**Introduction:** Reversible cerebral vasoconstriction syndrome (RCVS) refers to a group of cerebral vasculopathies that result in reversible constrictive changes of cerebral arteries. It is a largely under-recognized condition, given the lack of validated diagnostic criteria. The sudden onset of excruciating “thunderclap” headache may be the only presenting symptom, leading to a broad differential diagnosis. Risk factors include amphetamines use, stress, female gender, and post-partum state.

**Case presentation:** A 29-year old post-partum female presented to the emergency room after the sudden onset of a severe headache. Physical exam was unremarkable. CT head revealed a small subarachnoid hemorrhage over the left frontal and temporal convexity and within the left Sylvian sulcus. An arteriogram demonstrated areas of irregular narrowing and slight dilation of the posterior and middle cerebral arteries bilaterally. Findings were concerning for vasculitis.

Laboratory workup revealed normal TSH, ESR, CRP, rheumatoid factor, VDRL, ANA, ANCA, complement fractions, cryoglobulins, protein electrophoresis, and hepatitis B and C. Drug testing was positive for amphetamines. Lumbar puncture was unremarkable. A diagnosis of RCVS was established. Symptoms resolved and the patient was subsequently discharged.

**Discussion:** This case illustrates a unique, under-recognized entity that should be considered in the differential diagnoses when evaluating for intracranial vasculitis. Failure to recognize this entity may lead to unnecessary immunosuppressive therapy, additional arteriograms and invasive diagnostic procedures such as brain biopsy. The location of SAH and the angiographic pattern, combined with a negative rheumatologic workup, made RCVS the most likely diagnosis.

Oral # 8

Category: Research

Institution: Michigan State University - East Lansing

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Presenter: Prajwal Dhakal

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### **Do Sequential Compression Devices Prevent Venous Thromboembolism in Hospital Inpatients?**

**Objective:**Analyze if sequential compression devices(SCDs) prevent venous thromboembolism(VTE) in hospitalized patients.

**Methods:**All Sparrow Hospital admissions from 04/01/2015-03/31/2016 were included and categorized according to methods used for VTE prophylaxis- SCDs, anticoagulants (ACs), both SCDs and ACs (BOTH), or None. Univariate and multivariate regression analysis were performed.

**Results:**Out of total 39,265 patients, 0.6%(n=246) developed VTE in hospital. Mean age was 56 years(SD±20.3). 58% were females; 55% were active/former smokers. Mean hospital stay was 4.3 days(SD±5.5).

Compared to None, SCDs did not significantly lower risk of VTE(OR:1.2,95%CI:0.65-2.29). However, there was increased risk of VTE associated with patients on BOTH (OR:7.3,95%CI:3.8-13.93) or on ACs (OR:7.4,95%CI:4.09-13.50). Notably, hospital stay was 5.7 days(SD±8.6) and 7.7 days(SD±7.9) respectively for BOTH and ACs groups- compared to 4.0 days(SD±4.5) and 2.7 days(SD±3.4) for SCDs and None.

Increased length of stay, colon cancer, bladder cancer, esophageal cancer, leukemia, myeloma, and Hodgkin's disease were associated with higher odds of VTE.

**Conclusion:**Use of SCDs may not prevent VTE during hospital stay, although other factors also play a role. More studies to define role of SCDs in VTE prevention are urgently needed. Increased VTE risk seen in BOTH and ACs in our study were likely attributed to higher risk of VTE in patients with increased length of stay and comorbidities. To control for these endogenous factors, instrumental variable regression needs to be employed in future studies. Measures such as increasing the conventional prophylactic doses of ACs and aggressive management may be needed in high risk cases.

Oral # 9

Category: CQI/EBM

Institution: Henry Ford Health System – Detroit

Program Director: Odaliz Abreu Lanfranco, MD, FACP

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### **The Effect of Electronic Records Based Intervention on Rates of Enrollment in Clinical Trials in Genitourinary Tumors' Patients**

The aim of the study is to assess the effect an electronic medical record based intervention has on the rates for clinical trial (CT) enrollment in genitourinary tumors GU.

Patient and Methods:

At our center, we have observed the number of patients enrolled or considered without enrolling in clinical trials in 6 months period (July 2015 - December 2016; the before (pre) intervention data). Keeping this as baseline, we created an electronic medical record intervention called "Clinical Trials" tab, then we observed the number patients enrolled or considered without enrolling in clinical trials for the following 6 months (January 2016-june 2016) or the after (post) intervention data as comparison to the pre intervention group.

Results:

We had 234 patients with GU tumor who were found in clinical trials' CT registry and CT electronic tab census between July 2015 and June 2016. The number of patients considered for CT increased with the intervention, namely, 39 patients (19.9%) were considered pre intervention as opposed to 157 patients (80.1%) post intervention. On the other hand, the number of patients who were actually enrolled in CT was comparable in both groups (20 patients vs. 18 patients in pre-intervention & post-intervention groups respectively).

Conclusion:

Although the number of patients considered for CT after the electronic chart based intervention was notably higher, there was not a major difference in patient enrollment to CT. Further innovative and aggressive quality improvement interventions are needed to improve the clinical trial rates at our center.

Oral # 10

Category: Research

Institution: Hurley Medical Center/MSU – Flint

Program Director: Ghassan Bachuwa, MD, FACP

Presenter: Yanal Alnimer

Additional Authors: Ranine Ghamrawi, Ahmed Aburahma, Carlos Rios- Bedoya, Khalil Katato

### **Factors Associated with Short Relapse Free Survival in Completely Resected Colon Cancer**

#### Introduction:

Several factors could affect disease recurrence in surgically resected colon cancer. While the role of certain factors such as cancer stage and grade is well established, the role of other factors (E.g. histological subtypes) is still under debate. Therefore, we conducted a study to evaluate the impact of several factors on relapse free survival in patients who were disease free following surgical resection of the colon tumor.

#### Methods:

The data was collected for patients with stage (I-III) colon cancer who underwent complete surgical resection of the tumor between Jan/2010-Dec/2015 in our institute. 90 subjects met the inclusion criteria were included in the study. The following factors were collected at the time of surgical resection of the colonic tumor: patients age, and sex, colon cancer stage, grade and histological subtype, patients body mass index, hemoglobin A1c and smoking history.

#### Results:

28 patients (31%) developed recurrence at a mean follow up time of 19.8 months (range: 2- 54.4 months). Median relapse free survival (RFS) was 54.4 months with a 5-years RFS 49%. Advanced colonic cancer stage and mucinous histological subtype were associated with shorter relapse free survival with a HR of 2.37, 95% CI= 1.38-4.06, HR= 2.46, 95% CI= 1.02-5.90 respectively. Current smokers or those who quite in less than 15 years tend to have worse relapse free survival with a HR of 2.47 (0.98-6.27).

#### Conclusion:

Advanced colon cancer stage and mucinous histological subtype are independent risk factors for cancer recurrence and shorter disease-free survival in completely resected colonic tumors.

Oral # 11

Category: Clinical Vignette

Institution: McLaren Regional Medical Center/MSU – Flint

Program Director: Parul Sud, MBBS, FACP

Presenter: Lakshmi Ddeepthi Talasila

Additional Authors: Rowena Inocencio, Hafiz Khan, David Eilender, Susan Smith

### **Multiple Myeloma with Superior Mesenteric Venous Thrombosis on Presentation: A Rare Case Report**

#### Introduction:

Multiple myeloma (MM) is a plasma cell disorder characterised by monoclonal gammopathy, which usually presents with bone pain, unexplained anemia, hypercalcemia and systemic symptoms of malignancy. We report a rare case of MM with superior mesenteric venous thrombosis on presentation.

#### Case summary:

A 63-year-old Caucasian male with HTN and CAD presented with acute onset of sharp, non-radiating, epigastric pain, aggravated by movement and relieved by lying supine. Patient denied hematochezia, melena, constipation, diarrhea or similar past complaints. Amylase and lipase were normal. Abdominal CT revealed acute cholecystitis and lytic lesions in the lumbar vertebrae. MRCP showed the lytic lesions but also superior mesenteric vein (SMV) thrombosis. Bone scan showed abnormal uptake in the ribs bilaterally. Hypercoagulability work-up was negative and serum immuno-fixation electrophoresis showed IgG lambda monoclonal gammopathy. Bone marrow biopsy showed 60% plasma cells diagnostic of MM.

#### Discussion:

MM patients usually present with anemia, bone pain and elevated creatinine. Presentation with hypercalcemia may occur in up to 30% while hyperviscosity is the initial presentation in only 10%. Several mechanisms have been postulated for hypercoagulability in malignancies including clotting factor abnormalities, defects in the coagulation cascade, immobility, the presence of an inheritable or acquired hypercoagulable state; myeloma appears to involve several unique mechanisms. Our patient had no risk factors for hypercoagulability and typical symptoms and findings of MM. To our knowledge, this is only the second reported case of MM with SMV thrombosis on presentation.

Oral # 12

Category: CQI/EBM

Institution: McLaren Regional Medical Center/MSU – Flint

Program Director: Parul Sud, MBBS, FACP

Presenter: Ahsan Wahab

Additional Authors: Lisa Ochoa, Ali Ahmad, Sara Nazir, Siddique Chaudhary, Hafiz Khan, Mahin Khan, Susan J. Smith

### **A QI Initiative for Bridging the Health Literacy (HL) Gap by Educating the Internal Medicine Resident Physicians at McLaren-Flint**

#### Introduction:

Only 12% of Americans have proficient health literacy (HL). Patients hide this fact from physicians and family due to shame. This QI project was developed to evaluate our resident physicians' (RP) ability to accurately predict patients with low HL and to improve RPs understanding of health literacy and its associated adverse effects.

#### Aim statement:

Over six-month, we intended to increase the IM residents' HL-knowledge by 30% as measured by a HL-knowledge-based survey.

#### Methods:

The IRB exempted this project. Patients visiting the residency-clinic within a two-week period were screened for low HL with the REALM-R, a validated tool. Post-visit, RPs were surveyed to predict their patients' HL. A comparison of predicted-HL and measured-HL was made. RPs were also sent a HL-knowledge-based survey (pre and post-education) to measure their understanding of HL and its adverse effects. Pre and post-education scores were compared.

#### Results:

HL RP prediction and patient REALM-R results were completed by 108 RP-patient pairs. Our RPs correctly identified 5 of 40 patients who were at risk for poor HL (sensitivity = 12.5%). They correctly identified 97.1% of 68 who were not at risk (specificity = 97.1%). Our residents knowledge pre and post-education did not improve significantly– 58% vs 62% (n=18).

#### Conclusion:

Our QI result verified that RPs overestimate patients' HL and do not completely understand the magnitude, effects nor remedies to bridge the HL needs of their patients. This suggests an area for curricular improvement in order to impact patients' ability in self-care.

Oral # 13

Category: Clinical Vignette

Institution: Sinai Grace Hospital - DMC – Detroit

Program Director: Mohamed Siddique, MD, FACP

Presenter: Aditya Kotecha

Additional Authors: Hussein Saleh, MD; AbuFazl Shaik Mohammed, MD; Christina Desousa, MD; Geetha Krishnamoorthy, MD

### **Metachronous Inflammatory Pseudotumor of the Lungs, Calvarium and the Meninges due to IgG4 Related Disease**

Introduction: IgG4 related disease causes tumefactive lesions of the organs due to lymphoplasmacytic infiltration by IgG4 positive plasma cells and leads to fibrosis, and may be associated with elevated IgG4 level.

Case Presentation: A 28-year-old male with Cryptogenic Organizing Pneumonia 7 years ago and an episode of leucocytosis with lung nodules 2 years ago, presented with seizures. MRI of the brain showed calvarial and meningeal masses, which were resected. Biopsy showed spindle cell proliferation with polyclonal IgG4 positive plasma cells with negative ALK1 staining, consistent with Plasma Cell Granuloma (PCG), a subtype of inflammatory pseudotumor, an IgG4 related disease. CT thorax showed fibrotic changes of lungs. We obtained the slides from the 2009 lung biopsy and review was consistent with another subtype of inflammatory pseudotumor, fibrohistiocytic type with predominant macrophages and fibrosis. IgG4 cells were found rarely, since IgG4 positive cells decrease after steroid therapy, which had been started before lung biopsy. We made a diagnosis of IgG4 related disease with metachronous inflammatory pseudotumor of the lungs and meninges.

Discussion: Autoimmune pancreatitis was the first IgG4 disease described. IgG4 related disease can have multiorgan involvement at presentation or organ involvement can be metachronous. Prednisone treatment is first line and is effective if given prior to significant fibrosis. Rituximab has excellent efficacy in severe cases. Internists should be aware of IgG4 related disease, and if tissue biopsy is consistent with this diagnosis, extensive surgery can be avoided since the disease in the active phase responds to steroid or rituximab.

Oral # 14

Category: CQI/EBM

Institution: Sinai Grace Hospital - DMC – Detroit

Program Director: Mohamed Siddique, MD, FACP

Presenter: Swetha Murthi

Additional Authors: E.M. Malitha S. Hettiarachchi, MD; Rajika Munasinghe, MD, MBA, MS, FACP;

Lawrence Lackey, MD; Camelia Arsene, MD, PhD, MHS

### **Is Degludec A More Appropriate Insulin Analogue than Glargine?**

**Introduction:** Newer ultra-long insulin analogues like Degludec are constantly being developed for a more favorable pharmacokinetic profile than the existing long-acting insulin like Glargine, but their is always a debate. The main aim of this evidence-based review is to outline the efficacy and safety of Degludec versus Glargine.

**Methods:** A literature search using Ovid Medline and Cochrane databases was performed with the key words “Degludec” and “Glargine”. A total of 130 articles were found, out of which three studies were identified to be relevant; two were meta-analyses and one was a randomized clinical trial (RCT).

**Results:** A multinational RCT found that there was no significant difference in achieving target Hba1c between Degludec (N = 555) and Glargine (N = 278) groups. In a meta-analysis that involved 7 RCTs (N = 4317), it was found that Degludec was similar to Glargine in achieving target Hba1c <7%. It also showed that Degludec had a lower rate of nocturnal hypoglycemia (RR = 0.75, 95% CI 0.65-0.85) and a better reduction in fasting plasma glucose level than Glargine. An extension of the meta-analysis that included those who achieved good glycemic control of hba1c <7% (N = 2044), found that Degludec was associated with a lower rate of nocturnal hypoglycemia (RR = 0.57, 95% CI 0.45-0.72) as well as overall hypoglycemia (RR = 0.79, 95% CI 0.68-0.92).

**Conclusions:** Insulin Degludec and Glargine have similar efficacy in providing adequate glycemic control. However, Degludec is associated with fewer episodes of hypoglycemia and better fasting plasma glucose level.

Oral # 15

Category: CQI/EBM

Institution: Sinai Grace Hospital - DMC – Detroit

Program Director: Mohamed Siddique, MD, FACP

Presenter: Mohammed Mustafa Nayeem

Additional Authors: E.M. Malitha S. Hettiarachchi, MD; Irfan Omar, MD; Rajika Munasinghe, MD, MBA, MS, FACP; Camelia Arsene, MD, PhD, MHS;

### **Review on Blood Transfusion in an Anemic Chronic Kidney Disease Patient with Non ST-Elevation Myocardial Infarction**

**Introduction:** Almost 40% of patients with non-ST-elevation myocardial infarction (NSTEMI) suffer from Chronic kidney disease (CKD), which in fact doubles the mortality. Anemia arising in CKD contributes to morbidity and mortality in Acute Coronary Syndrome and has shown to worsen outcomes. Our question is: "Does blood transfusions in chronically anemic patients with NSTEMI improve the outcome?"

**Methods:** An evidence-based review of multiple search engines was performed using key words like "NSTEMI", "CKD", "anemia", "blood transfusion". Data from a retrospective study, clinical trials and meta-analysis was reviewed and analyzed.

**Results:** A retrospective study with a sample size of 79,000 patients suggested an improvement in survival benefit with blood transfusion in patients with hematocrit (HCT) level <33%, while transfusing in patients with HCT>36% had increased risk of death compared to non transfused patients. A clinical trial comprising of 40,000 patients reported improved outcomes in STEMI population but worse outcomes in NSTEMI patients regardless of hemoglobin (Hb) levels. A meta-analysis done with a sample size of >203,000 patients suggested that blood transfusion was independently associated with an increased risk of all-cause mortality (relative risk: 2.91) and recurrent myocardial infarction (MI) (relative risk: 2.04).

**Conclusions:** Blood transfusions can be beneficial in chronically anemic NSTEMI patients only if the Hb is lower than 9mg/dl or HCT level of <33%. Patients with Hb levels above 9 and HCT levels >36 who received transfusions ended up with inferior outcomes compared to non transfused patients. Common complications were end organ failure or recurrent MI.

Oral # 16

Category: CQI/EBM

Institution: Sinai Grace Hospital - DMC – Detroit

Program Director: Mohamed Siddique, MD, FACP

Presenter: Sujata Putatunda

Additional Authors: Fazeena Shanaz, MD; Elisa Akagi, MD; Dale Stern, MD; Swetha Murthi, MD; Farah Daneshvar, MD; Nora Dagher; Omar Rahal

### **A Quality Improvement Initiative to Lower HbA1c and to Improve Outcomes in Patients with Uncontrolled Diabetes Mellitus**

**Introduction:** Many of the patients in our primary care clinic have poorly controlled diabetes mellitus with multiple barriers to managing their disease. We instituted a continuous quality improvement (CQI/CQI/EBM) initiative following a Plan-Do-Study-Act cycle for patients with HbA1c values >8.0 in order to improve glycemic control and clinical outcomes.

**Methods:** Cycle 1 consisted of identifying patients with a HbA1c >8 during January 2014 to January 2015 and educating them on diabetes management. Beginning on November 2015, patients were scheduled on designated diabetic clinic days and offered referrals to diabetic education programs. Medical assistants and residents received educational sessions. In addition to those in Cycle 1, the interventions of Cycle 2 included identifying and resolving barriers to follow up care.

**Results:** In Cycle 1 (n=133), the mean pre-intervention HbA1c was 10.78 and the mean post-intervention HbA1c was 10.28 ( $p < 0.011$ ). In Cycle 2 (n=107), the mean pre-intervention HbA1c was 10.49, and the mean post-intervention HbA1c was 9.67 ( $p < 0.000$ ). Pre and post analysis of educational sessions for residents and medical assistants also showed statistically significant improvement in their knowledge ( $p < 0.001$ , and  $p < 0.000$  respectively).

**Conclusions:** The data shows that patients following at our outpatient clinic with uncontrolled diabetes had a statistically significant reduction in HbA1c after implementing our interventions. We have successfully completed the second PDSA cycle of this CQI/CQI/EBM initiative, which shows ongoing improvement of HbA1c and patient compliance. We are planning to continue with a third PDSA cycle with further advancements.

Oral # 17

Category: Research

Institution: St. John Hospital and Medical Center - Grosse Pointe

Program Director: Raymond Hilu, MD, FACP

Presenter: Sai Teja Katta

Additional Authors: Joshua Startup MD, Mohammad Zalt MD.

### **Beta Blocker Use and Tachycardia in Acute Pulmonary Embolism**

Pulmonary embolism (PE) is one of the common medical emergencies with increased morbidity and mortality if not diagnosed in a timely way. The evaluation of patients with suspected PE needs to be efficient for early management and intervention.

Current literature supports the use of validated scoring systems (the Modified Wells Criteria) to determine the clinical probability of acute pulmonary embolism and stratify the patients between high (>4) and low probability (<4) of having acute PE. One important component of the Modified Wells criteria includes a heart rate >100 beats/min with 1.5 points.

The objective is to determine if the use of Beta Blockers results in artificially lower Wells scores in the patient with suspected PE by lowering heart rate, thus delaying the diagnosis.

This is Retrospective cross-sectional study, Reviewed charts of 168 patients who was diagnosed with Acute PE, divided into two groups with one being on Beta blockers at the time of diagnosis and other not. Using Chi-Square Test and T-test Values, we noticed of patients on B-Blockers at the time of diagnosis has statistical significant lower heart rates, and subsequent decreased Modified Wells score compared to another group. also, noticed statistical significance in the delay in diagnosis in patients with low probability group.

Based on the data, the Clinical probability of Acute PE can be still high in patients taking B-blockers with Low well's score. it might affect the validated scoring system to be less sensitive in these Individuals. Further prospective studies are needed to solidify these results.

Oral # 18

Category: Research

Institution: St. John Hospital and Medical Center - Grosse Pointe

Program Director: Raymond Hilu, MD, FACP

Presenter: Irfan Majeed

Additional Authors: Irfan Majeed MD, Philip Vendittelli MD, Leonard B. Johnson MD FACP

### **Concomitant Primary HIV and Cytomegalovirus (CMV) Infection**

**Introduction:** Co-infection of HIV and CMV is common but acute concomitant HIV and CMV infection is rare. We report a patient presenting with acute symptomatic co-infection due to HIV and CMV.

**Case:** A previously healthy 25 year old male presented with one week of nausea, vomiting, abdominal pain, diarrhea and cough. On examination, he had a T<sub>max</sub> 103°F, HR 95/minute, appeared weak and had mild abdominal distension. Initial tests were as follows: amylase 246, lipase 172, ALT 167, AST 261, and chest Xray demonstrated possible right middle lobe infiltrate. HIV testing was performed after he admitted to an unprotected sexual contact three weeks earlier. He was hydrated and treated with IV ceftriaxone and azithromycin. HIV antibody was positive, CD4 100 and HIV RNA was > one million copies. He had progressive bilateral pulmonary infiltrates and worsening oxygenation despite antibiotics and CMV PCR was 26,100 IU/mL and negative beta-D-glucan. His antibacterial agents were discontinued and started on IV ganciclovir and subsequently he had a gradual improvement. He was discharged home on oral valganciclovir and trimethoprim/sulfamethoxazole prophylaxis. He was seen in the office two weeks later, HIV therapy was initiated and he completed a one month course of anti-CMV therapy.

**Discussion.** Acute HIV infection is associated with a wide range of symptoms and may be associated with opportunistic illnesses such as Pneumocystis pneumonia, thrush and CMV reactivation. Concomitant primary HIV/CMV co-infection is rare but should be considered especially in patients with pneumonia unresponsive to routine antibiotics and concomitant pancreatitis.

Oral # 19

Category: Clinical Vignette

Institution: St. John Hospital and Medical Center - Grosse Pointe

Program Director: Raymond Hilu, MD, FACP

Presenter: Safa Maki

Additional Authors: Safa Maki MD MPH, Lamia Aljundi MD, Leonard B. Johnson MD (FACP) Internal Medicine Department, St. John Hospital and Medical Cen

### **Diabetic Muscle Infarction Mimicking Cellulitis**

Diabetic muscle infarction (DMI) is an uncommon microvascular complication of diabetes mellitus with significant morbidity and poor overall prognosis. It is characterized by limb pain, swelling and redness.

A 47 year old female with a history of end-stage renal disease, diabetes mellitus (DM) and peripheral arterial disease presented with left thigh pain for four days. Vitals were stable except for a temperature of 100.1° F. There was left thigh swelling, redness, warmth and severe tenderness. Tests revealed a normal WBC count, mildly elevated CPK, hyperglycemia, negative blood culture, normal plain x-ray of the thigh and duplex ultrasound was negative for DVT. Her symptoms did not respond to opioids and empiric vancomycin was started for presumed cellulitis. Contrast CT only showed diffuse tissue swelling. A left lower extremity MRI demonstrated myositis in vastus lateralis muscle. Further testing showed elevated ESR of 120 mm/hour and negative autoimmune work up. Vancomycin was discontinued and she was treated with NSAIDs with symptomatic improvement and she was discharged to inpatient rehabilitation center.

DMI is associated with long-standing poorly controlled DM, is more frequently seen in women and the mean age is 42 years. Clinical features include acute painful swelling most commonly involving the thigh or calf, fever is rare. Diagnosis is based on clinical suspicion and MRI imaging. Treatment is symptomatic as it resolves on its own but relapses are common. Clinicians should be aware of this condition as it is often is misdiagnosed with cellulitis resulting in inappropriate antibiotic use.

Oral # 20

Category: Research

Institution: St. John Hospital and Medical Center - Grosse Pointe

Program Director: Raymond Hilu, MD, FACP

Presenter: Jason Mouabbi

Additional Authors: Szpunar S., Zein R., Ghannam S., Garg R., Tsao D., Attallah J., Saravolatz L., Kafri Z., Hadid T.

### **Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio as Predictive Markers for Unprovoked Deep Vein Thrombosis**

Neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR) are emerging markers for thrombotic disorders. Multiple studies have shown an association between NLR, PLR and thrombus formation. NLR and PLR have not yet been established as markers of unprovoked deep vein thrombosis (DVT).

We conducted a retrospective chart review of 700 patients who presented with lower extremity swelling. Patients who had a diagnosis of DVT confirmed via ultrasound Doppler were analyzed (DVT group) and compared to patients who had a negative one (Control group). NLR and PLR was calculated based on a CBC done on the same day of the Doppler study. NLR  $\geq 3.4$  is considered positive; PLR  $\geq 260$  is considered positive. D-dimer was also assessed; values  $\geq 500$ ng/dl were considered positive.

The sensitivity of NLR was 90.2%, specificity was 80.4%, PPV 82.1% and NPV 89.1%. The sensitivity of PLR was 62.8%, specificity 98.0%, PPV 97.0% and NPV 72.5%. On the other hand, the sensitivity of D-Dimer was 88.2%, specificity 35.3%, PPV 57.7%, NPV 75.0%.

Based on this study, both NLR and PLR are better predictors of the presence or absence of DVT compared to D-Dimer. NLR can be useful to rule-out DVT when it is negative; whereas PLR can be useful in ruling-in DVT when its positive. NLR and PLR ratios offer a new powerful, affordable, simple and readily available tool in the hands of clinicians to help them in the diagnosis of unprovoked DVT.

Oral # 21

Category: CQI/EBM

Institution: St. Joseph Mercy - Ann Arbor  
Program Director: Patricia McNally, MD, FACP  
Presenter: Sohaib Gilani  
Additional Authors: Tanya Boldenow

### **Decreasing the Overuse of Cardiac Telemetry: Utilizing Staff Education and a Nursing Driven Checklist During IDRs**

#### Introduction

The overuse of cardiac telemetry monitoring is well described. The Choosing Wisely campaign advocates for a protocol driven approach for telemetry use based on American Heart Association (AHA) recommendations. The study objective is to develop a sustained decrease in the overuse of telemetry utilizing physician education and a nursing driven checklist for discontinuation during interdisciplinary rounds (IDR). This study presents a proof of concept that implementing AHA recommendations can safely decrease the inappropriate use of telemetry.

#### Methods

A multidisciplinary team developed the protocol. A randomized sample of 100 adults pre and post intervention in the non-ICU settings were included. Excess hours of telemetry were calculated. Code blue and census corrected number of patients on telemetry were tracked for one year.

#### Results

Of the 100 patients, 17 (17%) in the pre and 23 (23%) in the post cohort were on telemetry for continuous pulse oximetry and were excluded. 31 (37%) patients did not meet AHA guidelines which decreased to 18 (23%) in the post intervention cohort, a 38% decrease ( $p=0.02743$ ). There was a 26% decrease ( $p=0.04845$ ) in patients who were on telemetry for more than 48 hrs. There was sustained decrease in total patients on telemetry, best fit line was a positive parabolic curve. Code blue rates were similar.

#### Discussion

This study showed that significant reduction in patients who do not meet AHA criteria for telemetry can be achieved safely. Positive parabolic curve suggests that a more automated system for discontinuation is needed to maintain sustainable reduction.

Oral # 22

Category: CQI/EBM

Institution: St. Joseph Mercy - Ann Arbor

Program Director: Patricia McNally, MD, FACP

Presenter: Zeyad Sako

Additional Authors: Ruby Marr MD, Corey Dean MD, Afnan Ammar MD

### **Improving Continuity of Care at the Academic Internal Medicine Residency Clinic**

#### Introduction

In resident clinics, competing demands jeopardize the patient and physicians' shared goals of efficient, high-quality, low-cost care. Literature shows enhanced continuity is associated with improved patient and provider satisfaction, adherence to recommended preventive care, and decreased hospitalizations and emergency department visits. Despite formulating a resident partnership in 2014, our Academic Internal Medicine Clinic (AIM) showed minimal improvement in continuity.

#### Objectives

To improve patient/provider continuity to 60% by using the Institute of Healthcare Improvement Model.

#### Methods

Our quality improvement project, which began July 2016, included three PDSA cycles. Data was analyzed on a weekly and monthly basis. Cycle one consisted of resident clinic schedules being available 2-3 months in advance and ensuring visibility of the schedule for residents in the clinic. In cycle two, we increased resident availability by adding an extra half day of clinic. The third cycle focused on workflow and staff retraining.

#### Results

Baseline data from March 2016 demonstrated continuity at 46.5% between patient and provider pairings. By December 2016, continuity had risen to 54.7% with an overall difference of 8.1% and a p-value of 0.025. January 2017 data showed sustained improvement and an all-time high of 59.8%.

#### Discussion

Our project demonstrated significant process improvement in AIM. Interventions such as the availability and visibility of schedule, increased resident availability, and workflow improvements have allowed us to reach our target increase in continuity of 60%.

Oral # 23

Category: Clinical Vignette

Institution: St. Joseph Mercy - Oakland - Pontiac  
Program Director: Benjamin Diaczok, MD, FACP  
Presenter: Rizwan Ahamed  
Additional Authors: Sarah McCalley MS3

### **Steroids and Thyrotoxicosis Precipitate Periodic Paralysis**

Steroids and Thyrotoxicosis Precipitate Periodic Paralysis  
Rizwan Ahamed, MD; Sarah McCalley, MS3; Anupam Sule, MD, PhD, FACP  
St Joseph Mercy Oakland , Pontiac, MI

#### Introduction:

Periodic paralysis is seen in channelopathies and is usually precipitated by a carbohydrate rich meal, fasting or strenuous exercise. It may be accompanied by hypokalemia or hyperkalemia.

#### Case:

A 29-year-old Hispanic male with hyperthyroidism presented to the emergency department with progressive weakness and paralysis. Earlier that day the patient was treated for odynophagia with antibiotics and an intramuscular injection of dexamethasone. He developed progressive severe weakness of all his extremities. The patient had suffered a similar episode five years ago following a steroid injection. Patient had stopped taking his Methimazole one month prior. He denied strenuous exercise, carbohydrate rich meal or alcohol ingestion.

The patient was tachycardic. His strength was 2/5 in the proximal musculature. Deep tendon reflexes were diminished. Labs revealed severe hypokalemia, hypophosphatemia along with low TSH and high free T4. Patient's symptoms resolved within 24 hours.

#### Discussion:

Thyrotoxic periodic paralysis (TPP) occurs in one in a million cases and has been predominantly reported in young Asian males. Hyperthyroidism potentiates catecholamine mediated Na/K ATPase transport of potassium into the cells. Glucocorticoids increase glucose levels which act as stimulus for insulin release. Hyperinsulinemia shifts potassium into the intracellular compartment accentuating hypokalemic muscle weakness.

#### Conclusion:

Glucocorticoids are used in the treatment of thyroid storm. Clinicians should be aware of a small subset of hyperthyroidism patients where the use of glucocorticoids can precipitate paralysis.

Oral # 24

Category: CQI/EBM

Institution: St. Joseph Mercy - Oakland - Pontiac

Program Director: Benjamin Diaczok, MD, FACP

Presenter: Justin Field

Additional Authors: George Augustine, MD, Mohanad Saleh, MD, Rudin Gjeka, MD, Kirit Patel MD, FACC, Anupam A Sule, MD, PhD, FACP

### **Appropriate ICD-10 Compliant Documentation for Echocardiograms Per CMS Guidelines**

#### **Problem:**

Appropriate documentation provides accurate data for research, performance measurement and reimbursement. The electronic medical record system at our institution lacks the capacity for echocardiogram orders to be linked with ICD-10 diagnosis codes in the problem list resulting in delays in patient care due to need for order clarification. The aim of this project was to improve documentation of reasons for ordering echocardiograms during physician order entry.

#### **Intervention:**

Retrospective chart review for the prevalence of inpatient echocardiogram orders from October 1st, 2016 to December 30th, 2016 (n=88 days) was performed. The Pre-Intervention phase had (n=523) incorrect echocardiogram orders and (n=2172) correct orders. Our intervention strategy included educating physicians, residents, and mid-level providers during the month of January 2017, distributing reference sheets with common ICD-10 codes at nursing stations as well as complete ICD-10 code lists. Post intervention data was collected from January 15th, 2017 to March 15th, 2017 (n=64 days).

#### **Outcome:**

During the Post-Intervention phase there were (n=224) incorrect echocardiogram orders and (n=2770) correct orders. The percentages of incorrectly ordered echocardiograms decreased from 19.4% to 7.5% which was statistically significant. (Mann-Whitney U test  $U=805.5$ ,  $p<0.0001$ ). This decreased the delay in reporting as the Technicians spent less time attempting to get order clarification from ordering physician.

#### **Sustainability:**

During the second PDSA cycle the reference sheets are being uploaded to the internet to serve as a reference not only at our institution but other institutions across the country that are utilizing the same EMR.

Oral # 25

Category: CQI/EBM

Institution: St. Mary Mercy Hospital - Livonia  
Program Director: David Steinberger, MD, FACP  
Presenter: Utibe Effiong

Additional Authors: Lauren Bailey, RN; Payam Lahiji, MD; Mohammed Saleh, MD; Preeti Misra, MD; Tejal Mehta, MD and David Steinberger, MD

### **Effect of an Educational Intervention on Knowledge of Hospital-Acquired Clostridium Difficile Infection Prevention**

**INTRODUCTION:** Given the high incidence of hospital-acquired *C. difficile* infection (CDI) and the lack of primary prevention through immunization, a team of health professionals at St Mary Mercy Hospital developed and implemented an online educational module for *C. difficile* infection control in healthcare facilities. Our objectives were to develop and implement an online instructional module imparting evidence-based strategies for preventing *C. difficile* infection within the hospital setting and to observe improvement in knowledge scores after having completed the module.

**METHODS:** A module based on the CDC guidelines for *C. difficile* infection control in health-care facilities was developed using an iterative, consensus-based process. The pretest was administered immediately prior to starting the module. The posttest was administered immediately following the module. To measure the difference between pretest and posttest scores, a paired samples t-test and effect size (eta squared) were employed.

**RESULTS:** A total of 1088 respondents had usable pre- and posttest scores. The pretest mean score was 70.13% while posttest mean score of 96.45%. Results from the paired-samples t-test proved this difference to be highly significant:  $t(1087) = 62.99$ ,  $p < 0.0005$ . The eta squared statistic was 0.78.

**CONCLUSIONS:** One limitation of our design is re-rest bias. To remedy this deficit, future QI research could either randomize participants to take the pretest or posttest, or randomize questions between pretest and posttest. Findings from this QI study can be paired with other infection prevention measures—such as hand washing monitoring—to identify remaining gaps in environmental infection control within our healthcare facility.

Oral # 26

Category: CQI/EBM

Institution: Wayne State University - Crittenton Hospital - Rochester

Program Director: Sarwan Kumar, MBBS, FACP

Presenter: Alicja Sobilo

Additional Authors: Jacob Salman MD, Nour Chams MD

### **Inappropriate Use of IV Anti-Hypertensives**

**Introduction:** There are no clear guidelines for the use of IV anti-hypertensives(IV-AHs) in the hospital for asymptomatic hypertension. Treatment of asymptomatic hypertension in the acute hospital setting is associated with complications including renal insufficiency and hypotension. Educational intervention over 2 PDSA cycles was implemented in order to decrease use of IV-AHs in non-emergent hypertension.

**Methods:** Initially charts were reviewed from 134 hospitalized patients over 3 months who received IV-AHs: Labetalol, Enalapril, and Hydralazine. Exclusion criteria included hypertensive emergency and stroke. Initial data showed 34% complications with Enalapril, 23% with hydralazine and 35% with labetalol. IVAH use was not indicated and over 80% of patients in had oral options available. Our intervention included educational presentation to nurses, pharmacists, residents, physicians.

**Results and Discussion:** Educational presentation focused on hypertension guidelines had significant effect. Total IV enalapril dispensed doses decreased from 1,857 to 1,282 (31% reduction) and total cost from \$8,414.62 to \$6,929.10 (18% reduction). IV Hydralazine doses decreased from 663 to 250 (62% reduction) and total cost decreased from \$10,266.48 to \$3,810.24 (63% reduction). IV labetalol use decreased from 411 doses to 287 (30% reduction) and total cost \$4,503.69 to \$2,921.18 (35% reduction). After 2 rounds of education total doses of IVAHs was reduced by 1,112 and total cost by \$9,524.27 in a 3-month interval. We are planning further intervention via EMR component which will prompt physicians if other antihypertensive options are available. This will improve not only patient safety and reduce complications, but will also decrease hospital costs.

Oral # 27

Category: CQI/EBM

Institution: Wayne State University - Crittenton Hospital - Rochester

Program Director: Sarwan Kumar, MBBS, FACP

Presenter: Lucinda Wenzlick

Additional Authors: Danielle Fabry, Vesna Tegeltija, Sarwan Kumar

### **Improving Resident Error Reporting**

This project's aim is to improve the number of hospital error reports generated by resident physicians and to incorporate error discussion as a part of daily rounds. Lack of error reporting by residents at Crittenton Hospital Medical Center (CHMC) was recognized by ACGME during a site visit by the CLER committee. In response to the committee's findings, the first PDSA cycle was used to guide and format this project. As part of root cause analysis, a survey was conducted to investigate the reasons that prevent residents from reporting errors. Over 30% of residents replied that they are, "Not sure what constitutes a medical error," as the reason limiting their reporting. Another 21% admitted that they are, "Unaware of the process that occurs after errors are reported." Based on the survey results, the first PDSA cycle successfully provided education to IM residents, which addressed the main insecurities and misconceptions regarding error reporting. A mock session was also provided to familiarize and guide residents through the process of reporting errors. Three months following the education intervention, resident error reporting improved five-fold, from one report per year to five reports in three months. To capitalize on this momentum, a second PDSA cycle focused on the remaining barriers to reporting errors. A multidisciplinary team was developed to address, investigate, analyze, and ultimately implement change in response to the error reported. For future: Additional attempts at education will be made to new interns, incorporating errors into daily rounds, and sub-categorizing errors to determine resolution.

Oral # 28

Category: Clinical Vignette

Institution: Wayne State University - DMC - Detroit

Program Director: Jarrett Weinberger, MD, FACP

Presenter: Amjad Kanj

Additional Authors: Nadine Abdallah, Hibah Ismail

### **A Case of PR3-ANCA Positive Renal-limited Vasculitis**

Pauci-immune necrotizing glomerulonephritis is a subgroup of rapidly progressive glomerulonephritis, characterized by absence of immunoglobulins on immunofluorescence microscopy. It is usually part of multi-organ involvement in patients with granulomatosis with polyangiitis (GPA) or microscopic polyangiitis (MPA). Rarely, it can present as renal-limited vasculitis (RLV).

A 37-year-old African American man presented with cola-colored urine of few days. He had mild hypertension and trace pedal edema on exam. Labs showed normocytic anemia, hypoalbuminemia and Cr:3.2 (BUN:34). Urinalysis showed 3+ proteins, dysmorphic RBCs, oval fat bodies and RBC casts. 24-hour urine protein was 3.2g (subnephrotic range proteinuria). Ultrasound of the kidneys showed bilateral parenchymal disease. Serologic testing was positive for PR3-ANCA. Renal biopsy was consistent with Pauci-immune necrotizing glomerulonephritis with 50-60% sclerosis. Chest X-ray was negative and nasopharyngolaryngoscopy showed no lesions. The patient was diagnosed with PR3-ANCA RLV. He received three days of methylprednisolone and cyclophosphamide and was discharged home on prednisone.

In patients with RLV, renal biopsy tends to show more sclerosis than in GPA or MPA, likely because they present late in the course of disease due to absence of extra-renal manifestations. This highlights the need for early recognition and timely treatment of this condition. A systematic approach should be followed. This starts with a thorough history and physical exam, followed by basic labs, urinalysis with microscopy, targeted serologic testing and renal biopsy. Also, patients with RLV should be made aware of the extra-renal manifestations of GPA and MPA as they might appear later in the course of disease.

Institution: Wayne State University - DMC - Detroit

Program Director: Jarrett Weinberger, MD, FACP

Presenter: Jasleen Kaur

Additional Authors: Ravinder Bhanot M.D., Chetna Jinjuvadia M.D.

**'Saturation Gap' - Key to Diagnosis of Rasburicase-Induced Methemoglobinemia in a Previously Unrecognized G6PD Deficient Patient**

Rasburicase is commonly used in patients with hematologic malignancies for tumor lysis syndrome (TLS) prophylaxis and management. Methemoglobinemia is a rare but serious adverse effect of Rasburicase, more common in patients with Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency.

We report a case of a 48-year-old African American man with relapsed chronic myeloid leukemia (CML) in blast crisis who was admitted for chemotherapy. He developed TLS and therefore received Rasburicase treatment. Although he was asymptomatic, yet his oxygen saturation on pulse oximeter (SpO<sub>2</sub>) consistently remained low (80's). Interestingly, he had normal PaO<sub>2</sub> and oxygen saturation on ABG analysis (SaO<sub>2</sub>-99%) revealing the so-called 'Saturation Gap'. This prompted the suspicion for methemoglobinemia, an important albeit uncommon cause of low SpO<sub>2</sub>, and lab work did reveal high methemoglobin levels (8-12%; Normal<1%). He recovered uneventfully with conservative measures including supplemental oxygen and packed red cell transfusion. He was presumed to be G6PD deficient (later on confirmed with the G6PD quantitative lab test) and thus methylene blue was avoided as it can further worsen methemoglobinemia in these patients.

In conclusion, Rasburicase-induced methemoglobinemia is a potentially serious concern, especially in African-American patients, who are at risk for G6PD deficiency. Knowledge of this side effect and a high index of suspicion for diagnosis, especially in the presence of a "saturation gap", is important in early diagnosis and successful management of this condition. Also, patients from ethnicities in which G6PD deficiency is prevalent should be screened prior to administration of Rasburicase where practical.

Institution: Western Michigan University School of Medicine - Kalamazoo

Program Director: Joanne Baker, DO, Member

Presenter: Muhammad Danish Saleem

Additional Authors: Samuel H. Lai; Don J Park

### **Dapsone Induced Aplastic Anemia with Early Signs of Response to Treatment with Eltrombopag**

Aplastic anemia is a rare adverse effect associated with Dapsone. The pathogenesis and optimal treatment of this uncommon toxicity remains unknown, but is thought to be directed towards immune mediated bone marrow suppression rather than cell destruction. We present a case of a 71-year-old female with pancytopenia after three weeks of Dapsone treatment for systemic lupus.

She presented with increasing bruises and bleeding gums and was found to have pancytopenia with profound thrombocytopenia (platelet count 7,000/mcL), compared to the other hematopoietic lineages. She was initially treated for acute immune thrombocytopenic purpura. Platelets increased to 73,000/mcL after one transfusion without further significant drop, suggesting that the pancytopenia resulted from under-regeneration caused by Dapsone induced bone marrow suppression. Bone marrow biopsy revealed 10% hypocellularity without dyspoiesis or myelofibrosis. Four weeks after discontinuation of Dapsone, there was no improvement in all three lineages despite platelet and PRBC transfusions. Other treatments considered included immunosuppressive therapy (IST) such as antithymocyte globulin, cyclosporine, and methylprednisolone. However, considering her profound thrombocytopenia and recent evidence of the effectiveness of treating aplastic anemia with thrombopoietin receptor agonist, she was given oral Eltrombopag. Within two weeks, the patient showed increases in neutrophil and platelet counts, suggesting that thrombomimetics can be used in Dapsone induced aplastic anemia along with other IST. The relative lack of side effects with thrombomimetics may favor its use over IST. Furthermore, improvements in each lineage suggest a pathophysiology related to hematopoietic stem cell suppression that is treatable with thrombomimetics.