



Internal Medicine Residency Program

Boston University Medical Center

Senior Resident

Academic Day

Friday, May 27, 2016

Handbook of Abstracts

Table of Contents

Acknowledgement of Mentors	Page 1
Renal Transplantation in patients with HIV <i>Annette Artau, MD</i>	Page 2
Women's Health Outpatient Curriculum for Residents <i>Amanda Bradke, MD</i>	Page 3
Diagnostic Error Among Internal Medicine Residents: Incidence and a Simple Method to Improve Diagnosis <i>Michael Castellot, MD</i>	Page 4
The A, B, Cs of Hepatitis <i>Bailey, Y. Cheng, MD</i>	Page 5
The need for reduction of radiation exposure in symptomatic Crohn's disease at Boston Medical Center <i>Yu Chen, MD</i>	Page 6
Thinking Twice on Transthoracic Tissue Biopsy before Treating Pulmonary AML <i>Yvonne Chu, MD</i>	Page 7
Rates of Venous Thromboembolism (VTE) Prophylaxis in Inflammatory Bowel Disease (IBD): Inappropriate Underutilization? <i>Nicholas Cordella, MD</i>	Page 8
TB Determined: The Uncertain Future of the Tuberculosis Epidemic in Southern Africa <i>Jared Eddy, MD</i>	Page 9
Practice Patterns and Outcomes Associated with Choice of Vasopressor Therapy for Septic Shock: A Population Based Propensity-Matched Cohort Study <i>Ashraf Fawzy, MD</i>	Page 10
A Unique Presentation of Renal Cell Carcinoma with Iron Deficiency Anemia <i>Lakshmi Gowda, MD</i>	Page 11
Facial Swelling and Dyspnea <i>Gabriela Gryczynski, MD</i>	Page 12
Technetium Pyrophosphate Cardiac Imaging in Asymptomatic Variant Transthyretin-Related Cardiac Amyloidosis <i>Muhammad Haq, MD</i>	Page 13
Talking Smack: An Exploration of Illicit Substances Affecting our Patient Population <i>Michelle Hughes, MD</i>	Page 14
Linkage to Care in Incarcerated Population <i>Karen Jiang, MD</i>	Page 15
A Skeletal Survey of Leg Pain: A Case of Post-traumatic Chronic Osteomyelitis <i>John S. Kim, MD</i>	

The Complexity of Diagnosing Maturity Onset Diabetes of the Young in Ethnic Minorities <i>Pinky Kurani, MD</i>	Page 17
The Relation of Plasma Vitamin K Status to Meniscal Pathology in Knee Osteoarthritis <i>J Liu, MD</i>	Page 18-19
They say once you get diabetes, that’s the end of your life”: a qualitative study with diabetic patients in Kolkata, India. <i>Paul M Long, MD</i>	Page 20
Early Evaluation of the Metabolic Effects of Lorcaserin in a Randomized Control Trial <i>Hannah Mathew, MD</i>	Page 21
Shape-Up and Eat Right (SUPER) Families: Feasibility of family-based group intervention for weight management <i>Juhee McDougal, MD</i>	Page 22
A Molecular Biomarker for Systemic Sclerosis-Associated Pulmonary Arterial Hypertension. <i>Matthew Moll, MD</i>	Page 23
An initiative to increase resident generated patient safety incident reporting at the VA Boston Healthcare System <i>Kathryn Molt MD</i>	Page 24
How do we measure CVD risk? A cross-sectional analysis of CVD risk factors and CVD risk predictions in HIV-positive and HIV-negative persons in rural Uganda <i>Mara E Murray Horwitz, MD</i>	Page 25
Efficacy and Safety of Vedolizumab in Patients with Inflammatory Bowel Disease in a Large Tertiary Medical Center <i>Shannon Oppenheim, MD</i>	Page 26
Coronary Artery Calcium: A “Free” Diagnostic Test that can Change your Practice <i>Nicholas Patchett, MD</i>	Page 27
An out-of-balance axis <i>Vassiliki Pravodelov, MD</i>	Page 28
The 2015 Annual American College of Gastroenterology Meeting: Insights from a Twitter Analysis <i>Reich, Jason S, MD</i>	Page 29
A Framework for Breaking the Opioid Prescribing Cycle <i>Payel Roy, MD</i>	Page 30
The Need for Better Code Blue Documentation: Results from a Code Committee Quality Improvement Initiative <i>Anas Sarhan, MD</i>	Page 31
Occam’s razor versus Hickam’s dictum in a liver abscess case <i>Saranya Sasidharan, MD</i>	Page 32
A Masked Case of Vancomycin-Induced Immune Thrombocytopenia <i>Samuel A. Schueler, MD</i>	Page 33
Improving Order Sets at Boston Medical Center <i>Nandini Setia, MD</i>	Page 34

Systems-level Resources for Pulmonary Nodule Evaluation in the United States: A National Survey <i>James Simmons, MD</i>	Page 35
Discordance between Electrocardiographic Left Ventricular Hypertrophy and Echocardiographic Parameters in Elderly Patients with Heart Failure <i>Steven Simon, MD</i>	Page 36
Reducing Overuse of Cardiac Telemetry at an Academic Medical Center Through Implementation of Guideline Specific Electronic Order Sets <i>Rajat Singh, MD</i>	Page 37
Making the Difference: Quality Improvement in Modern Medical Training <i>Lakshman Swamy, MD / - Senior Talk, Chris Worsham, MD</i>	Page 38
Hyperglycemia Management in Septic Shock: Opportunities for Improvement At Boston Medical Center <i>Dylan Thomas, MD</i>	Page 39
The effect of bone marrow plasma cell burden on survival in patients with AL amyloidosis undergoing high dose melphalan and autologous stem cell transplantation <i>Alain Uwumugambi, MD</i>	Page 40
Improving the Handling of Protected Health Information <i>Abhinav Vemula, MD</i>	Page 41
Making the Difference: Quality Improvement in Modern Medical Training <i>Lakshman Swamy, MD and Chris Worsham, MD</i>	Page 42
Digital Health: the Future or a Flop <i>Jordan Yoder, MD</i>	Page 43
18-30 year-olds more likely to link to HCV care: an opportunity to decrease transmission <i>Young Kraig L, MD</i>	Page 44
A Vascular Obstacle in Ultrasound Guided Hip Joint Injection <i>MaryAnn Zhang, MD</i>	Page 45

Acknowledgement of Mentors

1. Jason Ackrivo, MD
2. Sara Alexanian, MD
3. Stephan Anderson, MD
4. Sabrina Assoumou, MD
5. Pamela Bellino, MD
6. Sheilah Bernard, MD
7. Rachel Casas, MD
8. Dan Chen, MD
9. Ryan Chippendale, MD
10. Michael Donlin, NP (Advanced Care Nurse Practitioner)
11. Harrison Farber, MD
12. Francis Farraye, MD
13. Michael Gould, MD (Kaiser Permanente faculty)
14. Jacob Groshek, MD (BU School of Communication)
15. Gouri Gupte, MD (BUSPH faculty)
16. Robert Horsburgh, MD
17. Jonathan Iaccarino, MD (VA Portland faculty)
18. Brian Jacobson, MD
19. Hasmeena Kathuria, MD
20. Eugene Kissin, MD
21. Gene Kwan, MD
22. Robert Lafyatis, MD
23. Adam Lerner, MD
24. Benjamin Linas, MD
25. Yukari Manabe, MD (Johns Hopkins faculty)
26. Christos S. Mantzoros, MD (BIDMC faculty)
27. Edward Miller, MD
28. Hannah Miller, MD
29. Tuhina Neogi, MD
30. Ansu Noronha, MD
31. Craig Noronha, MD
32. Christing C. Reardon, MD
33. Frederick Ruberg, MD
34. Vaisali Sanchorawala, MD
35. Christopher Slatore, MD (Oregon Health and Science Univeristy Faculty)
36. Karin Sloan, MD
37. Mark Sloan, MD
38. Jorge Soto, MD
39. Devin Steenkamp, MD
40. Katrina Steiling, MD
41. Rachna Vanjani, MD
42. Olivera Vragovic, MD
43. Allan Walkey, MD
44. Sharmeel Wasan, MD
45. Renda S. Weiner, MD

Category: Senior Talk Abstract

Renal Transplantation in patients with HIV

Artau, Annette

1954 marks the year of the first successful renal transplant. In 1981, the CDC documented *Pneumocystis carinii pneumonia* in five previously healthy gay men in Los Angeles, an event later recognized as the first official report of the AIDS epidemic. For the next 15 years, it appeared that the topics of HIV and Renal Transplantation would never intentionally meet, with the notable exception of the 1984 National Organ Transplant Act where HIV infection was adjudged to be an absolute contraindication to deceased organ donation in the United States. This, however, would eventually change.

1996 marks the year highly active antiretroviral therapy (HAART - usual regimen combines three anti-HIV drugs from at least two different classes) was introduced. After this, many patients with HIV were no longer dying of AIDS related illness - now the treatment of chronic illnesses in patients with HIV, like kidney disease, became increasingly discussed. A United States clinical trial was done from 2003-2009 that looked into the outcome of kidney transplantation in HIV infected recipients: The results showed that transplantation was feasible, and HIV infection in recipient should not lead to exclusion from transplantation. In 2008, doctors in South Africa - done in response to bleak options available to HIV infected patients with chronic kidney disease in South Africa as HIV was listed as contraindication to dialysis - went beyond what was being done in the United States and began to transplant HIV infected recipients with kidneys of HIV infected donors. Results from this trial were favorable, and discussions began in the United States to proceed in similar fashion, as this would mark a new set of available donors for people with HIV, and would possibly take off demand for non-HIV infected organs from non-HIV infected patients on the donor list. This led to the HOPE Act (HIV Organ Policy Equity Act) which called for the 1984 policy to be overturned. HOPE Act was enacted in 2013, and became law in June 2015. Thus far, four hospitals have signed up to participate in clinical trials. By March 2016, the first HIV to HIV renal transplant was done in the US.

Category: Quality Improvement/ Education

Women's Health Outpatient Curriculum for Residents

Amanda Bradke, Rachel Casas, Ryan Chippendale

Aims and Goals: This project aims to create and evaluate a comprehensive women's health curriculum for residents rotating through the women's health primary care clinic at Boston Medical Center.

Background: Over the past few decades, multiple professional societies in the United States emphasized incorporating women's health into resident level curricula, but national implementation has varied in Internal Medicine residency programs. Prior surveys of primary care residency program directors demonstrate growth of women's health opportunities, but show inconsistency in emphasized content and discrepancies between perceived and expected mastery of topics in women's health. Additionally, a mixed methods needs assessment of residents and faculty at Boston Medical Center confirmed the perceived importance of women's health curricula, need for increased education, and preferred methods of implementation including a small group, interactive format.

Methods: Based upon the local needs assessment and formative feedback from residents and faculty, we developed a series of case conferences on women's health topics to be implemented for residents in women's health clinic. To evaluate the curriculum we created a survey to be given before and after resident participation. The survey includes multiple choice, vignette style questions to evaluate resident knowledge of women's health, as well as scale based questions to assess resident attitudes and comfort levels of a variety of skills important in providing health care to women.

Results: Seventeen case conferences are being developed, some of which have already been implemented in clinic. These conferences have been well received as assessed through informal resident and faculty feedback. The knowledge, attitudes and skills survey was piloted on 2 residents rotating through clinic.

Future Directions: We plan to complete the development of approximately twenty case conferences in total. The formal implementation of the curriculum, as well as the pre and post evaluation surveys is forthcoming as new residents start their rotation in women's health clinic July 2016.

Category: Quality Improvement / Medical Education

Diagnostic Error Among Internal Medicine Residents: Incidence and a Simple Method to Improve Diagnosis

Michael Castellot, MD, Aravind Menon, MD Tom Peteet, MD

Introduction: Diagnostic error and cognitive bias have been recognized as critical areas of research inpatient safety, with rates of diagnostic error as high as 15% amongst clinicians. Errors can broadly be classified as ‘system-related’, ‘no-fault’, and ‘cognitive’. Our study aimed to determine the degree of diagnostic accuracy among medical residents as well as evaluate the effect of simple interventions to address the cognitive biases that commonly contribute to inaccurate diagnosis.

Methods: We performed chart reviews of patients admitted by Internal Medicine residents during their “nightfloat” rotations to a medicine service through the Emergency Department. We chose to look at nightfloat admissions since residents’ typically have greater autonomy in clinical decision-making at night. We determined the nightfloat’s diagnosis and differential based on the ‘Assessment and Plan’ portion of their Admission H&P. This was compared to the diagnosis listed in the Discharge Summary, as this should reflect the attending physician’s input as well as data that resulted throughout admission. We then implemented several interventions aimed at decreasing cognitive biases (from structured interviews to posters) and the rate of diagnostic error post-intervention was calculated. Here I report the effect of one such intervention. Overnight residents were asked to voluntarily complete a note card, titled “Diagnostic Timeout”, for each new admission they performed. It asked them one question: “If this patient were to die overnight, what would be the three most likely causes?” and asked them to list up to three responses. For each response, there was a simple “yes/no” check box of “Has this diagnosis been or is it currently being adequately addressed? (i.e. already ruled out, labs pending, therapy initiated)”.

Results: Through a chart review of 28 admissions, we found a diagnostic accuracy rate of 86%. Secondary data included 21% of cases that had a change in diagnostic plan from the emergency room, and 25% of the cases had a change in diagnostic plan from the attending physician the subsequent morning. In the diagnostic time-out intervention, there was 100% diagnostic accuracy, 13% change of plan from the emergency room, and 0% change in plan from attending physicians.

Discussion: There is significant room for improvement in diagnostic accuracy among internal medicine trainees. There are many different types of cognitive errors, but common causes include over reliance on type 1 (“fast”) reasoning, premature closure, and anchoring. All three of these can be theoretically ameliorated by “cognitive forcing techniques” that are designed to make a physician pause and consider his assumptions and conclusions. The Diagnostic Timeout looked at here would be an example of one of these techniques. While having a small sample size, our data suggest that these simple to implement techniques may improve the diagnostic accuracy of residents with little expenditure of time. The hope would be that residents who are initially prompted (in this case, by the Diagnostic Timeout cards) to perform this type of thinking would in time internalize it such that they continue to practice and reason this way without the prompt post-residency. The focus of our work on cognitive factors distinguishes it from much of the QI being done, which focuses more on “systems” issues. Systems issues are clearly an important factor to address in order to improve patient care. However, cognitive bias is another important factor contributing to diagnostic inaccuracy that has often been overlooked. It makes particular sense from the standpoint of residency programs, who have the dual focus of providing quality patient care and developing their resident. Strategies directed at improving quality by improving clinical reasoning have the potential to both improve the quality of care while simultaneously having an educational benefit on to the resident.

Category: Quality Improvement / Education

The A, B, Cs of Hepatitis

Bailey Y. Chang, Vassiliki Pravodelov

Learning Objectives:

- 1: Recognize the importance of Hepatitis B vaccination in patients with chronic Hepatitis C
- 2: Review the intricacies of Hepatitis B and C co-infection

Case: A 52 year-old woman with history of remote Hepatitis A infection and chronic untreated Hepatitis C presented to the primary care clinic with a week-long history of fatigue and new polyarthralgias of the hand, shoulders and knee. Her past medicosurgical history was significant for chronic knee and ankle pain, former intravenous heroin and alcohol use in remission. The patient had received one dose of the Hepatitis A vaccine and 2 doses of the Hepatitis B vaccine in the past, never completing either vaccination series. Due to patient distress she was referred to the emergency department (ED). There, Lyme IgG was negative, erythrocyte sedimentation rate (ESR) and basic metabolic panel were normal, while the C-reactive protein was elevated at 63.5 mg/L. She was sent home with ibuprofen. Her joint pain persisted and progressed to swelling, prompting further testing which revealed a weakly positive rheumatoid factor, a positive Hepatitis B core antibody, and aspartate transaminase (AST) at 291 U/L alanine transaminase (ALT) at 607 U/L. Serum cryoglobulins were also detected. Due to nausea, vomiting, and worsening polyarthralgias she was sent again to the ED where she had an abdominal CT scan revealing no obvious cause of her symptoms, and she was discharged home. At the follow-up clinic visit her anti-cyclic citrullinated peptide antibody was negative although Hepatitis B viral (HBV) load was found to be greater than 8 million with a positive Hepatitis B core IgM antibody, indicating acute hepatitis B infection. AST and ALT had increased slightly to 335 U/L and 569 U/L, respectively. She was at that point referred urgently to the gastroenterology clinic but, due to inadequate pain control, she represented to the ED and was admitted for acute Hepatitis B management. Her AST and ALT continued to rise, peaking at 690 U/L and 1022 U/L respectively. Her alkaline phosphatase also peaked at 525 U/L, from a baseline of about 110. Her hepatitis C viral (HCV) load was noted to be 3355 IU/mL. Her exposure to Hepatitis B was thought to be an unprotected sexual encounter with a Hepatitis B positive partner. Finally, her most recent AST and ALT had normalized and the Hepatitis B viral load was noted to be 132 IU/mL. Her symptoms of nausea and vomiting improved, but the arthralgias and fatigue persisted likely due to presence of untreated cryoglobulin positive chronic Hepatitis C.

Discussion: This case serves as a reminder that immunization against the hepatitis B virus can be defeated in clinical practice. Our patient developed acute hepatitis B in spite of having recently begun the vaccination series, when reason would dictate that the hepatitis B surface antibody (HBsAb) response would have been most potent. However antibody unresponsiveness has been described in certain populations, including those with chronic liver disease. Our patient did not complete her vaccination series and therefore an antibody titer was not obtained prior to the onset of her symptoms. It is not recommended to routinely check an HBsAb titer after completing the series in the immunocompetent population, as the antibody response is reported to be about 95%. In those at risk for nonresponse, however, it is recommended to give an additional 10mg dose and to check the antibody titer approximately three months after the last dose of vaccine; those with less than 10mIU/mL of HBsAb should repeat the four-dose vaccination series to which 50-60% of the nonresponders tend to respond. Our patient developed insufficient immunogenicity from her vaccine doses. It must be noted that several international studies have showed that even individuals who respond to the HBV vaccination series are still at risk for developing an acute HBV infection. One issue that bears mentioning is the suppression of the HCV load, noticed during her hospitalization. Case reports have shown that patients with underlying chronic HCV infection who developed acute HBV infection exhibited accelerated clearance of the HBV surface antigen molecule, HBV load, and HCV viral load.

Conclusion: The anti-HBV vaccine can and should be used to mitigate the possibility of developing severe acute hepatitis in those individuals with chronic hepatitis C. However, in those individuals who are at risk for a poor immunologic response to the standard vaccine regimen, care must be taken to increase the normal vaccination dosage and routinely check for poor antibody response. As a final point, for those individuals who do go on to develop acute hepatitis B, serologic monitoring is of utmost importance given the possibility to clear both the hepatitis B and C viruses. Perhaps even more importantly, appropriate patient education regarding preventable exposures should be given as the efficacy of vaccination is not perfect.

Category: Quality Improvement / Education

The need for reduction of radiation exposure in symptomatic Crohn's disease at Boston Medical Center

Chen Y, Tamayo-Murillo D, Le S, Sax A, Jeong C, Colip C, Farraye F, Miller H, Anderson SW, Soto JA.

PURPOSE: Patients with Crohn's disease (CD) are at risk of high radiation exposure, particularly from CT imaging. Symptomatic Crohn's patients are often scanned repeatedly due to broad differential diagnoses associated with the presenting complaint. While CT is a valuable tool in the assessment of Crohn's disease and its complications, we must be cognizant of its overutilization. MRI Enterography (MRE) is a validated tool for the assessment of Crohn's disease severity, fistulas, and strictures; If Crohn's disease flare is suspected, MRI Enterography (MRE) is the imaging modality of choice over CT to reduce radiation exposure. The goals of the project is to 1) evaluate the utilization rate and indications for CT imaging of Crohn's patients at our institution; 2) decrease radiation exposure by increasing MRE utilization in Crohn's patients presenting with non-specific abdominopelvic pain as part of a quality improvement initiative.

METHODS: We performed a retrospective chart review of 100 consecutive Crohn's disease patients who received a CT scan from 2000 to 2015. All incidences of radiation from CT imaging were noted. The total and average number of CT scans were tallied. CT scans were categorized by indication and the total number of normal studies was also obtained. To increase MRE use, a joint recommendation statement from the departments of Gastroenterology and Radiology was released endorsing MRE use when a patient with known CD presents with non-specific abdominopelvic pain prompting the need for cross sectional imaging. Furthermore, we are also engaging our information technologist (IT) to change our ordering procedure on our electronic medical system to help clinicians decide proper imaging modalities in patients with CD. Prospectively, we will be collecting rates of CT and MRE utilization at BMC for Crohn's disease patients and their impact on clinical management after the abovementioned interventions.

RESULTS: 100 patients with Crohn's disease were evaluated, 53 female and 47 male, with a mean age of 48, and a range of 22 to 88 years. In this study population 491 CT scans were performed. The indications for the imaging studies included assessment of nonspecific abdominal or pelvic pain (46.8%), evaluation of suspected Crohn's flare or Crohn's related complications (30.5%), surgical complication or surgical follow up (9.5%), flank pain (5.2%), trauma (0.4%), or other (7.6%).

In this population, the average number of CT scans performed was 4.9, with a range of 1 to 23. A total of 43 patients received ≥ 5 CTs, 12 received ≥ 10 CTs, 4 received ≥ 15 CTs and 2 received ≥ 20 CTs. Of the 491 CT scans performed, 135 (27.5%) were reported as normal or with stable chronic changes related to the patients underlying Crohn's disease.

CONCLUSIONS: The average number of CT scans per patient in this population approached 5 scans with a maximum of 23 scans in a single patient. Prior studies have shown that radiation above 50mSv (~5 CT scans) increases the risk of cancer, which is particularly pertinent for the Crohn's patient population. Of the scans performed a significant proportion were recorded as normal or with stable chronic changes from Crohn's disease, thus not providing a cause for the patient's symptoms. Our findings demonstrate there is considerable room for reducing the use of CT imaging in symptomatic Crohn's patients, given the significant number of scans with normal or stable chronic findings. Thus, the ongoing quality improvement initiative will address whether or not such interventions will decrease the number of CT scans ordered.

Category: Quality Improvement / Education

Thinking Twice on Transthoracic Tissue Biopsy before Treating Pulmonary AML

Yvonne Chu, Umit Tapan, John Cho Lee, Vaishali Sanchorawala, Adam Lerner

Introduction: Currently there are no practice guidelines for diagnosing acute myeloid leukemia (AML) lung infiltrates, and it remains unclear if there is a need to obtain tissue biopsy prior to chemotherapy especially if tissue diagnosis has inherent procedural risks and can potentially delay treatment. Here we describe a case of AML lung infiltrates in which our patient underwent a diagnostic lung biopsy before receiving chemotherapy and bone marrow transplant and subsequently had complete resolution of lung infiltrates on CT scan.

Case Description: A 60 year-old female with a past medical history of psoriasis, hyperthyroidism post radioactive iodine treatment, and a 40 pack-year smoking history presented with chest pain preceded by URI symptoms and was found to have diffuse ST segment elevations on electrocardiogram and a moderate size pericardial effusion on echocardiogram. She was diagnosed with and treated for pericarditis. Lab studies revealed leukocytosis with a white blood cell count of $41.3 \times 10^3/\mu\text{L}$ with a predominance of monocytes and monoblasts. Bone marrow biopsy was consistent with AML. Mutations in the nucleophosmin gene (NPM1) and internal tandem duplication of the fetal liver tyrosine kinase 3 (FLT3-ITD) gene were identified, both of which are associated with increased relapse rate and reduced overall survival.

She was re-admitted for induction chemotherapy, and at that time her only complaint was of a persistent dry cough. She denied fever, sputum production, hemoptysis, or other symptoms of infection. Given the persistence of her cough, a chest CT scan was performed showing multiple bilateral nodular opacities measuring up to 1.6 cm. The plan to administer induction chemotherapy was delayed by 3 days while the patient underwent transthoracic fine needle aspiration (FNA) of one of the peripheral nodules.

The FNA revealed atypical mononuclear blastoid cells consistent with AML infiltrates. However, prior to these results being available and without further delay, the patient started induction chemotherapy (7+3; daunorubicin and Ara-C). Repeat chest CT showed complete resolution of infiltrates. The patient later underwent successful allogeneic stem cell transplantation. Bone marrow biopsy at 30 days and 100 days post-bone marrow transplantation revealed all donor chimerism, no evidence of AML, and no mutations in NPM1 and FLT3. She is alive and well without relapse ten months following her diagnosis.

Discussion: Though rarely described in the literature, AML can infiltrate the lung. In a retrospective study looking at 278 patients diagnosed with AML, 19% had pulmonary complications. 56.6% of the cases were confirmed likely bacterial or fungal infections, 9.4% were likely cardiac disease, and 7.5% were due to pulmonary embolism. There were only 2 cases (3.8%) of malignant infiltrates.

Our case is unique in that a biopsy was performed prior to chemotherapy which definitively demonstrated monocytic blastoid cells in the lung infiltrate. Furthermore, the effectiveness of chemotherapy for AML lung infiltrates was demonstrated with resolution of infiltrates seen on repeat imaging. In retrospect we question the utility of the lung biopsy as the results were not available for several weeks and did not change our decision to proceed with induction chemotherapy after a negative infectious workup.

Transthoracic FNA is considered a relatively safe and high-yield approach to obtaining lung tissue with a sensitivity of 92.1% and a specificity near 100% for detecting malignancy. However, lung biopsies are not without risks with the most common complications being pneumothorax (PTX) at an incidence of 20.5% with 7.3% of patients with PTX requiring chest tube placement and clinically significant hemorrhage at an incidence of 2.8%.

To not delay treatment and to minimize pulmonary complications associated with lung biopsy, we propose that in the appropriate clinical setting (absence of symptoms or lab results suggestive of infection), patients with bone marrow biopsy-proven AML forgo biopsy of new pulmonary infiltrates and proceed immediately to chemotherapy.

Category: Clinical Research

Rates of Venous Thromboembolism (VTE) Prophylaxis in Inflammatory Bowel Disease (IBD): Inappropriate Underutilization?

Nicholas Cordella MD, Gregory Patts MPH, Janice Weinberg ScD, Francis A. Farraye MD, MSc

Introduction: It is well established that patients admitted to the hospital with an acute flare of their IBD (Crohn's Disease or Ulcerative Colitis) are at significantly increased risk of developing Venous Thromboembolic Events (e.g. DVTs, PE, etc.). Specialty society guidelines are now beginning to recommend all patients admitted with IBD flare, except those with life threatening bleeding, should receive pharmacologic VTE prophylaxis while inpatients. Emerging data also suggests that the rates of appropriate prophylaxis as low as ~40%. The aim of this study was to assess the rates of VTE prophylaxis in a diverse, urban, academic medical center and to identify patient and systemic factors that may predict under-prophylaxis.

Methods: A retrospective analysis conducted using the Boston Medical Center (BMC) Clinical Data Warehouse (CDW). Patients admitted with to BMC with IBD flares from 1/1/2001 - 12/31/2014 were identified using ICD-9 codes. Rates of pharmacologic prophylaxis were determined for each inpatient visit over that period using appropriately dosed orders for Heparin, Lovenox or Fondaparinux. Excluded from the analysis were patients <18 years old, pregnant, on chronic anticoagulation therapy or those with a history of prior VTE, hypercoagulable disorder or active malignancy. Rates of prophylaxis were analyzed over several demographic and laboratory factors.

Results: We identified 1385 eligible inpatient visits. Over the period of analysis, the overall rate of pharmacologic VTE prophylaxis was 61% for all inpatient visits. We found an association between age and under-prophylaxis with both older patients >65 y/o (59%) and younger patients 18-35 y/o (59%) having lower rate of prophylaxis than those 36-64 y/o (67%); $p<0.001$. LOS was also a predictor of under-prophylaxis, those with LOS greater than median received prophylaxis on 79% of visits while those under the median only received prophylaxis on 48% of visit; $p<0.001$. Interestingly, there was no statistically significant difference between rates of prophylaxis among patients with lower hemoglobin on admission or in those who had a GI consult order during admission.

Conclusion: In this study we demonstrated sustained under-prophylaxis of VTE in IBD patients at a large academic medical center with a diverse patient base. Though low prevalence, VTEs can lead to significant morbidity and mortality, suggesting there is incentive to improve rates of prophylaxis. We identified several factors associated with inadequate prophylaxis which may be suitable targets for Quality Improvement or Patient Safety interventions.

Category: Senior Talk

TB Determined: The Uncertain Future of the Tuberculosis Epidemic in Southern Africa

Eddy, Jared

Once considered a vanquished diminishing disease, tuberculosis has made a resurgence in the past several decades. Nowhere has this been more apparent than in southern Africa where the dual epidemics of HIV and TB may affect one quarter of the population. The introduction of decentralized yet national programs for anti-tuberculous therapy and the provision of antiretrovirals has done much to combat these illnesses. Nevertheless, significant challenges remain including the diagnosis of both pulmonary and extra-pulmonary TB, adherence to long treatment courses, suboptimal therapy for drug-resistant infections (MRD, XDR), the challenge of IRIS (immune reconstitution inflammatory syndrome), and the as of yet fruitless efforts to develop an effective vaccine. Moreover, the endeavor is just beginning to identify and target those most at risk of reactivation among the legions of latently infected individuals. On a larger scale, addressing the socioeconomic factors that ultimately allow TB to thrive is still a distant goal for most African nations. This talk will address many of the above considerations in the context of two trips by this resident to southern Africa: the first working as a physician at the Scottish Livingstone Hospital in Molepolole, Botswana; the second observing TB clinical trials in Khayelitsha Township outside of Cape Town, South Africa.

Category: Clinical Research

Practice Patterns and Outcomes Associated with Choice of Vasopressor Therapy for Septic Shock: A Population Based Propensity-Matched Cohort Study

Ashraf Fawzy, MD, MPH; Stephen R. Evans, MPH and Allan J. Walkey, MD, MSc

Objectives: Clinical guidelines recommend norepinephrine as initial vasopressor of choice for septic shock, with dopamine suggested as an alternative vasopressor in patients at low risk for arrhythmias. We sought to determine practice patterns and outcomes associated with vasopressor selection in a large, population-based cohort of patients with septic shock that allows for assessment of outcomes in clinically important subgroups.

Design: We performed a retrospective cohort study to determine factors associated with choice of dopamine as compared with norepinephrine as initial vasopressor for patients with septic shock. We used propensity score matching to compare risk of hospital mortality based on initial vasopressor. We performed multiple sensitivity analyses using alternative methods to address confounding and hospital-level clustering. We investigated interaction between vasopressor selection and mortality in clinical subgroups based on arrhythmia and cardiovascular risk.

Setting: Enhanced administrative data (Premier, Inc) from 502 US hospitals during years 2010-2013.

Subjects: 61,122 patients admitted with septic shock who received dopamine or norepinephrine as initial vasopressor during the first two days of hospitalization.

Measurements and Main Results: Norepinephrine (77.6%) was the most frequently used initial vasopressor during septic shock. Dopamine was preferentially selected by cardiologists, in the Southern US, at non-teaching hospitals, for older patients with more cardiovascular comorbidities, and was used less frequently over time. Patients receiving dopamine experienced greater hospital mortality (propensity matched cohort: N=38,788, 25% vs 23.7%; OR 1.08, 95% CI 1.02-1.14). Sensitivity analyses showed similar results. Subgroup analyses showed no evidence for effect modification based on arrhythmia risk or underlying cardiovascular disease.

Conclusions: In a large population-based sample of patients with septic shock in the US, use of dopamine as initial vasopressor was associated with increased mortality among multiple clinical subgroups. Areas where use of dopamine as initial vasopressor are more common represent potential targets for quality improvement intervention.

Category: Quality Improvement / Education

A Unique Presentation of Renal Cell Carcinoma with Iron Deficiency Anemia

Gowda, Lakshmi

Introduction

Renal cell carcinoma (RCC) is the most common type of kidney cancer in adults and accounts for approximately 85% of neoplasms arising from the kidney. Traditionally, renal cell carcinoma is associated with the classic triad of hematuria, flank pain and an abdominal mass. In fact, this triad occurs in only 10-15% of cases and often involves diagnosis at an advanced stage. RCC can be asymptomatic or present with nonspecific symptoms like weight loss, fatigue and anemia and is often an incidentally detected on radiographic imaging. Anemia is reported in one third of patients with RCC but it is unclear how often iron deficiency anemia is a presenting symptom.

Case Report

The patient is a 70 year-old male without prior medical problems who presented to his PCP with two weeks of progressive dyspnea on exertion, bilateral lower extremity edema and anemia concerning for high output cardiac failure. His labs were significant for a hemoglobin of 2.9, hematocrit 11, iron 8, ferritin 22 and TIBC 371 suggestive of a pure iron deficiency anemia. He reported melena two weeks prior to presentation however stool guaiacs were negative and he had no hematochezia during his course. His urinalysis was also surprisingly unremarkable for hematuria. He received a blood transfusion and IV iron with improvement in his symptoms. Abdominal ultrasound done to evaluate hepatomegaly on exam showed a mass in the right kidney. Further imaging with a CT scan revealed a 12 x 13 x 15cm infiltrating mass with encasement of the right renal vein and IVC thrombus but without involvement in the GI tract. CT scan did show evidence of lung and liver metastases with subsequent liver biopsy positive for metastatic clear cell renal cell carcinoma. He was deemed to not be a surgical candidate and discharged with a plan to begin palliative pazopanib but returned 6 months later again with severe anemia.

Discussion

The classic clinical presentation of RCC is the triad of hematuria, flank pain and an abdominal mass, which is present in only 10-15% of cases. Anemia is described in one third of patients with RCC, the majority of which were from anemia of chronic disease from diminished erythropoietin production. In this case, the patient presents instead with an iron deficiency anemia likely related to his diagnosis of RCC. Other etiologies of iron deficiency were considered including more common causes of chronic blood loss like occult GI bleed and nutritional deficiencies but workup with fecal occult blood testing were negative. CT scan and liver biopsy confirmed a clear cell renal cell carcinoma. A similar case of clear renal cell carcinoma presenting with iron deficiency anemia refractory to management was reported in 2013. The tumor showed hemosiderin laden macrophages which was postulated to be the source of iron losses. Interestingly, one other similar case study in 1984 reported reversal of anemia after nephrectomy. This patient returned 6 months later with anemia refractory to therapy, suggesting that tumor removal might be the sole solution to treatment of the anemia.

Category: Quality Improvement / Education

Facial Swelling and Dyspnea

Gryczynski, Gabriela

Learning: Objective: Describe the differential diagnosis and outpatient management of facial swelling and dyspnea on exertion.

Case Presentation: A 56-year-old F with PMH obesity (BMI 33) and a remote 15-pack-year smoking presented to primary care clinic with a 3 week history of facial swelling and 3 month history of increasing dyspnea on exertion (DOE). The patient was previously seen in clinic one month ago, when she endorsed DOE with strenuous exercise and an occasional feeling of ‘chest discomfort’ that she attributed to GERD. She had a normal CBC, CMP, TSH, pap test, mammogram, ECG, and was started on an H2 blocker and scheduled for an exercise stress test, but missed that appointment. This visit the patient described facial fullness and swelling and stated that she has ‘not looked like herself’ in the last few weeks. She also endorsed rapidly increasing DOE and reported that she cannot currently walk a block or climb one flight of stairs without getting out of breath. The patient also described new onset orthopnea and a sensation of not being able to take a full breath. She denied fevers, night sweats, voice changes, tremor, palpitations, and difficulty swallowing. She reported an intentional 20 pound weight loss over the past 6 months as a result of a diet and exercise regimen. She also reported increased stress and fatigue over the last several months, which she attributed to working three physically demanding jobs. She denied illicit substances and initiating new foods, beauty or cleaning products, and medications other than the H2 blocker. On physical exam patient had mild facial fullness, though it was difficult to discern whether this was her natural appearance or pathologic. The vitals and remainder of the physical exam were unremarkable. A CXR obtained in clinic showed “right hilar density and associated linear atelectasis along with elevation of the right hemi diaphragm.” A CT scan obtained in the emergency department later that day demonstrated a “large anterior mediastinal mass measuring up to 5.8 cm that encases and mostly occludes the SVC.”

Discussion: Differential diagnosis in a patient presenting to clinic with facial swelling and increasing DOE include allergic reaction, neck mass, or thoracic mass. All three of these diagnoses can cause airway compromise and are potential medical emergencies. An allergic reaction was lower on the differential for this patient because the gradual onset of the patient’s symptoms was not c/w angioedema or dyspnea caused by anaphylaxis. Additionally, the only new medication or product the patient had started was H2 blocker, which is not and agent commonly associated with allergic reactions. A neck mass was also lower on the differential because a mass causing airway compromise in the neck region would likely have been identified on physical exam. Furthermore, the origin of this mass would likely been the thyroid and the patient had a normal TSH and did not endorse classic hypo- or hyper-thyroid symptoms.

Thus, a thoracic mass was the most likely explanation of the patient’s DOE and facial swelling. While the differential diagnosis of DOE is extremely broad, the combination of DOE and facial swelling should place superior vena cava (SVC) syndrome at the top of the differential. SVC syndrome is caused by any process that leads to obstruction of blood flow in the SVC. It is most commonly caused by mass effect from pathologic processes in the lungs or mediastinal structures. Malignancies account for the majority of SVC syndrome, with about 85% of those malignancies being caused by lung cancers (50% NSCLC, 25% SCLC) and 10% by non-Hodgkins lymphomas. Rarer causes of SVC syndrome include thrombi, post-radiation fibrosis, and fungal infections. The most common presenting symptoms of SVC syndrome are dyspnea followed by a sensation of facial swelling and fullness. These symptoms usually progresses over weeks and are exacerbated by lying flat. Less common symptoms can include chest pain, dysphagia, hoarseness, cough, arm swelling, and confusion caused by cerebral edema. Facial swelling and distention of the vasculature of the chest and neck are the most common physical exam findings. While 84% of patient’s presenting with SVC syndrome have abnormal plain films, a CT scan with contrast is the imaging of choice for diagnosing SVC syndrome. As most patients diagnosed with SVC syndrome will require immediate hospitalization, referring any ambulatory patient suspected of having SVC syndrome to the emergency department for immediate CT imaging is the correct clinical decision. Until the 1980s SVC syndrome c/b malignancies was treated by emergent radiation to shrink the tumor, the current practice recommends rapid histologic diagnosis (likely in an inpatient setting where the patient can be monitored) prior to starting treatment. Patients presenting with signs of impending respiratory failure are still treated with emergent radiation.

Conclusion: The combination of progressive dyspnea and facial swelling, in the ambulating setting, should raise suspicion for SVC syndrome and prompt a referral for emergent imaging.

Category: Clinical Research

Technetium Pyrophosphate Cardiac Imaging in Asymptomatic Variant Transthyretin-Related Cardiac Amyloidosis

Muhammad Haq, MD; Sumeet Pawar, MBBS; John L. Berk, MD; Edward J. Miller, MD, PhD; Frederick L. Ruberg, MD

Background: Transthyretin-related cardiac amyloid (ATTR-CA) is an increasingly recognized cause of heart failure with preserved ejection fraction (HFpEF). In single center studies, technetium pyrophosphate (^{99m}Tc -PYP) cardiac imaging has been shown to noninvasively identify ATTR-CA with a quantitative heart-to-contralateral chest (H/CL) ratio threshold > 1.5 . While ^{99m}Tc -PYP is well characterized in patients with overt cardiomyopathy, the utility of ^{99m}Tc -PYP in patients with variant TTR genotype (TTRm) without signs or symptoms of heart failure remains undetermined.

Purpose: To assess the utility of ^{99m}Tc -PYP cardiac imaging in patients with variant TTR genopositivity without heart failure in a single center experience.

Methods: Forty patients who underwent clinical examinations, echocardiography, measurement of cardiac biomarkers, and ^{99m}Tc -PYP scintigraphy (planar imaging) were subsequently subdivided into three groups: (1) patients with non-amyloid HFpEF, $n = 8$ (2) asymptomatic TTR mutation carriers, $n = 12$ and (3) TTR mutation carriers with symptoms of heart failure (ATTRm), $n = 20$. Cardiac retention of ^{99m}Tc -PYP was assessed using both a semi-quantitative visual score (range: 0 [no uptake] to 3 [uptake greater than bone]) and a H/CL ratio on planar images. Continuous and categorical variables were compared between the groups.

Results: TTR mutation carriers appeared phenotypically normal as compared to patients with ATTRm cardiac amyloidosis as determined by left ventricular ejection fraction (61 ± 8 vs 51 ± 14 , $p = 0.04$), interventricular septal thickness (0.9 ± 0.3 vs 1.5 ± 0.3 , $p < 0.001$), E/e' (8.1 ± 1.5 vs 18.1 ± 8.9 , $p < 0.001$), B-type natriuretic peptide (15 vs 234, $p = 0.001$) and troponin-I (0.008 vs 0.09, $p < 0.01$). However, abnormal ^{99m}Tc -PYP uptake was observed in 10 of the 12 asymptomatic TTR mutation carriers without heart failure as follows, grade 1 ($n = 3$, 25%), grade 2 ($n = 3$, 25%) and grade 3 ($n = 4$, 33%). In addition, ^{99m}Tc -PYP uptake was increased among asymptomatic carriers as compared to patients with HFpEF (H/CL ratio 1.5 ± 0.4 vs 1.2 ± 0.1 , $p < 0.001$), but lower as compared to ATTRm (H/CL ratio 1.5 ± 0.4 vs 1.8 ± 0.4 , $p < 0.001$).

Conclusion: ^{99m}Tc -PYP scintigraphy demonstrated abnormal uptake by both quantitative and semi-quantitative methods among asymptomatic carriers of TTR mutations. These data suggest that abnormal ^{99m}Tc -PYP may be the first measureable manifestation of ATTR cardiac amyloidosis.

Category: Senior Talk

Talking Smack: An Exploration of Illicit Substances Affecting our Patient Population

Senior Talk

Hughes, Michelle

Substance use is an ongoing problem greatly affecting both patients and society today. In 2007 it was estimated that illicit drug use in the US cost \$120 billion due to lost productivity and \$11 billion in health care costs. Unfortunately, these costs have continued to climb because of growing rates of illicit drug use and high rates of associated complications, including overdose deaths. Since 2010 overdose deaths from heroin have skyrocketed, going from 2,000 in 2010 to over 8,000 by 2014 in part from adulterants such as fentanyl common in heroin sold in Massachusetts.

Boston Medical Center is a safety-net hospital which cares for a number of patients with substance use disorders. Though providers know to ask a basic substance use history, understanding how these substances are used and what effects, side effects, symptoms and complications accompany these drugs is paramount to treating these patients. The goal of this talk was to improve house-staff knowledge surrounding common drugs such as heroin, cocaine and crack cocaine, synthetic cannabinoids and crystal meth and also address some of the more common ways prescription medications are misused by their patients. There are many resources available such as the DEA Fact Sheets and NIH's National Institute on Drug Abuse to help providers understand specific details surrounding use and complications of specific drugs, though one of the most important and often underutilized resources is the patient themselves.

Category: Clinical Research

Linkage to Care in Incarcerated Population

Karen Jiang, M.D., Kinna Thakarak, M.D., Kathryn Ivy, Tarika Williams, M.D., Olivera Vragovic, MBA,⁴
Rachna Vanjani, M.D.

Purpose: Our primary aim is to determine the relationship between the rate of follow-up after discharge and the rate of readmissions/cost at a tertiary care facility. Another purpose of our study is to gain understanding of the health issues of the incarcerated population by studying reasons for admission and how the admission diagnoses are associations with readmissions and cost.

Methods: This is a retrospective study. We obtained admission, outpatient and billing data from Boston Medical Center's Billing Department. We performed extensive chart reviews of all incarcerated patients admitted to Boston Medical Center (BMC), a tertiary hospital, between January 2010 and December 2012. Descriptive and chi-square was performed for the preliminary results to be followed by logistic regression.

Results: There were 416 hospital admissions from twenty-one correctional facilities within Massachusetts. The cohort consisted of 340 patients (F = 34, M =34, Trans = 2). The patient population was predominantly white and African American. Among the cohort, the readmission rate was 15% (63/416). There were 273 (66%) hospital admissions where the discharge summary included a follow-up appointment within 12 weeks at BMC. 143 (52%) of the 273 hospital admissions with follow-up appointments at discharge presented for their follow-up visits. 12 (8%) of those patients were readmitted within 30 days of their admission. 130 discharges did not present to their follow-up appointments and 23 (17%) of those discharges were associated with 30-day readmissions. The total cost of the 416 admissions during the two-year study period was 13.4 million dollars. 2.3 million dollars (17%) were associated with 30-day readmissions. The three most frequent admission diagnoses were cardiovascular disease:16% (68/416), assault/trauma: 15% (65/416), GI causes i.e. GI bleed, hepatitis and pancreatitis and etc: 14% (60/416). 27 admissions (6.5%) were self-inflicted injuries/suicide attempts. 25 admissions (6.25%) were related to addiction/substance use. There were 11 in-hospital deaths during the two-year study period.

Conclusion: Our preliminary data showed that a lower discharge follow-up rate was associated with a higher rate of readmissions. It showed that 30-day readmissions were associated with significant financial costs. Our study also confirmed an important finding that has been reported in many previous studies which is that there is a high rate of cardiovascular disease among inmates. The etiology of this calls for further investigation. Furthermore, assault and trauma, which are preventable causes, represent a major healthcare crisis among inmates. More effort should be put into understanding the etiology and prevention of these preventable hospital admissions originated from the prison system.

Category: Quality Improvement / Education

A Skeletal Survey of Leg Pain: A Case of Post-traumatic Chronic Osteomyelitis

John S. Kim, MD

Introduction: Chronic osteomyelitis is an uncommon cause of leg pain that requires a high-level of clinical suspicion. Safe anticoagulation therapy with rifampin therapy is limited to injectables.

Case Description: A 38-year-old Portuguese-speaking Brazilian man presented to the ED with right thigh pain and intermittent chills. The pain was progressive, sharp, and unremitting despite use of acetaminophen. He denied IVDU or prior surgeries. He was afebrile and had a tender, bony medial thigh mass. X-ray of the right femur showed marked diaphyseal cortical thickening involving the medullary canal. CRP and ESR were elevated. The patient was referred to an oncologic orthopedist for concern of primary versus metastatic bone tumor. Thereafter, a detailed history revealed that the patient as a child fell from a tractor sustaining an injury to his right thigh that was treated with penicillin. Since then he reported self-limited episodes of chills and right thigh swelling. An NM radionuclide bone scan showed intense uptake of right mid to distal femur. An MRI showed diffuse cortical thickening with associated marrow edema. He was taken to the OR for debridement of necrotic bone, biopsy, and placement of intramedullary rod. Operative cultures grew MSSA in 3 of 3 cultures with negative fungal, mycobacterial cultures. He was diagnosed with acute on chronic MSSA osteomyelitis and completed a six-week course of nafcillin with rifampin and transitioned to oral therapy with levofloxacin with rifampin. Two weeks after his surgery, he presented to the ED with right calf swelling and pain and was diagnosed with a right leg DVT. Due to drug interactions with rifampin and oral anticoagulants, ID was consulted. He was treated with enoxaparin for three months without complications.

Discussion: Evaluation of infectious cause of bone pain requires a high clinical suspicion and a detailed history. A language barrier, the dynamic environment of the ED, and premature closure may have precluded a detailed history.

Rifampin is used as adjunctive therapy for MSSA infections particularly for osteomyelitis and prosthetic device-related infections. Rifampin is contraindicated in patients taking novel oral anticoagulants because it is a strong inducer of their hepatic metabolism, thereby decreasing their serum concentrations. Rifampin also alters concentrations of warfarin although close monitoring allows their concurrent use. Given the absence of drug interaction between injectable anticoagulants and rifampin, enoxaparin was the ideal therapeutic option.

Category: Quality Improvement / Education

The Complexity of Diagnosing Maturity Onset Diabetes of the Young in Ethnic Minorities

Pinky Kurani and Devin Steenkamp

Introduction: Monogenic forms of diabetes are relatively rare and reported to account for approximately 1-2% of patients living with diabetes. Identification of specific monogenic diabetes phenotypes is increasingly important given numerous diagnostic, prognostic and genotype-phenotype associations. HNF1A MODY is the most common phenotype of MODY in well studied populations, and most frequently, though not exclusively, described in Euro-Caucasian populations. Although HNF1A MODY has been reported in individuals of African descent, the prevalence, distribution and clinical relevance of many genetic variants in these and other groups remains unknown.

Case: A 38 years old Cape Verdean man presented with polyuria, polydipsia, fatigue and a 6 kilogram weight loss over a few months. Family history was notable for a father with diabetes diagnosed in his 60s, a sister with presumed type 1 diabetes and a maternal aunt with diabetes. Physical examination was unremarkable except for newly diagnosed hypertension. He was a thin man with an athletic build (BMI 22) without acanthosis nigricans or central obesity. HbA1C was measured at 13.5%, total cholesterol concentration of 300 mg/dL, HDL of 43 mg/d, LDL of 213 mg/dL, and triglycerides pf 221 mg/dl. Serum creatinine was 1.22 and random glucose of 398 mg/dL with a normal anion gap. Autoantibody markers for beta cell autoimmunity were negative; including assays for islet cell antibodies, glutamic acid decarboxylase-65 antibody and insulin autoantibody. Glipizide therapy (5mg twice daily) was initiated but marked hyperglycemia persisted, therefore insulin glargine was added with significant improvement in glycemic control. A1C declined to 7.6% four months after initial diagnosis. However, recurrent hypoglycemia developed and glipizide was subsequently discontinued with additional reduction in insulin glargine dose. Genetic sequencing was pursued given an atypical diabetes presentation with a suggestive family history; which revealed three abnormal variants: two heterozygous missense mutations and one heterozygous synonymous mutation in the HNF1A gene.

Discussion: This case has certain suggestive features consistent with HNF1A MODY (family history, young age at onset, lean body habitus and absent beta cell antibodies.) However, certain features are less consistent with this diagnosis. Sulphonylurea sensitivity is usually a striking feature of HNF1A MODY. However, this patient required insulin soon after diagnosis. In addition, elevated serum cholesterol and triglycerides are not typical features of HNF1A MODY, but could certainly be explained by insulin deficiency at presentation. It is clear that the clinical relevance of the HNF1A variants detected in this patient is complex. Assigning pathogenicity to specific “novel” MODY mutations is often fraught with complexity. It is plausible that certain missense mutations hold few functional consequences. Clinical phenotype may depend on the functional importance of the affected domain and may not be associated with overt diabetes or may possibly lead to a milder phenotype. A particular phenotype is additionally affected by environmental, social and other modifying genetic factors. This patient was 38 years old at the time of diagnosis and presented in a catabolic manner, with strong clinical suspicion of a monogenic diabetes phenotype. His presentation is inconsistent with the milder phenotype that would be expected if the mutations detected were not pathogenic. Though he displays atypical features, HNF1A MODY is known to have a highly variable phenotypic expression. A large series of individual HNF1A mutations demonstrated the high allelic heterogeneity within this gene. HNF1A MODY is the probable etiology of diabetes; however it is important to note that complex clinical and genetic interplay are involved in accurately identifying a diabetes phenotype in ethnic minority populations.

Category: Clinical Research

The Relation of Plasma Vitamin K Status to Meniscal Pathology in Knee Osteoarthritis

J Liu, M Englund, S. Booth, D Felson, M Nevitt, B Lewis, J Torner, A. Hu, T Neogi

Purpose: Vitamin K is an essential cofactor in the process of bone and cartilage mineralization. Low serum vitamin K has been associated with increased prevalence of hand and knee osteoarthritis (OA), higher risk of developing knee OA and cartilage lesions, and, recently, worsening of meniscal lesions. Meniscal damage is a potent risk factor for knee OA, and severe knee OA is associated with meniscal damage. Given these associations, we sought to identify whether vitamin K status was associated with the prevalence and incidence of meniscal pathology on MRI.

Methods: The Multicenter Osteoarthritis (MOST) Study is a large, NIH-funded longitudinal cohort study of individuals age 50-79 with or at high risk for developing knee OA. Participants had baseline and follow-up knee x-rays and 1.0T MRIs at 0 and 30 months. MRI evidence of meniscal pathology was evaluated using WORMS. Meniscal integrity was graded on a 0-4 scale in 3 subregions of the medial and lateral menisci, respectively, and medial and lateral meniscal extrusion were graded on a 0-2 scale. We defined meniscal pathology as any abnormality of meniscal integrity (score ≥ 1 in any subregion) or meniscal extrusion (medial or lateral score ≥ 1). Vitamin K status was determined by plasma phylloquinone levels at baseline, and categorized as insufficient ($<1.0\text{nM}$) or sufficient ($\geq 1.0\text{nM}$). We excluded baseline coumadin users. We examined the relation of vitamin K status to knee-specific baseline presence of meniscal pathology in the whole sample, and to development of meniscal pathology at 30 months among subjects without meniscal pathology at baseline using binary regression with robust variance estimation to obtain prevalence ratios (PR) and risk ratios (RR), respectively. We used GEE to account for correlations between two knees within a person. All analyses were adjusted for age, sex, BMI, 25(OH)-vitamin D, smoking status, race, and prior knee injury. Results were also stratified by knee radiographic OA status.

Results: A total of 1457 knees from 1048 subjects (mean age 62.0 ± 7.9 years, BMI 29.9 ± 4.9 kg/m², 62.4% female, 34.0% with insufficient vitamin K levels) were included in the cross-sectional analysis. Of these, 535 knees did not have meniscal pathology at baseline and were used in the longitudinal analysis. The prevalence of meniscal pathology was high, and baseline vitamin K status was not significantly associated with either the prevalence of or incidence of meniscal pathology (see table). Effects were similar when knees were stratified by radiographic OA status.

Conclusion: Plasma vitamin K insufficiency is not associated with prevalence or incidence of meniscal pathology over 30 months. Given the high prevalence of meniscal pathology at baseline, we may need to examine the potential effects of vitamin K on meniscal pathology at an earlier age, or in a cohort not specifically selected for OA risk to avoid the possibility of depletion of susceptibles.

Table: Relation of vitamin K to meniscal pathology		
Cross-sectional analysis (N= 1457 knees, 1048 subjects)		
Baseline Vitamin K status (Prevalence)	Prevalence of meniscal pathology (knee-based) (%)	Adjusted* Prevalence Ratio (95% CI), p-value
Insufficient (<1nM) (n=494 (34%) subjects)	293 (59.3)	0.98 (0.90-1.08), p=0.7
Sufficient (≥1nM) (n=963 (66%) subjects)	586 (60.9)	1.00 (reference)
Longitudinal analysis (N=535 knees, 441 subjects)		
	Incidence of meniscal pathology over 30 months (knee-based) (%)	Adjusted* Risk Ratio (95% CI), p-value
Insufficient (<1nM) (n= 191 (36%) subjects)	21 (11.0)	0.96 (0.79-1.16), p=0.7
Sufficient (≥1nM) (n= 344 (64%) subjects)	44 (12.8)	1.0 (reference)
*Adjusted for: age, sex, BMI, vitamin D level, smoking status, race, prior knee injury		

Category: Clinical Research

They say once you get diabetes, that's the end of your life": a qualitative study with diabetic patients in Kolkata, India.

Paul M Long, Katelyn NG Long, S S Das, Sanjay Prasad

Background: In India, over 65 million people, 8.6% of the total population, live with diabetes. In addition to robust quantitative public health and biomedical research, strong qualitative studies are needed to better understand the personal and cultural impact of diabetes in India. As a means of learning how healthcare systems might improve their response to the needs of diabetes patients, this qualitative study explores the question: "What is it like to be diabetic in West Bengal, India?"

Methods: The study took place in an outpatient clinic of a private hospital in Kolkata. Semi-structured key informant interviews were conducted with adult Type 2 Diabetes patients (n=17). Consenting patients were interviewed by a member of the research team in the language of their choice (Bengali, Hindi, or English). Recorded interviews were translated and transcribed into English, twice verified for accuracy, and thematically coded.

Results: Patients spoke broadly about two key themes, 1) the enormous impact that diabetes has on their lives and 2) the barriers they face with regards to their care. Patients frequently discussed the mental health challenges associated with living with diabetes, recurrently using the word *tension* to describe both the cause and effect of diabetes. They also discussed the reverberating effects of diabetes on familial and social lives, the challenging economics surrounding diabetes care, the disruption of food rituals, and their fear of obtaining other chronic diseases. Regarding barriers to care, patients conveyed a blended sense of loyalty to their doctors and disappointment with their care, particularly the scarcity of clear communication and personalized guidance. Many patients expressed a lack of confidence in their ability to manage the disease, avoid complications, or access support services.

Conclusions: This study identifies numerous challenges experienced by diabetic patients in West Bengal. We anticipate that a multi-disciplinary approach to diabetes care will be required to appropriately manage the disease. Preliminary recommendations that will require future validation include --- implementation of diabetes educators as apart of clinic visits, formalized evidence based training curriculum for medical providers, establishment of support groups for vulnerable diabetic patients, integration of mental health workers into diabetic care, and utilization of nurses to conduct home visits.

Category: Clinical Research

Early Evaluation of the Metabolic Effects of Lorcaserin in a Randomized Control Trial

Olivia M. Farr PhD¹, Jagriti Upadhyay MD¹, Anna Gavrieli PhD¹, Michelle Camp MS¹, Hannah Mathew MD², Maria Vamvini MD¹, Harper Kaye¹, Nikolaos Spyrou¹, Anastasia Koniaris MD¹, Holly Kilim MD¹, Alexandra Srnka¹, Alexandra Migdal MD¹, Christos S. Mantzoros MD, DSc, PhD *h.c.mult*^{1*}

¹ Division of Endocrinology, Beth-Israel Deaconess Medical Center/Harvard Medical School, Boston, MA 02215

² Boston University Medical Center, Boston, MA

Introduction: Worldwide, over 600 million individuals meet classical criteria for obesity. The resultant health implications and financial burdens have spurred increased effort in the area of weight management. Medical providers now have access to a new crop of weight loss agents, with such medication being Lorcaserin, a 5HT_{2c} serotonin receptor agonist. While it has been approved by the FDA, there remain questions surrounding its action on brain activation centers, neurocognitive effects and metabolic consequences.

Aim: To assess the metabolic effects of Lorcaserin, as part of a larger investigation of its brain center activity.

Methods: We conducted a double blind randomized, placebo controlled trial with Lorcaserin. Forty eight patients received Lorcaserin or placebo, and followed them longitudinally over a four week periods. We measured anthropometric and laboratory data over this time period and performed analysis looking for significant differences in these values between the two groups.

Results: The majority of anthropometric and laboratory data did not demonstrate significant differences between placebo and Lorcaserin groups. The only measures that demonstrated significant differences between the two groups were that of waist circumference and energy expenditure.

Conclusion: Lorcaserin has been found to be an effective weight loss agent. However, whether the resultant weight loss translates into improved health outcomes requires further study. Of note, Lorcaserin may have notable impact on waist circumference, which increasingly is being utilized a predictor for cardiovascular and metabolic health.

Category: Clinical Research

Shape-Up and Eat Right (SUPER) Families: Feasibility of family-based group intervention for weight management

Juhee McDougal, MD, Kenya Palmar, Aaron J. Manders, RD, LDN, Ashley C. McCarthy, BA, Kathy A. Ireland, MS, RD, Carine Lenders, MD, Caroline M. Apovian, MD.

BACKGROUND: One third of adults and almost half of non-Hispanic blacks are obese. Nearly one fifth of children are obese. Children who are overweight by age 5 are more likely to become obese adults.-Treatment options are limited. A monthly family-based group weight loss program may be a possible treatment option. We sought to conduct a pilot study to identify the feasibility of a 1-year, in-person, family-based group program for weight loss. The primary outcomes are 1) attendance 2) satisfaction with the program. Secondary outcomes include change in weight status, eating behaviors and physical activity.

METHODS: Overweight/obese ($BMI \geq 25$) parents with one or more overweight children ($BMI \geq 85$ th percentile) were recruited from the Nutrition and Weight Management Center at Boston Medical Center. Height (inches) and weight (lbs) were recorded for all participants at baseline, and parents completed a baseline survey. Weights were monitored at each group, and heights for children thereafter. A mid-year survey was collected at 6 months. Groups were led by a registered dietitian and a nurse practitioner, and included a nutrition and physical activity intervention. Families were contacted via telephone, email and mail between visits.

RESULTS: Five families (5 adults, 8 children) were enrolled. Average age for adults was 33 years with average BMI of 47.4 (31.4-73.6). Average age for children was 9 years with average BMI percentile of 97.6. Families were all English-speaking, African American; 60% of participants were enrolled in Medicaid. Attendance over the first 6 months ranged from 17-50% (mean 28%). Monthly feedback forms were filled out by 80% of the families, of which 100% were satisfied.

CONCLUSIONS: The program will conclude in September 2016. This mid-year evaluation of group-based intervention incorporated families from underserved population. Attrition is a common problem in weight loss group interventions. To increase attendance moving forward, several changes will be implemented in response to family feedback. Feasibility is uncertain at this time but will be re-evaluated at the end of the program.

Category: Clinical Research

A Molecular Biomarker for Systemic Sclerosis-Associated Pulmonary Arterial Hypertension.

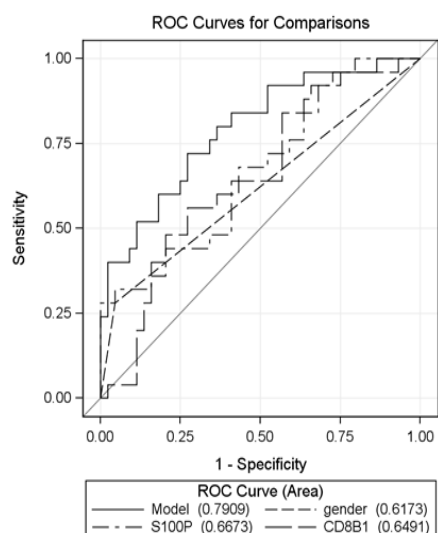
Matthew Moll, Romy B. Christmann, Michael L. Whitfield, Yu Mei Wang, Lisa Rice, Eric Stratton, Robert Lafyatis, Harrison W. Farber

Rationale: Pulmonary arterial hypertension (PAH) is a major cause of morbidity and mortality in Systemic Sclerosis (SSc). Using microarray analysis, we have described a unique biomarker gene-cluster on peripheral blood mononuclear cells (PBMCs) from SSc-PAH patients that correlated with mortality. The goal of the present study was to improve the SSc-PAH biomarker and determine if it could be used for early diagnosis of SSc-PAH.

Methods: PBMCs were collected from healthy controls (n=10), limited SSc patients without cardiopulmonary complications [SSc-noPAH, n=45; 10/45 with mean pulmonary arterial pressure (mPAP) between 20-25 mmHg called SSc-highnoPAH], and limited SSc-PAH patients (SSc-PAH, n=25; mPAP>25, PCWP≤15, PVR≥3WU) diagnosed by right heart catheterization. SSc-PAH biomarker included 68 selected genes based on unbiased statistical screening of 3 publicly available microarray studies on SSc-PAH PBMCs. RNA levels were measured by Nanostring (molecular barcoding technology, highly sensitive, and fully automated). Logistic regression analysis was performed correlating gene expression levels with percentage of PAH patients in our cohort (SAS software).

Results: Genes that distinguished SSc-PAH included: S100 calcium-binding protein P (S100P), tissue inhibitor of metalloproteinase 1 (TIMP1), membrane-spanning 4-domains subfamily-A (MS4A4A), Fructose-1,6-bisphosphatase 1 (FBP-1), Branched chain amino-acid transaminase 1 (BCAT1, all p<0.05), all of which were up-regulated, and CD8 Antigen, Beta Polypeptide 1 (CD8B1, p=0.056), which was down-regulated. When SSc-highnoPAH patients were analyzed as a separate group, gene expression levels were similar to SSc-PAH patients, with significant trends for MS4A4A, TIMP1, S100P (all p<0.05). Data were then used as inputs into a stepwise forward selection logistic regression model and receiver operating characteristic curve analysis demonstrated an area-under-the curve of 0.79; this model included a positively correlated gene, S100P, a negatively correlated gene, CD8B1, and gender.

Conclusions: We have proposed a model for SSc-PAH diagnosis based on PBMC gene expression using a reliable and automated technology. The improved biomarker classified SSc-PAH and SSc-noPAH with a high degree of accuracy. SSc-highnoPAH had a similar gene expression profile as SSc-PAH, which might suggest an early event in SSc-PAH development, and that this biomarker can be used for early non-invasive diagnosis. Prospective validation of this genetic biomarker is warranted.



Category: Quality Improvement / Education

An initiative to increase resident generated patient safety incident reporting at the VA Boston Healthcare System

Kathryn Molt MD, Jason Ackrivo MD, Pamela Bellino

Background: Since the publication by the Institute of Medicine of *To Err is Human* in 1999 there has been a shifting focus from identifying personal errors towards identifying systems issues that affect patient safety. The Joint Commission and the Accreditation Council for Graduate Medical Education have recognized the importance of trainee involvement in adverse event reporting and patient safety and now mandate postgraduate education and participation in quality improvement. Though it has been established that adverse events reported by physicians are more often related to near miss and adverse events with respect to patient care than those reported by other allied healthcare staff it remains that physicians in general have a relatively low rate of incident reporting, estimated as comprising 1.1-3% of adverse event reports generated across a variety of institutions. Despite an increased focus on patient safety and incident reporting, particularly at the trainee level, there remains of paucity of data on mechanisms by which to improve trainee reporting.

Methods: An initiative to assess and improve patient safety and adverse event reporting by trainees at the Veterans Administration Boston Healthcare System was undertaken in November of 2014. A 7 question survey to assess knowledge, attitudes, and barriers regarding adverse event reporting was sent to 490 Internal Medicine residents from the three major academic institutions (BMC, BIDMC, and BWH) that are involved in inpatient medical care at the West Roxbury VA. A brief educational course was then provided on the importance of, and system by which adverse events are reported. Finally, a new electronic system specifically geared towards residents was put into place in an attempt to facilitate resident involvement by increasing efficiency and to better track reports made by trainees. Data was analyzed to assess the number of resident generated reports over a 3 month period pre- and post-intervention.

Results: 92 residents (19% response rate) responded to the pre-intervention survey, which revealed that 13% (12 trainees) had previously received education on the incident reporting system. Despite this only 7% of residents knew how to locate and use the current incident reporting system and only 1 respondent had previously used the system to file a patient safety incident report. 81% identified that lack of knowledge on how to use the system contributed to lack of incident reporting. Other barriers identified were a lack of time (30%) and uncertainty as to what would constitute a reportable incident (26%). Only 2 respondents felt reporting patient safety incidents was not important, 3 felt they had not witnessed a reportable event and 7% were concerned with anonymity of the system. Pre-intervention there were an average of 14 resident generated reports over two 3 month periods, post- intervention there were an average of 25 resident generated reports over similar time periods ($p= 0.133$).

Limitations: A small percentage of eligible residents responded to the survey and the educational course was only offered once. The survey used was not validated, though it is similar to other questionnaires used in research on this topic. In the analysis of pre-intervention reports filed it was difficult to assess if they were filed by trainees as the system allowed for anonymous reporting.

Conclusions: Residents most often have a positive attitude with respect to patient safety incident reporting that will facilitate engagement in patient safety, though they often lack the knowledge required to report safety incidents and additionally identify a variety of barriers which may serve as points to improve future systems processes. The majority of trainees polled view incident reporting as important, though some maintain concerns regarding anonymity. This raises concern that trainees may be under-reporting due to concerns regarding punitive action. A single, brief educational course on patient safety event reporting increased internal medicine resident generated reports. Though not statistically significant, this may be a viable option for improving trainee reporting of patient safety events.

Category: Clinical Research

How do we measure CVD risk? A cross-sectional analysis of CVD risk factors and CVD risk predictions in HIV-positive and HIV-negative persons in rural Uganda

Mara E Murray Horwitz, MD; Gene Kwan, MD, MPH; Yukari Manabe, MD

Introduction: Cardiovascular disease (CVD) is on the rise in low- and middle-income countries (LMICs) and among persons with HIV. The World Health Organization (WHO) has made prevention a priority, calling for early detection and treatment of persons at high risk of developing CVD. However, there are no validated tools to predict CVD for persons with HIV in LMICs.

This study aims to (1) describe CVD risk factor prevalence in HIV-positive and HIV-negative individuals in rural Uganda, and (2) estimate CVD risk in this population using various prediction models.

Methods: We enrolled 540 HIV-positive ART-naïve persons with CD4 \leq 250 cells/ μ L in an HIV treatment study in Kiboga, Uganda. Each subject underwent CVD risk factor screening. Using a stratified random sample of 165 participants, we recruited 165 age- and sex-matched HIV-negative individuals as a reference group. CVD risk predictions were calculated using the following models: Framingham risk score, ASCVD, Lancet Chronic Disease (LCD) and WHO risk charts, and Globorisk. Analysis was restricted to the age range for which all of the risk models have been validated (40-74 years old).

Results: After age restriction, 88 HIV-positive and 96 HIV-negative participants were included. Women comprised about half of each group, and most were aged 40-49 years. HIV-positive participants reported lower socioeconomic status and more tobacco and alcohol use. HIV-negative participants had higher rates of overweight, obesity, hypertension, and diabetes, and higher total and LDL cholesterol. HIV-positive participants had lower HDL cholesterol.

Overall, CVD risk predictions in this population were low. All risk models predicted more persons at “high risk” in the HIV-negative group compared to the HIV-positive group. Agreement between risk scores varied; agreement was moderate between Framingham and ASCVD scores, poor between most other scores, and in general weaker among those with HIV.

Conclusions: In this cross-sectional study of rural Ugandans with and without HIV, those without HIV had higher rates of traditional CVD risk factors, translating into higher CVD risk scores across the spectrum of CVD risk models. There was poor inter-score agreement about which individuals were “high risk”, especially in the HIV-positive group. Our study illustrates an urgent need for improved CVD risk prediction tools in LMICs—and in particular for persons with HIV—to enable early detection and treatment of CVD risk globally.

Category: Clinical Research

Efficacy and Safety of Vedolizumab in Patients with Inflammatory Bowel Disease in a Large Tertiary Medical Center

Oppenheim, Shannon; Miller, Hannah L.; Wasan, Sharmeel; Noronha, Ansu; Farraye, Francis A.

Background: Vedolizumab (vedo) is a human monoclonal antibody that binds to the integrin $\alpha 4\beta 7$ and is effective in inducing clinical response, remission, and mucosal healing in moderate to severe ulcerative colitis (UC) and Crohn's disease (CD). Here, we describe our experience with vedo at Boston Medical Center (BMC), a tertiary IBD referral center.

Methods: A retrospective review of UC and CD patients treated with vedo at BMC was performed. Disease activity, endoscopic assessment, prior medications, treatment response and need for dose escalation were analyzed.

Results: We identified 68 patients (mean age 42, 56% female, 45 CD and 23 UC) treated with vedo from 6/14 through 11/15. The mean disease duration prior to treatment with vedo was 16 yrs (1-50) for CD and 11 yrs (1-30) for UC patients. 22 (48%) of the CD patients had previous surgery. Prior treatments included thiopurines (N=58, 85%), methotrexate (N=40, 59%), and anti-TNF therapy with infliximab (N=57, 84%), adalimumab (N=40, 59%), certolizumab pegol (N=13, 19%) and golimumab (N=7, 10%). Ten patients (15%) had failed 3 anti-TNF agents, 33 (48%) had failed 2 anti-TNF agents, 21 (31%) had failed 1 anti-TNF agent and 4 (6%) were anti-TNF naive. Concomitant medications included thiopurines (N=23, 34%) or methotrexate (N=21, 31%). 49% of CD patients and 52% of UC patients had a clinical response. Nine patients (8 CD and 1 UC) required dose escalation. CD patients (mean age 49, mean disease duration 19 years) were escalated to q4 weekly dosing at an average of 32 weeks (4-12 weeks) after q8 week therapy. Of those 8 patients, 7 have responded to the q4 week infusions (mean 6.3 infusions, range 1-12) and one patient discontinued therapy. One UC patient was escalated to q6 weekly dosing at 40 weeks and continues at this interval at 56 weeks. Eighteen patients discontinued therapy (14 CD, 4 UC) at an average of 4.3 infusions for CD and 3.2 infusions for UC patients. Nine of the patients who discontinued vedo required surgery within the first year of discontinuing therapy (7 CD, 2 UC). Six of the discontinued CD patients were started on an alternate biologic (1 adalimumab, 1 infliximab, 1 certolizumab pegol and 3 ustekinumab). Adverse effects included transient pyrexia (N=2), muscle aches (N=2), headache (N=2) and rash (N=3), all of which did not lead to discontinuation of therapy.

Conclusion: In a retrospective review of patients with long standing moderate to severe CD and UC failing multiple anti-TNF agents seen at a tertiary IBD center, vedolizumab appears to be a safe and effective treatment. The majority of patients who have escalated dosing to every 4 weeks have responded and continue on therapy.

Category: Senior Talk

Coronary Artery Calcium: A “Free” Diagnostic Test that can Change your Practice

Patchett, Nicholas; Pawar, Sumeet; Miller, Edward J

Background: Coronary artery calcium (CAC) is a powerful CAD risk marker when assessed by dedicated calcium scoring CT scan. We assessed diagnostic implications of CAC visible on attenuation correction CT scans (CTAC) from SPECT/CT myocardial perfusion imaging (MPI).

Methods: Visual presence or absence of CAC was assessed on CTAC in 1047 consecutive patients undergoing SPECT/CT MPI. Accuracy of MPI was assessed in patients undergoing invasive coronary angiography (ICA) within 1 year (n = 109). Outcomes were identified by retrospective chart review.

Results: Prevalence of true positive SPECT/CT MPI studies was greater among patients with CAC on CTAC (70% vs 16%; $p < .001$); prevalence of false positive studies was greater among those without (68% vs 15%; $p < .001$). PPV of MPI was 0.82 in patients with CAC, but only 0.19 in those without. Within median follow-up of 27.7 months, patients with CAC had higher all-cause mortality (6% vs 0.4%; $p < .001$), more late revascularizations (8% vs 0.4%; $p < .001$), and more MI (5% vs 0.2%; $p < .001$). Hazard ratio for all-cause mortality, MI, or late revascularization was 22.7 ($p < .001$) for patients with CAC vs those without.

Conclusions: Visual assessment of CAC on CTAC should be performed during SPECT/CT MPI because it affects diagnostic certainty and may improve risk stratification.

Category: Quality Improvement / Education

An out-of-balance axis

Vassiliki Pravodelov, Deborah Lee

Learning objectives:

- 1: Recognize hypopituitarism as a cause of hyponatremia and syncope.
- 2: Discuss the initial diagnostic workup and treatment of hypopituitarism.

Case: An 87-year-old Haitian woman with hypertension, chronic kidney disease, and chronic anemia presented to the hospital after a witnessed syncopal episode. She had intermittent syncopal episodes for a few months prior to presentation, typically while seated, with no prodromal symptoms, no seizure-like activity, no post-ictal findings, and no falls. Prior presentations for the same symptoms were attributed to her anemia and hypovolemia. Review of systems on this presentation was only positive for weakness, dizziness, and headache without red flags. On admission, she was afebrile and hemodynamically stable with negative orthostatic vital signs. The exam revealed pale conjunctivae, a normal thyroid, and a III/VI systolic murmur heard throughout the precordium with regular rate and rhythm. She appeared euvolemic with moist mucous membranes, no jugular venous distention, and no peripheral edema. She had an antalgic gait but no other focal neurologic findings. Lab results were significant for a low hemoglobin of 6.4 g/dL (her baseline), hypotonic hyponatremia with a sodium of 123 mEq/L and a serum osmolality of 272 mOsm/kg H₂O, a urine osmolality of 215 mOsm/kg H₂O, a urine sodium of 47 mEq/L, and a creatinine of 1.89 mg/dL (down from 2.28 mg/dL several days prior to admission). Her ECG showed normal sinus rhythm, normal intervals, and no ischemic changes. A transthoracic echo a few weeks prior to admission was unremarkable. Her medications were reviewed and none could explain her symptoms. She was started on intravenous normal saline. As a Jehovah's Witness, she declined blood transfusions. On admission, given her weakness and hyponatremia, thyroid function and cortisol tests were sent, revealing a low thyroid-stimulating hormone (TSH) of 0.09 uIU/mL, a low free thyroxine (T₄) of 0.49 ng/dL, a low total triiodothyronine (T₃) of 52 ng/dL, and a borderline low morning cortisol of 9.9 ug/dL. Thyroid function and cortisol tests were repeated with similar results. Further workup revealed a low prolactin of 4.3 ng/mL and a low post-menopausal follicle-stimulating hormone (FSH) of 11.5 mIU/mL. A cosyntropin stimulation test revealed an inadequate cortisol response to cosyntropin. Cortisol was 9.7 ug/dL at baseline, 14.6 ug/dL 30 minutes after cosyntropin administration, and 16.1 ug/dL after another 30 minutes. Adrenocorticotropic hormone (ACTH) was low at 12 pg/mL, likely in the setting of adrenal insufficiency. A pituitary MRI showed a small pituitary gland (thought to be appropriate for her age) with severe white matter disease, an old basal ganglia infarct, and no acute infarctions. The patient was started on hydrocortisone for adrenal insufficiency. Three days later, she was started on levothyroxine for central hypothyroidism. On discharge, her sodium had increased to 133 mEq/L, and her weakness had improved.

Discussion: This case illustrates the importance of having a broad differential for common signs and symptoms. Our patient's hyponatremia was initially attributed to hypovolemia, whereas her weakness and syncope were separately attributed to her anemia. Given that her hyponatremia was partially refractory to volume resuscitation, and that she had recurrent syncopal episodes despite stable hemoglobin levels, it was suspected that there were other unaddressed contributing factors to her symptoms. The connection between thyroid dysfunction and hyponatremia is not fully understood, but appears to involve impaired water excretion. Adrenal insufficiency can cause both syncope and hyponatremia. Cortisol deficiency results in a lack of negative feedback on antidiuretic hormone (ADH) and on corticotropin releasing hormone, an ADH secretagogue. Recognition of these possible explanations for her presentation led to a diagnosis of central hypothyroidism, which upon further workup revealed panhypopituitarism. Central hypothyroidism is much less common than primary thyroid dysfunction and can be difficult to recognize, especially because TSH levels are normal in the majority of hypopituitary cases. Once hypopituitarism is suspected, initial workup should include assessment of multiple hypothalamic-pituitary axes by checking levels of TSH, free T₄, total T₃, prolactin, FSH, ACTH, and cortisol. If the morning cortisol is borderline low, a cosyntropin test should be performed, as described in this case. After repeating labs for verification, any abnormalities should prompt pituitary imaging. If, as in this case, no tumors are found, other causes of hypopituitarism may be investigated depending on the goals of the patient and provider. It is important to note that treatment of hypothyroidism prior to correction of hypoadrenalism (if present) can worsen the symptoms of both deficiencies, as the thyroid replacement therapy may increase clearance of endogenous cortisol. It is thus recommended that adrenal function be assessed and corrected prior to initiating thyroid replacement in patients with central hypothyroidism, as was done for our patient. This case demonstrates the importance of avoiding premature closure, as it can result in misdiagnosis and potentially adverse events. Keeping a broad differential, especially for elderly patients with non-specific and refractory symptoms, can lead to unexpected diagnoses and thus the choice of appropriate treatment and possible recovery.

Category: Clinical Research

The 2015 Annual American College of Gastroenterology Meeting: Insights from a Twitter Analysis

Guo, Ling; Growshek, Jacob; Farraye, Francis A; Reich, Jason S

Introduction: At gastroenterology annual scientific meetings, there has been an increase in the social media (Facebook, Twitter, etc) presence amongst exhibitors and presenters. At the 2015 American College of Gastroenterology (ACG) meeting in Hawaii, Dr. Austin Chiang (@Austinchiangmd) generated “live tweets”. Recent studies have used advanced statistical software to better understand patient beliefs and symptoms as reflected by their posts on social media. Given the fact that the volume and type of information circulated online can be indicative of real-world events and trends in public opinion, this study was aimed at examining user-generated Twitter posts at the 2015 ACG conference in Hawaii.

Methods: This study collected and analyzed all 3,559 tweets from the ACG conference 2015 (October 16-21, 2015) using the keyword #ACG2015 or #ACG15, between October 9 through October 28, 2015. Tweets were gathered using the social media software Crimson Hexagon, a validated tool for social media analytics.. The general sentiment (positive-neutral-negative) was determined and tracked over time, as were the most frequent and influential users along with hierarchical cluster analyses of related keywords and topics.

Conclusion: We found that the most frequently tweeted topics at the conference were IBD, the microbiome, and IBS. This underscores the influence of current hot topics such as IBD and the microbiome. Despite the fact that general social media use is highest amongst young adults, our results show that the overwhelming majority of the most frequent tweeters at ACG 2015 were over the age of 35. While this is likely driven by the older average age of gastroenterologists and other conference attendees, it highlights the need for younger attendees ie: fellows, to contribute to social media content. Future studies can utilize social media as a critical tool to observe trends and direct educational needs of attendees at gastroenterology meetings.

Supported through a gift from Robin and Andrew Davis

Category: Senior Talk

A Framework for Breaking the Opioid Prescribing Cycle

Payal Roy MD

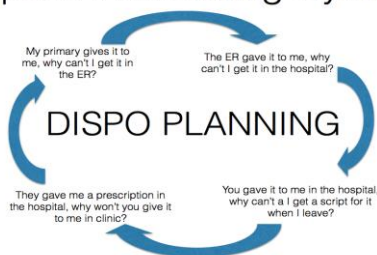
This senior talk sought to bring principles of outpatient opioid prescribing practices to the inpatient and acute care setting.

The most recent data from the National Institute on Drug Abuse in 2014 found that almost 30,000 people died in the US from prescription opioid and heroin overdose. In 1996, the American Pain Society suggested that pain was the “fifth vital sign.” This campaign is often cited for its adverse effect of increasing opioid prescribing in the US and contributing to the opioid epidemic in the US.

As part of his FY2017 budget, President Obama proposed \$1.1 billion in new funding to address the prescription opioid abuse and heroin use epidemic, bringing nationwide recognition to this issue. The US consumed over 500mg of morphine equivalents per capita (MEPC) in 2013, compared to less than 200mg MEPC in most of the rest of Western Europe. The CDC has released new prescribing guidelines around opioid use. These center around prescribing practices for chronic pain. One of the 12 Recommendations for Prescribing Opioids refers to the fact that long-term opioid use often begins with treatment of acute pain. The CDC recommends limiting opioid prescriptions to three days or less and suggests that more than 7 days is rarely needed. Overall, this represents progress in the physician fight against the opioid epidemic.

Unfortunately, these recommendations fail to advise clinicians practicing in all venues, including acute care settings. As many as 25% of opioid naive patients receive opioids prescriptions at discharge and have an odds ratio of over 3 of continuing to receive chronic opioids after discharge. This suggests that acute care setting opioids prescribing can significantly impact outpatient prescribing, and contribute to the opioids prescribing cycle:

Opioid Prescribing Cycle



In terms of how to break the cycle, I propose considering the following questions, formulated from outpatient prescribing principles:

- 1) Am I treating acute or chronic pain?
- 2) How long do I expect the pain to last?
- 3) What is an adequate trial of non-pharmacologic and non-opioid analgesia?
- 4) How will I decide if opioids are appropriate for this patient?
- 5) Under what circumstances would I not prescribe opioid pain medications?
- 6) What are my own biases when it comes to opioid prescribing?

Overall, we believe pain as the fifth vital sign created an increased sensitivity for prescribing opioids, leading us to over treat people whose risk-benefit profile did not warrant opioids. We need to swing the pendulum back to increasing our specificity. This is a difficult concept, as we are physicians with the aim to reduce suffering in our patients. However, we owe it to our patients and future generations to reduce the number of pills and prescriptions available from physicians to the public. This starts with reconsidering how we prescribe opioid pain medications in both the acute and chronic setting and in the inpatient and outpatient setting. We need to make more of an effort to steer away from opioids and work together to create an environment where opioids prescribing is done because it is indicated and not because it is easier. With this framework, physicians should aim to break the opioid prescribing cycle that is perpetuated by non-longitudinal care.

Category: Quality Improvement / Education

The Need for Better Code Blue Documentation: Results from a Code Committee Quality Improvement Initiative

Anas Sarhan, Sheilah Bernard

Rationale: Code Blue events are often stressful situations that, if not conducted by qualified providers, can result in adverse patient events. The absolute frequency of Code Blue events on medical-surgical wards at Boston Medical Center have decreased from 2009 to 2014 – a change that may be in part attributed to early recognition of the decompensating patient by warning systems such as the rapid response team.

Given the decreased volume of Code Blue emergency events, the purpose of this audit was to analyze patient outcomes as a surrogate for the proficiency of medical and nursing staff in in-hospital resuscitation efforts.

Methods: Paper documentation of Code Blue events at Boston Medical Center are submitted on a monthly basis to the Code Committee. All forms received from January 2012 until May 2014 were reviewed. The location, nature of arrest, immediate outcome, ensuing disposition, time of day, day of week, and deficiencies in documentation were extracted. A deficiency in documentation was defined as exclusion of any one of the following elements: (1) patient identification; (2) immediate patient outcome; or (3) nature of arrest (respiratory or cardiac).

Results: From January 2012 until May 2014, 458 Code Blue event sheets were submitted to the Code Committee. Of these, 350 events (76%) included respiratory arrest, and 285 events (62%) included cardiac arrest and/or cardioversion. Seventy-nine (17%) of the submitted forms did not include the nature of arrest. Of the 458 events during this time period, 371 patients (81%) survived resuscitation efforts, and 204 patients (45%) survived until discharge. The outcomes of 75 events (16%) were not documented. Of the 458 event sheets submitted, 295 (64%) were deficient in documentation.

Conclusion: Our data suggest that a more robust documentation system for in-hospital resuscitation events is needed. Without accurate documentation of the nature and outcome of Code Blue events, it is difficult to draw conclusions regarding our providers' proficiency in cardiopulmonary resuscitation.

Future directions: We suggest taking advantage of the Epic electronic medical record recently implemented at Boston Medical Center to create the role of a “code narrator” during resuscitation efforts. A proposal for Code Blue documentation reform has been submitted and a decision is pending.

Category: Quality Improvement / Education

Occam's razor versus Hickam's dictum in a liver abscess case.

Sasidharan, Saranya; Hurst, Jessica

Learning objectives:

1. Failure to consider an intrahepatic infection early when confronted with a mixed hepatocellular/cholestatic pattern can delay treatment and worsen prognosis.
2. Pyogenic liver abscesses are often due to biliary disease, and less common by comparison.
3. There may be a role for colonoscopy in the workup of liver abscess of unknown origin.

Case: A 62 year old man presented with one week of fatigue, anorexia, myalgias, and chills. He reported dark urine and yellowing of his eyes and skin. He admitted to taking naproxen, and cold medicine with acetaminophen several days prior. He denied fevers and abdominal pain. He consumed up to 12 beers daily. Past medical history included arthritis, and PTSD. He was afebrile, normotensive, but tachycardic to 110. He had scleral icterus and jaundice without spider angiomas or palmar erythema. His abdomen was nontender without hepatomegaly. He was oriented without asterixis. Labs included creatinine 2.4, WBC 14, AST 569, ALT 430, alkaline phosphatase 486, total bilirubin 12.5, direct bilirubin 10.0, INR 1.3 (previously <1), acetaminophen level 6. Ultrasound showed diffuse steatosis and gallbladder sludge, but no ductal dilatation or portal vein thrombus. Few ill-defined areas of fatty sparing were also seen. The initial diagnosis was alcoholic hepatitis, with a component of acetaminophen related injury. His renal function improved with fluids. However, his leukocytosis worsened to 21, INR elevation persisted, and although most of his LFTs improved his bilirubin lagged. He developed low grade fevers; ceftriaxone and metronidazole were started. CT showed two liver lesions (up to 5.4 x 5.6cm) concerning for abscesses, with gallbladder distention and pericholecystic fat stranding concerning for perforation. Serial CT-guided drainage revealed methicillin-susceptible staph aureus. Transthoracic echocardiogram, chest xray, and blood cultures were normal. The patient improved on nafcillin therapy.

Discussion: There has been a rise in the incidence of pyogenic liver abscess, with a stable mortality rate at 5.6%. Poor prognostic indicators include acute respiratory failure, gas forming liver abscess, or anaerobic infections. Hepatic seeding is often from a biliary source, and polymicrobial, and less often due to bacteremia or systemic infection that cause monomicrobial staph or strep abscesses. In 7.4% of patients initially diagnosed with cryptogenic abscess, colonoscopy reveals mucosal abnormalities ranging from high grade dysplasia to adenocarcinoma. This case was unusual for several reasons. First, diagnosis was delayed due to the presence of alcohol and acetaminophen use. The patient's lack of abdominal pain and initially fever obscured the true diagnosis, although the mixed pattern of LFT abnormalities, worsening leukocytosis, and development of fevers were clues that this case was not classic for alcoholic hepatitis. Second, a single microorganism, staph aureus, was identified, but there was no evidence of hematogenous spread and a primary source of infection was never identified.

Category: Quality Improvement / Education

A Masked Case of Vancomycin-Induced Immune Thrombocytopenia

Samuel A. Schueler, MD, Nilima S. Shet, MD, Nicholas Stienstra, MD, Daniel C. Chen, MD

Introduction: Vancomycin-induced immune thrombocytopenia, a potentially fatal entity, is difficult to recognize because it can present with different time courses and because patients receiving vancomycin may have other reasons to have or develop thrombocytopenia.

Case description: Mr. C, a 55-year-old gentleman with chronic hepatitis C, a previous diagnosis of primary idiopathic thrombocytopenia purpura, prior intravenous (IV) heroin use in remission, distant history of tricuspid valve endocarditis with subsequent tricuspid valve repair, chronic obstructive pulmonary disease and gastroesophageal reflux disease presented to the emergency department with altered mental status, fever, and cough. The patient met systemic inflammatory response syndrome criteria with temperature of 102.3°F and heart rate of 100. Serum, urine, and cerebrospinal fluid (CSF) testing was performed, and the patient was given 1 dose each of vancomycin 1 gram (g) IV (intravenously), cefepime 1 g IV, metronidazole 500 milligrams (mg) IV, and 2 L of normal saline IV. No heparin products were given. Admission labs showed a normal white blood cell count and hemoglobin level, and a platelet count of 150,000 per microliter. Serum chemistry testing was unremarkable except for an elevated lactate level of 3.3 millimoles per liter, which normalized after IV normal saline was given. CSF tests for cryptococcal antigen, herpes simplex virus, and Lyme disease were negative, and the CSF cell count and chemistry were normal. Serum and urine toxicology screens were negative. Urine testing was unremarkable.

On hospital day 2, the platelet count was 2,000. Physical exam, which was largely unremarkable on admission, was now significant for diffuse lower extremity petechiae. Antibiotics were held. Serum tests for human immunodeficiency virus (HIV) antigen, Lyme antibodies, heparin induced platelet antibody, unfractionated heparin serotonin release assay, platelet antibody screening (anti-glycoprotein 1b/1iia, anti-glycoprotein 1a/1ia, anti-glycoprotein 1b/1x, and anti-human-leukocyte-antibody class 1), and direct and indirect Coombs tests were negative.

On hospital day 3, the platelet count was 1,000, and remained < 4,000 through hospital day 5 despite platelet transfusions, prednisone 80 mg IV given on hospital day 3, and intravenous immunoglobulin (IVIG) 30 g given on hospital day 4. The platelet count was 40,000 on hospital day 6, 69,000 on day 7, and 150,000 on day 8.

The patient's serum tested strongly positive for vancomycin-dependent platelet-reactive Immunoglobulin G (IgG)¹, confirming a diagnosis of vancomycin-induced immune thrombocytopenia.

We later learned that our patient was given vancomycin during another hospitalization for pneumonia 3 months prior. During that admission his platelet count was initially 161,000, and then steadily trended down to a nadir of 1,000 8 days later despite platelet transfusions, prednisone, and intravenous immunoglobulin administration. We are unaware of any other previous exposure to vancomycin.

Discussion: As shown by Von Drygalski et al¹, the usual course of vancomycin-induced immune thrombocytopenia involves an average of a 93 percent drop in platelets with the average nadir platelet count on day 8 after vancomycin is first administered, with a return to greater than or equal to 150,000 platelets an average of 7.5 days after vancomycin is discontinued. However, in this same case series, 5 patients developed acute thrombocytopenia within 24 hours after initiation of vancomycin. Two of the 5 patients had known previous exposures to vancomycin, and it was hypothesized that all 5 of the patients may have had circulating vancomycin-dependent antibodies. Kenney and Tormey described an additional case of a male patient who experienced a drop in platelet count from 635,000 to 3,000 within 15 hours after exposure to vancomycin, with serum studies subsequently showing vancomycin-induced platelet antibodies, though it was unclear if the patient had previous exposure to vancomycin.² In our case, we were not initially aware of the patient's previous exposure to vancomycin. Further complicating matters were that our patient carried diagnoses of chronic hepatitis C, primary ITP, and also presented meeting SIRS criteria and with altered mental status concerning for infection. Given the life-threatening thrombocytopenia associated with vancomycin-induced immune thrombocytopenia and treatment implications, we find it important to: 1) Recognize the accelerated course of thrombocytopenia in a patient who may have circulating drug-dependent platelet-reactive antibodies; and 2) Recognize that confirming a diagnosis of vancomycin-induced immune thrombocytopenia by testing for vancomycin-dependent platelet-reactive antibodies may improve patient safety, particularly in a patient with multiple comorbidities that can independently cause thrombocytopenia.

Category: Quality Improvement / Education

Improving Order Sets at Boston Medical Center

Creating a standard process to increase quality and utilization

Nandini Setia, MD, Krupa Patel, MD, Jason Reich, MD, Matthew Moll, MD, Craig Noronha, MD, Gouri Gupte, PhD.

Background: Using order sets within an electronic medical record (EMR) has been shown to improve outcomes, including in-hospital mortality, adherence to evidence-based guidelines, and reduction in human error. However, we found that order set usage was low at Boston Medical Center for variety of reasons, including: Low quality/incorrect order sets; difficulty finding the correct order set; physicians are unaware order sets exist; and it is unclear who to contact for help. The ‘GI Bleed’ (GIB) order set, in particular, had several incorrect and irrelevant orders despite being a potentially high-use order set, and was therefore chosen as a pilot case for improvement.

Aim: Design a reproducible, generalizable process to improve Epic Order Set quality and usage at Boston Medical Center by improving usability, and increasing adherence to clinical guidelines.

Methods: We tracked order set usage at baseline, conducted resident survey regarding reasons for low order set usage and then performed Root Cause Analysis for low order set usage. We then outlined a standardized process to improve any order set used at Boston Medical Center. Next, we tested this process on the underutilized GIB order set as pilot case.

Results: Changes to the GIB order set included 1) Removed orders that were irrelevant, medically incorrect, or already used in a general order set 2) Added orders that were clinically indicated 3) Added links to evidence-based medicine resources. The final order set was concise, had standard-of care orders selected as defaults, contained options for STAT orders, and contributed to evidence-based medical education. After making these changes, order set usage increased from an average of 20 times per month to 104 times per month, a 420% increase.

Conclusions: The GIB Order set pilot process resulted in a high quality end product. This project created a reproducible, generalizable process to increase usage of order sets to improve quality of patient care. Furthermore, this process demonstrated that implementing a high quality, easy-to-use interface created a more sustainable impact on order set usage than the previous more costly awareness campaigns.

Category: Clinical Research

Systems-level Resources for Pulmonary Nodule Evaluation in the United States: A National Survey

James Simmons, MD; Michael K. Gould, MD, MS; Jonathan Iaccarino, MD; Christopher G. Slatore, MD, MS; Renda Soylemez Wiener, MD, MPH

Background: Each year, 1.5 million Americans are diagnosed with pulmonary nodules. Guidelines recommend evaluating these nodules in a timely fashion to identify the malignant subset. We conducted a survey of American Thoracic Society (ATS) clinicians to characterize the availability of system-level resources and processes of care to facilitate pulmonary nodule evaluation in the United States.

Methods: We surveyed clinician members of the American Thoracic Society's Respiratory, Cell, and Molecular Biology Assembly and Clinical Problems Assembly in April 2014. Eligible clinicians included U.S. physicians or mid-level providers who regularly saw patients in an outpatient clinic. The 32-item survey asked about practices regarding lung cancer screening and nodule evaluation.

Results: Of 5872 ATS members with a valid email address, 428 eligible clinicians participated (7%). Most respondents reported some (median 3, interquartile range 2-5) system-level resources to facilitate nodule evaluation. The most common structures and processes of care in place overall were inclusion of Fleischner Society guidelines in radiology reports (82.7%), flagged prompts to the ordering provider on radiology reports with new nodules (59.4%), and staff members to facilitate nodule evaluation (55.2%). Veterans Affairs (VA) sites tended to report more resources in place, with 88.0% reporting at least 3 (versus 69.8% at academic centers and 53.1% at community/HMO facilities). VA sites were significantly more likely to report electronic consults (64.0% VA, 15.7% academic, 7.4% community), academic settings were significantly more likely to report availability of same day consults (8.0% VA, 17.3% academic, 5.3% community), and both settings were significantly more likely to report dedicated pulmonary nodule clinics (48.0% VA, 49.5% academic, 10.6% community).

Conclusions: This U.S. national survey identifies great variation in the reported availability of systems-level resources to facilitate pulmonary nodule evaluation. Only the use of guideline recommendations, radiology flags, and staff for scheduling has diffused to a majority of sites. This raises concerns about the preparedness of U.S. sites to manage comprehensive lung cancer screening programs and in turn the downstream evaluation and treatment of detected nodules.

Category: Clinical Research

Discordance between Electrocardiographic Left Ventricular Hypertrophy and Echocardiographic Parameters in Elderly Patients with Heart Failure

S Simon, M Arvanitis, FL Ruberg

INTRODUCTION: Several major criteria exist for the evaluation of left ventricular hypertrophy (LVH) on electrocardiography (ECG). These ECG criteria generally associate with the echocardiographic definition of LVH, but significant variation exists. Factors that increase left ventricular fibrosis might drive this disparity, and associate with heart failure symptomatology. We sought to better understand the association between ECG criteria for LVH and echocardiographic criteria in a population of patients with heart failure, and to define clinical parameters associated with discordance.

METHODS: This is a prospective cohort study of elderly (age > 60 years), self-reported African American patients with diagnosis of heart failure, and echocardiographic mean posterior wall thickness (PWd) and septal diameter (IVSd) of > 12 mm. We determined which patients fulfilled LVH criteria on ECG using the Cornell voltage criteria. Serum B-type natriuretic peptide (BNP), as well as echocardiographic parameters were assessed in the two groups. Relationship of ECG-defined LVH with echocardiographic parameters and cardiac biomarkers were analyzed using two-tailed t-test.

RESULTS: A total of 66 patients were recruited for this study. Of these, 16 patients were excluded for ECG findings that preclude determining LVH (BBB, paced rhythm). Of the remaining 50 patients, 22 (44%) met LVH criteria on ECG and 28 (56%) did not. Age and gender were not significantly different between the two groups. The echo parameters posterior wall thickness (13.4 mm vs. 13.4 mm, $p=0.8$), septal diameter (13.5 mm vs 14.1 mm, $p=0.5$), LV mass (265g vs. 242g, $p=0.5$), E/A ratio (1.1 vs 1.6, $p=0.8$), and PASP (42 vs 36 mm Hg, 0.2) were not significantly different between the two groups. Among those meeting LVH criteria on ECG, serum BNP concentrations (1053 vs 382 pg/mL, $p=0.01$) were significantly higher.

CONCLUSION: Elderly, Black, patients with heart failure and ECG-defined LVH did not have significant differences in LV wall thickness or LV mass compared to those without ECG defined LVH. Notably, BNP concentrations were significantly higher in the group with LVH on ECG suggesting higher left ventricular filling pressures in these individuals. These findings suggest that other factors, not routinely measured by echocardiography, may be contributing to heart failure in this population and should be explored further with larger studies.

Category: Quality Improvement

Reducing Overuse of Cardiac Telemetry at an Academic Medical Center Through Implementation of Guideline Specific Electronic Order Sets

Rajat Singh, MD; Sumeet Pawar, MD; Michael Donlin, ACNP

Background: The use of cardiac telemetry is ubiquitous among medical and surgical inpatient wards. Utilized to detect potentially life-threatening arrhythmias, cardiac telemetry is generally considered to be a relatively benign intervention with significant impact on patient outcomes. However this in turn can lead to significant overuse of cardiac telemetry monitoring on medical wards, potentially contributing to alarm fatigue and adverse patient outcomes. In this study, we sought to reduce the number of unnecessary active (non-ICU) cardiac telemetry orders at a large academic medical center through utilization of a similar telemetry order set revision within the electronic medical record.

Methods: A retrospective chart review was performed to collect baseline data on the indication selected for the initiation of cardiac telemetry as well as the total duration of telemetry utilized during a hospital admission (in a non-ICU setting). Telemetry orders for which monitoring was not supported by AHA guidelines were removed from order sets. New order sets were revised, requiring providers to select from a list of clinical indications, each with pre-determined telemetry duration (24, 48, or 72 hours) based on AHA guidelines. Post-intervention chart review was performed in order to assess impact on indication selected, total duration of telemetry and number of total active telemetry orders.

Results: Redesigned order set was implemented on December 29, 2014. The total number of active telemetry orders on three medical wards was assessed from Nov 1, 2014 to Feb 1, 2015. There appeared to be an approximate 20% reduction in number of total active telemetry orders per week following implementation of revised order sets. Average telemetry duration improved from 7 days pre-intervention to 5 days post-intervention.

Conclusions: Implementation of a revised cardiac telemetry order set resulted in what appeared to be a sustained reduction of approximately 20% in number of total active telemetry orders within 30 days following intervention. Average telemetry duration improved from 7 days pre-intervention to 5 days post-intervention. Further data will need to be collected to assess sustained reduction in telemetry use beyond 30 days. This project did not assess patient safety factors such as rapid responses, code blues, or mortality post-intervention, which is an important future direction. This project is easily generalizable and reproducible at other medical centers that currently utilize electronic medical record order sets for initiation of cardiac telemetry.

Category: Quality Improvement / Education

Identifying Clinician Barriers to Improve Smoking Cessation at an Urban Safety-Net Hospital: A Quality Improvement Project

Lakshmana Swamy MD, MBA; Karin A Sloan MD, Carmel Fitzgerald NP, Guetchyn Millien, Charlie O'Donnell RRT, Christine C Reardon MD, Katrina Steiling MD, M.Sc., Renda S Wiener MD, MPH, Hasmeena Kathuria MD

Rationale: Cigarette smoking is the leading cause of preventable death in the US yet nearly 42 million adults continue to smoke. Low income and minority populations suffer a disproportionate burden of tobacco-related morbidity and mortality. Evidence based guidelines for smoking cessation exist but are underutilized. Nationally, only 20.9% of smokers receive counseling and only 7.6% receive cessation medications. As a quality improvement needs assessment, we sought to identify the adequacy of resident training in tobacco dependence treatment and clinician understanding of evidence based tools and guidelines, to evaluate current smoking cessation practices in both ambulatory and inpatient settings for primary care providers, and to identify perceived barriers in delivering effective smoking cessation interventions.

Methods: A 21-question survey tool was developed by the investigators to evaluate smoking cessation practices. Questions asked about delivery of the guideline-recommended 5As smoking cessation approach (Ask, Advise, Assess, Assist, Arrange), use of specific pharmacotherapy, internal and external referrals, and a variety of potential barriers. The tool was administered to 86 internal medicine residents and to 83 attendings (primary care and pulmonary) in-person during teaching conferences at Boston Medical Center. Results were subject to frequency analysis.

Results: For the 5As, results were combined for “Always” and “Almost Always.” Attendings and residents frequently asked about smoking (83%, 76%) and Advised patients to quit (70%, 76%). They less frequently Assessed quit attempts (30%, 36%). Attendings and residents offered Assistance with pharmacotherapy, most often with the patch (61%, 66%) or gum (44%, 52%). Usage of Varenicline or Bupropion ranged between 19-21% for both attendings and residents. Attendings and residents infrequently arranged for follow-up (26%, 21%). Perceived barriers to smoking cessation by attendings and residents were time constraints (71%, 81%), lack of knowledge about pharmacotherapy (51% for both groups), an unclear referral strategy (43%, 52%), and inadequate support (40%, 46%). Residents answered further questions specific to training, and 47% noted that post-graduate education was “not adequate.” 71% were “unfamiliar” with smoking cessation guidelines, and 27% felt “very comfortable” with counseling. 14% felt “very comfortable” with prescribing pharmacotherapy. 24% have recommended E-cigarettes for smoking cessation.

Conclusions: Residents and attendings are inadequately applying guideline-based strategies for smoking cessation. Most residents are not comfortable with delivering tobacco dependence treatment. Barriers to providing effective treatment for tobacco dependence is rooted in the lack of appropriate training, gaps in knowledge base, and time constraints. These results emphasize a need for stronger resident education in evidence-based tobacco dependence treatment and a need for concerted effort at the national and systems levels to educate providers and provide ancillary support for smoking cessation. They prompt consideration of implementing dedicated smoking cessation programs, both ambulatory and inpatient, to reduce clinician barriers to providing effective guideline recommended interventions.

Category: Clinical Research

Hyperglycemia Management in Septic Shock: Opportunities for Improvement At Boston Medical Center

Stephanie D'Souza, Kanupriya Soni, Dylan Thomas, Lakshman Swamy, Kevin Horbowicz, Karin Sloan, Sara Alexanian

Rationale: Hyperglycemia is known to increase morbidity and mortality in critically ill patients. Critical care hyperglycemia is associated with increased morbidity and mortality, length of stay, and cost. The ADA 2016 Standards of Care recommend an intravenous insulin infusion to control hyperglycemia at a threshold of no greater than 180 mg/dL in critically ill patients. Adherence to these guidelines may be inconsistent. A retrospective review from Boston Medical Center of 79 patients with septic shock in 2013 found that only 44% of patients with two glucose > 180 mg/dL were started on an insulin infusion within the first 48 hours following admission.

Objectives: For MICU patients in septic shock, we performed a quality improvement project with the aim to achieve by August 2015: (1) Adherence to an insulin infusion protocol of > 80% (2) Reduction of inappropriate use of subcutaneous insulin (defined as SQ insulin while on norepinephrine) to < 10% (3) Balancing measures include hypoglycemia and mortality.

Methods: We conducted an IRB approved chart review of 79 patients in the MICU on norepinephrine between 5/2014 – 5/2015. For each patient in the first 48 hours after norepinephrine was started, we extracted from the electronic medical record: (1) ordered for insulin infusion appropriately (after 2x blood sugar >180) (2) ordered for at least q4h glucose monitoring (3) ordered for subcutaneous insulin inappropriately (4) balancing measures: mortality and hypoglycemia. We developed a new hyperglycemia protocol and received Endocrine Committee approval in 12/2014. The 1st PDSA begun in January 2015 consisted of oral presentations to new each new MICU resident team about the new protocol every 3 weeks at morning conference.

Results: Between 05/2014 and 05/2015 the monthly rate of appropriate insulin infusion was highly variable between 0% and 100% although the sample size was small in some months. The percent of patients with hypoglycemia < 70 mg/dL varied between 0 and 50% monthly. The percent of patients with q4h or greater glucose monitoring varied between 20% and 100% monthly. The percent of patients with inappropriate subcutaneous insulin ordered varied between 0 and 50% monthly. The first PDSA cycle did not have a meaningful impact on these trends.

Conclusions: The management of hyperglycemia in septic shock at our institution is highly variable on a monthly basis although small sample size may be a partial contributor. Over 12 months, only 17 out of 31 patients (55%) who met criteria were appropriately started on an insulin infusion (goal >80%). Only 39 out of 79 patients (49%) appropriately received q4h or more blood glucose monitoring but this has increased since our intervention. 20 of 79 patients (25%) inappropriately were ordered for subcutaneous insulin (goal <10%) while on vasopressors. The first PDSA cycle educated interns and residents about the new standardized protocol for early recognition and treatment of hyperglycemia but adherence was poor. This represents an opportunity for quality improvement. An ongoing resident project seeks to increase early recognition and accelerate appropriate management via a nursing driven protocol to check blood sugars and treat hyperglycemia, a new electronic order set for vasopressors, and front-line education for nursing and residents.

Category: Clinical Research

The effect of bone marrow plasma cell burden on survival in patients with AL amyloidosis undergoing high dose melphalan and autologous stem cell transplantation

C Dittus¹, N Uwumugambi², F Sun¹, JM Sloan¹, V Sanchorawala¹

Introduction: Prognosis in AL amyloidosis has been linked to several variables including: poor performance status, severe postural hypotension, New York Heart Association functional class 3 or higher, low systolic blood pressure, and higher serum free light chain concentrations. Bone marrow plasma cell (BMPC) burden has also been identified as a negative prognostic factor. Specifically, patients with a BMPC burden >10% at presentation were shown to have decreased survival (16 months) when compared to those with a BMPC burden ≤10% (46 months). In patients who received high dose melphalan and stem cell transplantation (HDM/SCT), the 5-year OS was 46% in patients with BMPC burden >10% and 73% in those with BMPC burden <10%. We reviewed our database to see if our experience correlates with these findings. Additionally, we assessed whether induction therapy improved survival in patients with a BMPC burden >10%.

Materials and Methods: We reviewed 548 cases of AL amyloidosis who received HDM/SCT from 1994 through 2014. We searched for the following variables: Day 0 of SCT, date of death, BMPC burden, and induction therapy status. Kaplan Meier (KM) survival curves were calculated for overall survival in patients with BMPC ≤10%, and for those with >10%. In patients with a BMPC burden >10%, we compared KM survival curves for those who received induction therapy versus those who did not. Patients with a BMPC burden >30% were excluded from this study.

Results: Of the 548 cases reviewed, 443 (81%) had a BMPC burden ≤10%, and 105 (19%) had a BMPC burden >10%. KM analysis for patients with a BMPC ≤10% revealed a median survival of 7.86 years (95% CI 6.69, 9.83), and for patients with a BMPC >10% the median survival was 6.8 years (95% CI 5.75, 11.32). There was no statistically significant difference between the two groups (HR: 1.106; CI 0.82, 1.491; p=0.51). Five-year overall survival was comparable between the two groups: 63% for those with BMPC ≤10%, and 64% for those with BMPC >10%. For patients with a BMPC burden >10% (N=105), 25 patients received induction therapy. Induction regimens included oral melphalan with prednisone (N=6), bortezomib with dexamethasone (N=16), and CyBorD (cyclophosphamide, bortezomib, dexamethasone, N=3). The use of induction therapy did not have an effect on overall survival (p=0.35) in this group with BMPC >10%.

Discussion and Conclusions: In contrast to the prior study by Kourelis *et al* (J Clin Oncol 2013;31:4319-24), our study did not find a statistically significant difference in OS when stratified by BMPC burden. With a 5-year OS of 64%, our patients with a BMPC burden >10% had better survival when compared with the 46% 5-year OS in transplanted patients in that study. The lack of a statistically significant difference between groups in our study is likely because of the relatively good survival of our patients with BMPC burden >10%. The median OS of 6.8 years and 7.86 years are similar or improved compared to an earlier study published from our Center. Our study showed no benefit when patients with BMPC burden >10% received induction therapy. This supports the notion that patients with AL amyloidosis who are eligible for HDM/SCT, should not have this delayed for the administration of induction therapy. This research was supported by the Amyloid Research Fund at Boston University.

Category: Quality Improvement / Education

Improving the Handling of Protected Health Information

Abhinav Vemula, Kathleen Leahy, Nickie Braxton, David Maffeo, Brian Jacobson

Background and Aims: Managing Protected Health Information (PHI) is an important part of everyday medicine. The lack of proper management of PHI poses serious risks for patients. The Health Insurance Portability and Accountability Act of 1996 (HIPAA) holds covered entities responsible for the appropriate treatment and disposal of PHI in the workplace. However, the knowledge of what constitutes PHI and how to properly dispose of PHI is lacking among healthcare workers. In this study, the objective was to use mini-lectures and visual reminders in the Section of Gastroenterology (GI) to reduce the number of PHI violations by 50%.

Methods: The study included two outcome measures: pre- and post-intervention anonymous surveys given to the GI staff to assess knowledge regarding PHI, and observational audits done walking through the gastroenterology department looking for PHI violations. Three discrete interventions were done during the study. The first intervention consisted of a 5-minute presentation given at GI grand rounds and GI staff meetings educating health-care workers about what constitutes PHI and our institution's policy regarding the proper management and disposal of PHI. The second intervention was to replace broken "Slim Jims" (secured PHI disposal bins) with 10 new bins placed strategically throughout the department to increase ease of access. The final intervention consisted of placing four educational posters about PHI in non-public locations throughout the department as visual stimuli to remind practitioners about the importance of proper PHI handling. A repeat walk-through audit was conducted 2-4 weeks after each intervention. After all three interventions, the GI staff to take the anonymous survey again to assess for a change in PHI knowledge.

Results: 51 and 48 people answered the baseline and follow-up questionnaires, respectively. The results showed a significant increase in knowledge regarding what constitutes PHI (baseline: 53% versus follow-up: 79% correct answers) and regarding proper disposal (baseline: 79% versus follow-up: 95% correct answers). Results from walk-through audits of the department also showed a sequential decrease in the number of violations after each intervention was performed. Prior to any interventions, the median number of violations was 12 per day, which was reduced to 6 violations per day after the education intervention, and further reduced to 2 violations per day after the disposal bins were fixed, exceeding our goal of reducing violations by 50%. The study was conducted over a 10-month period suggesting the sustainability of the interventions.

Conclusions: Applying low cost interventions improved the knowledge and management of PHI in the GI department. The simple interventions also demonstrated long-term sustainability.

Category: Senior Talk

Making the Difference: Quality Improvement in Modern Medical Training

Lakshman Swamy and Chris Worsham

Burnout is an unfortunately pervasive phenomenon in modern medical training. We propose that burnout is largely a consequence of the need for residents to spend much of their time as work-arounds for broken health care systems. Participation in quality improvement empowers residents to make meaningful changes in health care which can build resilience against burnout and help protect them from burnout over their careers.

Recent research suggests that burnout rates among resident physicians may be as high as 70% across specialties (1). Seminal research in the field of occupational burnout suggests that the development of an existential crisis, emotional exhaustion, and depersonalization contribute to the phenomenon of burnout (2). These are defined broadly as follows, with our adaptations for healthcare: Existential Crisis: a deep seated unease about one's competence or "fit" with the career- "is medicine even right for me?" Emotional Exhaustion: emotionally overextended and exhausted by one's work in a way unrelated to the physical demands of the job- "after one too many failures despite massive efforts, I just don't have it in me to try again." Depersonalization: a disconnect from patients resulting from the sense that patients and superiors are not appreciative of one's efforts, resulting in a loss of patient centered care- "Patients are the enemy."

Fundamental principles of quality improvement and systems thinking shed light on the phenomenon of burnout. Broken health care systems produce burnout in at predictably high rates, which are increasing in the U.S. (3). Quality improvement principles teach that "every system is perfectly designed to produce the results it delivers." Therefore, the system is perfectly designed to produce burnout; we have institutionalized burnout in modern health care. It is an expectation, not an anomaly, that symptoms of burnout will occur in the majority of residents at some point in their training. As systems failures underlie many of the triggers of burnout, we believe participation in efforts to improve this system are potentially protective against burnout. Participation in quality improvement initiatives has been demonstrated to reduce burnout in both the inpatient and outpatient settings (4,5). We illustrate through our own example how not only participation in true QI efforts but even in simulated QI projects has the potential to energize and empower trainees and in doing so builds resilience against burnout.

(1)Holmes, E, presentation at American Psychiatric Association 2015

(2)Maslach, C and Jackson, SE (1986) MBI: Maslach Burnout Inventory: Manual Research Edition. Palo Alto, CA: Consulting Psychologists Press.

(3) Shanafelt TD, Hasan O, Dyrbye LN, et al. Changes in Burnout and Satisfaction With Work-Life Balance in Physicians and the General US Working Population Between 2011 and 2014. *Mayo Clin Proc.* 2015 Dec;90(12):1600-13. doi: 10.1016/j.mayocp.2015.08.023.

(4) Linzer M, Poplau S, Grossman E, et al. A Cluster Randomized Trial of Interventions to Improve Work Conditions and Clinician Burnout in Primary Care: Results from the Healthy Work Place (HWP) Study. *J Gen Intern Med.* 2015;30(8):1105–1111. doi:10.1007/s11606-015-3235-4

(5) Sexton JB, Sharek PJ, Thomas EJ, et al. Exposure to Leadership WalkRounds in neonatal intensive care units is associated with a better patient safety culture and less caregiver burnout. *BMJ Qual Saf.* 2014;23(10):814–22. doi:10.1136/bmjqs-2013-002042

Category: Senior Talk

“Digital Health: the Future or a Flop?”

Jordan Yoder

On March 23, 2010 Barack Obama signed the Patient Protection and Affordable Care Act, ushering in a new wave of legislation for healthcare in America. With the advent of high deductible health plans, the HITECH Act, meaningful use, and accountable care organizations, providers face new incentives to keep patients healthy and out of the hospital. Patients face new incentives to keep themselves healthy and away from their doctors. Both groups are turning to digital health innovations to help them do so.

As a result, venture capital investment in digital health companies has increased from \$1.5 billion in 2012 to \$4.5 billion in 2015 and now 80% of internet-connected adults use at least one digital health technology. A collection of randomized control trials have shown benefits to adding mobile components to weight loss and diabetes prevention programs, but the medical community has been slow to respond. With all the speed of this digital age, new health technologies are being developed daily and are outpacing any evidence of clinical benefit, reimbursement, and a generally lumbering medical institution.

As the landscape of healthcare in America continues its dramatic transition, it is essential that physicians understand and acknowledge how digital health impacts their patients and their practice. This senior talk will aim to provide an overview of that landscape, including the legislation behind these trends, the body of medical literature on digital health, the devices and companies leading the charge, and predictions on the future of healthcare.

Category: Clinical Research

18-30 year-olds more likely to link to HCV care: an opportunity to decrease transmission

Young Kraig L., Huang Wei, Horsburgh C. Robert, Linas Benjamin P., Assoumou Sabrina A.

BACKGROUND: Hepatitis C (HCV) incidence among 18-30 year-olds is increasing and guidelines recommend treatment of active injection drug users to limit transmission.

OBJECTIVE:(1) To measure linkage to HCV care among 18-30 year-olds and identify factors associated with linkage; (2) To compare linkage among 18-30 year-olds to that of patients >30 years.

METHODS: We used the electronic medical record at an urban safety net hospital to create a retrospective cohort with reactive HCV antibody between 2005 and 2010. We report seroprevalence and demographics of seropositive patients, and used multivariate logistic regression to identify factors associated with linkage to HCV care. We defined linkage as having evidence of HCV RNA testing after reactive antibody.

RESULTS: 32,418 individuals were tested including 8,873 between 18-30 years. The seropositivity rate among those ages 18-30 was 10%. In multivariate analysis, among those 18-30, diagnosis location (Outpatient vs. Inpatient/ED) (OR 1.78, 95% CI 1.28-2.49) and number of visits after diagnosis (OR 5.30, 95% CI 3.91-7.19) were associated with higher odds of linking to care. When we compared linkage in patients ages 18-30 to that among those older than 30, patients in the 18-30 years age group were more likely to link to HCV care than those in the older cohort even when controlling for gender, ethnicity, socioeconomic status, birthplace, diagnosis location and duration of follow-up.

CONCLUSION: 18-30 year-olds are more likely to link to HCV care than their older counterparts. During the interferon-free treatment era, there is an opportunity to prevent further HCV transmission in this population.

Category: Clinical Research

A Vascular Obstacle in Ultrasound Guided Hip Joint Injection

MaryAnn Zhang, Monica Pessina, Jay Higgs, Eugene Kissin

Background/Purpose: Injury of the lateral circumflex femoral artery (LCFA) is a potential cause of bleeding during invasive hip procedures due to its close proximity to the femoral acetabular joint. However, the LCFA is not routinely cited as a structure to avoid during intra-articular hip injections. The purpose of this study was to evaluate the risk of LCFA injury during ultrasound guided hip joint injection.

Methods: 1) We searched the PUBMED database (1967 to Apr 2015) for existing literature on basic techniques for ultrasound guided hip joint injection using the following search string: [“injection” OR “arthrocentesis” OR “aspiration”] AND [“hip” OR “intra-articular” OR “acetabulofemoral” OR “coxofemoral”] AND [“ultrasound” OR “ultrasonography” OR “ultrasound-guided” OR “image-guided”]. 52 non-English studies were excluded. 5 textbooks on musculoskeletal ultrasound were also reviewed. Resulting literature was screened for mention of the LCFA. 2) 18g spinal length needles were inserted under ultrasound guidance into the hip joints of 4 human cadavers. The tissues were dissected with the needles in place to expose the LCFA in relationship to the needle. 3) Rheumatologists trained for 8 months in ultrasound used electronic calipers to mark a planned needle trajectory from skin to hip joint on a live human ultrasound image during a musculoskeletal ultrasound final Observed Structured Clinical Examination (OSCE). Doppler imaging was subsequently used to locate the LCFA, and the closest distance between the planned needle trajectory and arterial signal was recorded.

Results: 1) 709 articles and 5 textbook chapters were reviewed; 11 discussed the technique of ultrasound guidance for hip injection. Of these 11 citations, 7 highlighted the femoral vascular bundle as a structure to avoid but only one specified routine use of Doppler imaging or specifically to avoid the LCFA. 2) In 3 out of the 4 human cadaveric dissections, the needle inserted into the hip under ultrasound guidance also made direct contact with the LFCA. 3) Of 27 OSCE participants, only 2 chose to activate Doppler imaging before marking their simulated hip injection trajectory. The electronic needle trajectory markings were subsequently found to pass through LFCA region Doppler signal in 6 (22%) cases. Among all 27 participants, the mean shortest distance from needle trajectory to arterial signal was 4mm (range 0-11mm).

Conclusion: The risk of LCFA injury during ultrasound guided hip joint injection is substantial. Although the clinical significance of LCFA injury remains unclear, for high risk individuals (such as those on chronic anticoagulation), we suggest routine use of Doppler imaging as a part of standard hip injection protocols. Further study is required to determine if a more oblique or transverse approach to the hip will reduce the risk of accidental vascular injury.

