



Internal Medicine Residency Program

Boston University Medical Center

Senior Resident

Academic Day

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Handbook of Abstracts

Table of Contents

| | |
|--|------------|
| Polycythemia vera in the setting of Nephrotic syndrome, complications of hyperviscosity <i>Bassima Abdallah, MD</i> | Page 1 |
| The incidence of atrial fibrillation among patients with AL amyloidosis undergoing high dose melphalan and stem cell transplantation: experience at a single institution <i>Monica Arun, MD</i> | Page 2 |
| Retinol binding protein 4 (RBP4) concentration identifies V122I transthyretin cardiac amyloidosis <i>Arvanitis, Marios, MD</i> | Page 3 |
| Poor knowledge and high stigma of IBD in the general population: Results of a National Survey <i>Miles Basil, MD</i> | Page 4 |
| Discharge summary workshop for fourth year medical students <i>Marianne Bauer, MD</i> | Page 5 |
| New World Techniques to Teach Old World Skills: Systematic Flipped Classroom Approach to Teaching the Bedside Cardiac Assessment <i>Hugo Carmona, MD</i> | Page 6 |
| Risk factors for acute human brucellosis in northern Tanzania <i>Shama Cash-Goldwasser, MD</i> | Page 7 |
| Pain and sensitization in women with aromatase inhibitor-associated arthralgias <i>Monica Crespo-Bosque, MD</i> | Page 8 |
| Using health-related quality of life and treatment measures to predict 10-year mortality in older survivors of early stage breast cancer <i>Clark Dumontier, MD</i> | Page 9 |
| Improving inpatient care of COPD exacerbations: Targeting appropriate oxygen supplementation <i>Radha Govindraj, MD</i> | Page 10 |
| Assessing tobacco treatment in hospitalized patients with substance use disorders <i>Minda Gowarty, MD</i> | Page 11 |
| A prospective study on racial disparities in patients with irritable bowel syndrome <i>Mustafa Haroon, MD</i> | Page 12 |
| The lymphocyte count predicts the overall survival on novel immunotherapies: A Clinical Study <i>Theodoros Karantanos, MD</i> | Page 13 |
| Atypical presentation of complicated appendicitis in the elderly: A case report and review of the literature <i>Priya Lakireddy, MD</i> | Page 14 |
| Provider perceptions of colorectal cancer surveillance in older adults <i>Stephanie Le, MD</i> | Page 15 |
| Nasal epithelial gene expression profiling in sarcoidosis <i>Zach Lipkin-Moore, MD</i> | Page 16 |
| Hiking to heart block <i>Shilpa Mukunda, MD</i> | Page 17-18 |

| | |
|---|------------|
| Myokines as a mediator of anti-NAFLD benefit in exercise: Clinical and biological implications <i>Jonathan Ohm, MD</i> | Page 19 |
| Toxic megacolon: A serious complication of clostridium difficile infection <i>Tomoko Okada, MD</i> | Page 20-21 |
| A further look into alternate routes of transmission for alpha-gal allergy: A case report and review of the current literature <i>Patel Gayatri, MD</i> | Page 22-23 |
| 30-day readmissions after coronary artery bypass graft surgery in the United States: Insights from the nationwide readmission database <i>Sumeet Pawar, MD</i> | Page 24 |
| Clot busters: Promoting implementation of the CHEST 2016 guidelines to optimize patient care and safety <i>Pooja Phull, MD</i> | Page 25 |
| Effects of incidental coronary artery calcification visualized during lung cancer screening on cardiovascular risk prediction <i>Mina Pirzadeh, MD</i> | Page 26 |
| Improved antibody response to three additional hepatitis B vaccine doses following initial vaccination failure in inflammatory bowel disease patients <i>Perry Pratt, MD</i> | Page 27 |
| The 6-minute walk test in AL amyloidosis patients: a single center case series <i>Vina Pulido, MD</i> | Page 28-29 |
| Overview of hormone therapies in transgender adults <i>Ray Qian, MD</i> | Page 30 |
| Quality of surveillance for esophageal varices in patients diagnosed with cirrhosis via transient elastography <i>Jalpan Ringwala, MD</i> | Page 31 |
| Utilization of gastroenterology electronic consultations in the Veteran Administration Boston Healthcare System, <i>Rishabh Sachdev, MD</i> | Page 32 |
| Optimizing ultrasound findings for B-lines on lung ultrasound- an In-Vitro Pilot Study <i>Chris Schmickl, MD</i> | Page 33 |
| Improvement of liver stiffness after treatment for HCV is independent of changes in aminotransferases <i>Vikram Singh, MD</i> | Page 34 |
| An innovative approach to teaching residents how to address health care inequities <i>Ashley Tran, MD</i> | Page 35 |
| Artificial intelligence in oncology <i>Nicolai Wohms, MD</i> | Page 36 |
| VE/VCO ₂ is a powerful predictor of mortality in wild-type transthyretin amyloidosis <i>Adil Yunis, MD</i> | Page 37 |
| Central serous chorioretinopathy in an ulcerative colitis patient with pouchitis on budesonide-ED <i>Samantha Zullo, MD</i> | Page 38 |

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Category: Clinical vignette

Polycythemia vera in the setting of Nephrotic syndrome, complications of hyperviscosity

Bassima Abdallah, MD

Background: Polycythemia vera (PV) is a myeloproliferative disorder characterized by clonal stem-cell proliferation of red blood cells, white blood cells and platelets. Course of PV is variable with symptoms stemming primarily from high red blood cell (RBC) counts with resultant increase in blood viscosity and from high platelet counts with associated increase in formation of thrombi.

Case: A 65-year old man presented to the Emergency Department with gradually progressive swelling in the legs and arms. He had previously been lost to healthcare for over two years and was not taking any medications at the time of presentation. His initial exam was significant for hypertension to 234/125mmHg and anasarca without jugular venous distension. He was found to have significant pleocytosis of all three cell lines on admission labs along with nephrotic range proteinuria on urine dipstick analysis. Work-up revealed Jak2 mutation and low erythropoietin level, consistent with a diagnosis of PV. For his anasarca in the setting of nephrotic range proteinuria, patient was treated with furosemide with effective diuresis while awaiting further workup with renal biopsy. He complained of burning pain in his feet which was initially attributed to swelling in the lower extremities. His pain increased despite effective diuresis and was associated with evolving duskiness and pallor of toes and soles of both feet for which vascular surgery was consulted and imaging was pursued revealing diffuse atherosclerotic disease throughout the abdominal aorta and its major branches. After extensive discussion between vascular surgery, hematology and renal teams about systemic anticoagulation, the risks were felt to outweigh the benefits. Hospital course was complicated by frontoparietal stroke and erythromelalgia with auto-infarction of the feet.

Discussion: This case illustrates the difficulties of weighing risks versus benefits of systemic anticoagulation in the setting of two coexisting conditions that lead to both an increased risk of hypercoagulability as well as risk of bleeding. It further highlights the potential complications of blood hyperviscosity in the setting of active diuresis.

Category: Clinical Research

The incidence of atrial fibrillation among patients with AL amyloidosis undergoing high dose melphalan and stem cell transplantation: experience at a single institution.

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Introduction: Treatment with high-dose melphalan and autologous stem cell transplantation (HDM/SCT) can induce hematologic responses and prolong survival in patients with AL amyloidosis. Complications related to cardiac events surrounding HDM/SCT remain an ongoing concern, especially in patients with cardiac amyloidosis. Atrial fibrillation (AF) may complicate SCT in up to 22% of cases. We sought to determine the incidence, risk factors, and outcomes related to AF in patients with AL amyloidosis undergoing HDM/SCT.

Methods / Results: We retrospectively analyzed the medical records of 91 patients with AL amyloidosis undergoing HDM/SCT between January 2011 and May 2015. Twelve patients (13.1%) developed AF during the peri-transplant period (1st day of stem cell mobilization to neutrophil engraftment), at a median of D+9 (range: D+1 to D+21). There were 13 deaths, only 2 of which occurred within 100 days of SCT (2% of total cohort). History of AF was identified as a risk factor for the development of AF. However, development of AF was not significantly associated with history of cardiac amyloidosis, troponin I, B-type natriuretic peptide, or echocardiographic measures. Among patients who developed AF, there was a significant association with increased intensive care unit admissions, increased use of vasopressors, and increased length of hospital stay, but no significant difference in mortality.

Conclusion: AF during HDM/SCT is not uncommon and precipitates clinically important complications. Patients with a history of AF should be carefully monitored during the peri-transplant period to permit early intervention and thereby reduce the number of arrhythmia-related complications.

Category: Clinical research

Retinol Binding Protein 4 (RBP4) concentration identifies V122I transthyretin cardiac amyloidosis

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Objective: To assess the role of retinol binding protein 4 (RBP4), an endogenous TTR ligand, in the diagnosis of mutant V122I transthyretin amyloid cardiomyopathy (ATTR) in elderly African American individuals and to develop an easy to use prediction model for the presence of V122I ATTR.

Methods: Fifty prospectively enrolled African American patients over age 60 years with non-amyloid heart failure, and a comparator cohort of previously identified, biopsy proven, ATTR V122I patients (n=25) comprised the development cohort, whereas 27 prospectively genotyped African American patients and 9 ATTR V122I amyloidosis patients comprised the validation cohort. Circulating biomarkers, electrocardiography (ECG), echocardiography, and clinical characteristics were assessed in all patients. A clinical prediction rule was developed using penalized logistic regression and validated in an independent cohort of cases and controls.

Results: Age, gender, BNP and TnI were similar in both groups. Serum RBP4 concentration was lower in patients with ATTR V122I compared to non-amyloid controls (31.5 vs. 49.7 ug/ml, $p < 0.001$). Left ventricular ejection fraction (LVEF) was lower in V122I ATTR (40% vs. 57%, $p < 0.001$), while interventricular septal diameter (IVSd) was higher (16 vs. 14 mm, $p < 0.001$). Receiver operating characteristic (ROC) analysis identified RBP4 as a sensitive identifier of ATTR V122I (AUC 0.78). A clinical prediction algorithm comprised of RBP4, TTR, LVEF, IVSd, mean limb lead ECG voltage and grade 3 diastolic dysfunction yielded excellent discriminatory capacity for ATTR V122I (AUC 0.97), while a 4 parameter model including RBP4 concentration retained excellent discrimination (AUC 0.92). Both models maintained high discrimination in the validation cohort.

Conclusions: A prediction model employing circulating RBP4 concentration and readily available clinical parameters accurately discriminated ATTR V122I cardiomyopathy from non-amyloid HF in a case matched cohort

Category: Clinical Research

Poor Knowledge and High Stigma of IBD in the General Population: Results of a National Survey

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Introduction : Inflammatory bowel disease (IBD) is a chronic disease, which in some patients leads to debilitating and often embarrassing symptoms. Studies have examined the various perceived stigmas experienced by IBD patients but less is known about the general public's perceived knowledge and stigmatization of IBD. We hypothesize that open discussion and communication around IBD may be lacking amongst patients and the general population and thus may lead to a high level of stigma associated with the disease as well as a low level of public knowledge.

Methods: A national survey was distributed to 1,200 opt-in general public respondents in the United States identified by the company Qualtrics. Respondents answered a series of true/false and write-in questions regarding general knowledge of IBD and perceived stigma associated with IBD.

Results: On a 12- item "true/false" questionnaire addressing basic IBD information, the average score was 6.58/12 (54.8%; SD = 1.77) with no respondent achieving a perfect score and 85.5% answering at least two-thirds of items incorrectly. 84% of respondents stated irritable bowel syndrome was a type of IBD. Over half (51%) of respondents felt that cultural norms such as diet are felt to be the leading cause of IBD with 36% of respondents stating that lack of exercise is a leading cause of IBD. Over half (52%) of the general public felt that homeopathic remedies could cure or improve IBD. When familiarity was assessed, there was an average score of 5.54/10 on a 1 (not familiar with IBD) to 10 (very familiar with IBD) self-reported scale. The perception and perceived stigma of IBD was highly negative with respondents ranking IBD as having the greatest social stigma compared to 7 health conditions (including genital herpes, HIV, alcoholism, testicular cancer, diabetes, and obesity) with the most embarrassing sequelae of IBD being need for a stoma and diarrhea. There was a statistically significant decrease in stigma as overall IBD knowledge increased amongst the general population.

Discussion: Public understanding of IBD is strikingly low in the US. We found there is a high level of social stigma and perceived embarrassment associated with IBD as well. Gastroenterologists must be aware of the stigma their patients may face in order to provide appropriate counseling for patients and their families. There is a need for improved IBD knowledge within the general public.

Category: Education research

Discharge Summary Workshop for Fourth Year Medical Students

Marianne Bauer, MD; Radha Govindraj, MD; Eric Jones, MPH; Ryan Chippendale, MD

Background: Sub-optimal transitions of care can lead to patient harm and system inefficiencies. Although warm handoffs are preferred, there are many barriers to achieving this in the current medical system making discharge summaries essential documents. A needs assessment survey of 26 Internal Medicine (IM) interns was conducted in August 2015 to guide curriculum development. Only 1 intern reported receiving formal discharge summary training prior to residency while 15 (58%) interns reported a desire for formal training. Given the identified curricular gap, an interactive workshop was developed to train 4th year medical students in using discharge summaries as an effective means of communication.

Methods: An hour-long interactive workshop was incorporated into Boston University School of Medicine's Advanced IM fourth year medical student clerkship. A study key linked, paper-based survey was administered at the start (pre) and end (post) of the workshop. The workshop was given once per rotation for a total of 7 sessions. 4 of the sessions were at the beginning of the 4th year (n= 29 students, the majority of whom had not completed a sub-internship) while 3 of the sessions (n= 26 students) were at the end of the year. The workshop begins with a case-based facilitator led discussion on the essential components of discharge summaries. Students are then divided into small groups to analyze a sub-optimally written discharge summary which is followed by a large group debrief.

Results: Using the McNemar's test, a statistically significant number of participants reported a shift (from pre to post testing) to "completely confident" with regards to their ability to write a succinct and effective discharge summary (p=0.005) and to use a discharge summary to communicate outstanding issues (p=0.002). Additionally, there was a statistically significant increase in perceived importance of receiving formal training on discharge summaries during medical school when pre-post cohort data was analyzed using the Wilcoxon Signed-Rank test (p=0.006).

Conclusions: This innovation identifies a curricular deficit that is easily remedied with a short, effective, hands-on workshop. Students responded well to this interactive workshop as a method to teach essential aspects of discharge summaries as evidenced by an increase in self-reported confidence levels. This session, which can be easily reproduced at outside institutions, can significantly enhance student knowledge, confidence, and awareness of the importance of discharge documents in handoffs from hospital to outpatient providers.

Future Directions: An advanced modified version of this workshop will be incorporated into the pre-intern year "boot camp" for fourth year medical students which involves the students writing and receiving feedback on a discharge summary. Eventually, the plan will be to disseminate this series of workshops to other institutions and clerkships within our institution to ensure all medical students receive appropriate training prior to starting internship.

Category: Education Research

New World Techniques to Teach Old World Skills: Systematic Classroom Approach to Teaching the Bedside Cardiac Assessment

Hugo Carmona, Daniel Chen, Gail March, Sheilah Bernard, James Meisel

Introduction: Bedside physical exam skills such as the cardiac exam are less emphasized in current medical education, as reliance on technological innovations like computed tomography (CT) have overtaken reliance on clinical exam skills. As medical students with decreased confidence in their clinical exam skills becomes physicians and future educators, this cycle is perpetuated. Typical lecture-style approaches to teaching bedside physical exam skills likely do not promote learner retention. Flipped-classroom teaching styles reinforce learner retention through

Methods: Prior to this study, we provided students with knowledge-based surveys before and after their Internal Medicine (IM) clerkships. During their IM clerkships, a quasi-experimental approach was used to randomize students to either usual teaching or a series of unique lectures by hospitalist faculty around bedside cardiac assessments. During a second quasi-experimental study, third-year medical students were randomized to either an interventional cohort, which included online teaching videos, pre-class assignments, and a flipped classroom-style teaching session versus usual care at their assigned location for their Internal Medicine clerkship. A knowledge survey was administered before and after the rotation.

Results: Survey results from the traditional lectures showed that students felt more confident in their clinical skills, but there were no differences in knowledge retention. This informed the second aspect of this study, which utilizes a flipped-classroom approach to increase learner retention. The knowledge survey administration is ongoing.

Conclusion: Traditional lecture-style approaches to cardiac physical exam skills increase confidence without increasing learner retention. We hypothesize a flipped-classroom approach will increase retention.

Category: Clinical research

Risk factors for acute human brucellosis in northern Tanzania

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Background: Little is known about the epidemiology of human brucellosis in sub-Saharan Africa. This hampers prevention and control efforts at the individual and population levels. To evaluate risk factors for brucellosis in northern Tanzania, we conducted a study of patients presenting with fever to two hospitals in Moshi, Tanzania.

Methods: Serum taken at enrollment and at 4-6 week follow-up was tested by Brucella microagglutination test. Among persons with a clinically compatible illness, confirmed brucellosis cases were defined as having a ≥ 4 -fold rise in agglutination titer between paired sera or a blood culture positive for Brucella spp., and probable brucellosis cases were defined as having a single reciprocal titer of ≥ 160 . Controls had reciprocal titers of < 20 in paired sera. We collected demographic and clinical information and administered a risk factor questionnaire.

Results: Of 562 participants in the analysis, 50 (8.9%) had confirmed or probable brucellosis. None of these participants received a clinical diagnosis of brucellosis from their non-study clinician providers. Multivariable analysis showed that risk factors for brucellosis included assisting goat and sheep births (OR 5.9, 95% CI 1.4, 24.6) and having contact with cattle (OR 1.2, 95% CI 1.0, 1.4). Consuming boiled or pasteurized dairy products was protective against brucellosis (OR 0.12, 95% CI 0.02, 0.93).

Discussion: The under-recognition of brucellosis by healthcare workers could be addressed with clinician education and better access to brucellosis diagnostic tests. Interventions focused on protecting livestock keepers, especially those who assist goat and sheep births, are needed. Other measures might include control of brucellosis in livestock populations.

Category: Clinical research

Pain and sensitization in women with aromatase inhibitor-associated arthralgias

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Background/Purpose: Aromatase inhibitors (AIs), the preferred treatment for estrogen receptor positive breast cancer, are associated with arthralgias which decrease adherence. Because estrogen may be anti-nociceptive, estrogen deprivation may cause pain sensitization to develop, which can be assessed by pressure pain thresholds (PPT). We examined the relation of PPT to pain in AI-associated arthralgias.

Methods: The HOPE (Hormones and Physical Exercise) study randomized 121 postmenopausal women with breast cancer treated with AIs for ≥ 6 months who had arthralgias but no prior rheumatologic conditions to an exercise intervention vs. usual care. Self-reported pain severity, pain location and PPT at the knee and wrist were obtained.

Results: Of the 121 subjects enrolled in the trial, 99 subjects had pain and PPT data available at 6-months (mean age 62, mean BMI 30). Higher number of joints with pain were associated with higher baseline pain severity scores on (42.6 \pm 5.2 for 7-10 sites vs. 9.4 \pm 3.7 with 0-3 sites, $p < .0001$) and with lower PPT at baseline (PPT 1.94 \pm 0.47 for 7-10 sites and 3.31 \pm 0.32 with 0-3 sites, $p 0.02$). While pain severity improved more in the exercise arm than the usual care arm, there was no significant change in PPT over time.

Conclusions: The severity of AI-associated arthralgias by WOMAC and QuickDash were associated with number of painful joints and PPT. While pain severity improved with exercise, this improvement was unrelated to improvement in PPT, suggesting that pain improvement through exercise must occur through mechanisms other than improvements in pain sensitization.

Category: Clinical Research

Using health-related quality of life and treatment measures to predict 10-year mortality in older survivors of early stage breast cancer

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Background: Older women make up the growing majority of breast cancer (BC) survivors. Guideline BC treatments are known contributors to long-term survival, and health-related quality of life (HRQOL) is emerging as not only an important outcome in survivorship care but also as a factor thought to influence mortality. However, prognostic models that include HRQOL alongside BC treatment measures are lacking. We aimed to develop a 10-year mortality risk score based on a priori chosen treatment and HRQOL variables.

Methods: We studied 660 women ≥ 65 -years old diagnosed with stage I-IIIa primary breast cancer in years 1997-1999. Data from medical and psychosocial domains were collected over 10 years from interviews, medical records, and death indexes. BC treatment variables included receipt of definitive locoregional surgery +/- radiation, chemotherapy, and tamoxifen. HRQOL variables included physical function [10-item Physical Function Index (PFI-10) from the Medical Outcomes Study Short Form-36 (MOS SF-36)]; mental health [5-item Mental Health Index (MHI-5) from the MOS SF-36]; and social support [8-item modified MOS Social Support Scale (mMOS-SSS)]. We used penalized logistic regression models to develop a 10-year mortality risk score, and investigated its discrimination (c-statistic) and calibration (observed versus predicted mortality using the Hosmer-Lemeshow (HL) test).

Results: Mortality through 10-years of follow-up was 34.8% (230 of 660 women). The c-statistic of a risk score using only age, number of comorbidities, stage of BC, and BC treatment was 0.71. The c-statistic increased to 0.74 with the addition of HRQOL measures and showed good calibration ($p=0.72$ from HL test). Physical function and mental health had strong independent associations with mortality (women with high PFI-10: OR 0.63, 95% CI 0.43, 0.92; women with high MHI-5: OR 0.57, 95% CI 0.39, 0.85).

Conclusions: In older early stage breast cancer survivors, our risk score combining HRQOL with treatment measures showed good discrimination and calibration. HRQOL is independently associated with 10-year mortality and adds predictive ability to age, comorbidity, stage of BC, and BC treatment.

Category: QI Research

Improving Inpatient Care of COPD Exacerbations: Targeting Appropriate Oxygen Supplementation

Radha Govindraj, MD; Marianne Bauer, MD; David Yuh, MD

Background: Chronic lower respiratory diseases which include COPD and asthma, were the third leading cause of death in the United States in 2015 second only to heart disease and cancer. According to the Healthcare Cost and Utilization Project, there were 644,744 total primary hospitalizations for COPD and bronchiectasis in the United States in 2013 which was the 8th most common reason for an inpatient stay. Guideline based treatment of a COPD exacerbation includes but is not limited to the administration of steroids, bronchodilators, appropriate oxygen supplementation, and/or mechanical ventilation as indicated. A chart review was performed of patients treated for COPD exacerbations by internal medicine house staff teams on the Menino campus in July 2016 at Boston Medical Center to identify potential targets for improving adherence to evidence based guidelines for COPD exacerbation management. Analysis of this chart review revealed that while 13 of 19 patients (68%) treated for an acute COPD exacerbation received nasal cannula supplementation, only 3 of those 13 patients (23%) had a formal order for nasal cannula supplementation. Of this group, only 2 of 3 patients (66.6%) had a titration goal and 0 of those 3 patients (0%) had the correct titration goal.

According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) Report, updated in 2016, supplemental oxygen should be titrated to improve a patient's hypoxemia with a target saturation of 88 – 92%. In patients with COPD exacerbations, there is an association of excess oxygen supplementation with hypercapnia, acidosis, and increased mortality. A cluster randomized controlled parallel group trial performed in Australia in the prehospital setting showed reduced mortality by 78% in patients with COPD exacerbations who received titrated oxygen treatment when compared to high flow oxygen treatment. 6 Based on this information, the goal of this project is to improve practices surrounding oxygen administration to patients with a COPD exacerbation.

Aim Statements: 1) Increase the percent of nasal cannula orders placed for patients who receive nasal cannula oxygen while being treated for a COPD exacerbation by internal medicine house staff on the Menino campus from 23% to 50% by December 2016. 2) Increase the number of correct titration goals associated with nasal cannula orders from 0% to 50% for patients treated for COPD exacerbation by internal medicine house staff teams on the Menino campus by December 2016.

Methods: 1) A project charter was created based on the July 2016 chart review which identified areas of non-adherence to evidence-based management of COPD exacerbations. 2) A cause-and-effect diagram was created to identify areas for improvement in the delivery of appropriate oxygen supplementation to patients with COPD exacerbations. 3) A paper order-set/checklist was designed to guide evidence-based treatment for COPD exacerbations. 4) Multiple PDSA cycles were performed with the paper order-set/checklist being distributed to 8 of the internal medicine house staff teams at the start of each week in August 2016. 5) Chart reviews were done for patients treated for a COPD exacerbation in August 2016 via EMR generated reports. 6) An electronic survey was administered to the internal medicine house staff who were on a medicine team on the Menino campus during August 2016

Conclusions: There was an increase over time in the percent of patients who received nasal cannula WITH a formal nasal cannula order following the introduction of the paper order-set/checklist on August 1, 2016. 1) There was an increase over time in the percent of appropriate titration goals associated with nasal cannula orders following the introduction of the paper order-set/checklist. 2) 100 % of house staff did NOT feel that using this intervention detracted from their workday

Category: QI research

Assessing Tobacco Treatment in Hospitalized Patients with Substance Use Disorders

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Background: Most adults who have substance use disorders also smoke cigarettes [1]. Studies suggest that quitting cigarettes may help adults in recovery stay sober [2], highlighting the importance of treating tobacco dependence in patients with substance use disorders. BMC has a dedicated inpatient Tobacco Treatment Consult (TTC) service. Due to limited resources the team consults on 30% of the 550 smokers admitted each month. Hospitalized smokers with co-substance use are also often seen by the Addiction Consult service. The number of smokers receiving counseling may be increased by incorporating tobacco treatment into Addiction Medicine consults. The purpose of this study is to assess how often the Addiction Medicine team addresses tobacco dependence and to examine perceived barriers to addressing tobacco dependence in smokers who have drug use disorders.

Methods: EMR data was electronically abstracted to identify the number of Addiction consults, Tobacco consults, and degree of overlap between these services between 7/8/2016 and 3/28/2017. From the list of Addiction Medicine consults, a pilot of 26 charts was manually reviewed to assess how often the Addiction Service addressed tobacco dependence. Items assessed included how often patients were: identified as smokers or nonsmokers, asked about current smoking status, advised to quit smoking, assessed for readiness to quit, assisted with a quit attempt, and arranged for follow up.

Results: Between 7/8/2016 and 3/28/2017, 73% of patients for whom the Addiction Team was consulted had concomitant tobacco use. Of these, 53% also had Tobacco Treatment consults, and 24% were seen by the TTC service. Manual review of 26 charts revealed a total of 54 initial consult notes by the Addiction Team. In 42/54 encounters (77%), patients were asked by the Addiction Team about their smoking status, and 30/54 (55%) patients were identified as smokers. By chart documentation, 0/30 smokers (0%) were advised to quit, 1/30 (3.3%) was assessed for readiness to change, 2/30 (6.7%) were assisted with quitting, and 0/30 (0%) were provided information on smoking cessation resources.

Conclusions: Due to limited resources and time constraints, hospitalization is a missed opportunity to counsel patients with co-substance use to quit smoking. Interventions to promote smoking cessation in these high-risk smokers will need to address provider-level and systems-level barriers. We plan to develop and test the effect of an online and in-person clinician smoking cessation curriculum in improving the number of hospitalized smokers with substance use disorder who receive effective counseling at the bedside.

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Category: Clinical Research

A Prospective Study on Racial Disparities in Patients with Irritable Bowel Syndrome

Horst C. Weber, Mustafa Haroon, Gayatri Patel, Ling Guo, Howard Cabral, and Corbett Shelton

Background: Irritable bowel syndrome (IBS) is a highly prevalent functional bowel disorder characterized by abdominal pain and change in bowel habits. This prospective study aims to validate our previous results of disparities in a racially diverse IBS patient cohort, and interim results with emphasis on quality of life measures are presented.

Methods: At Boston Medical Center we prospectively enrolled adult outpatients with IBS (N=80) and controls (N=166) based on Rome III criteria questionnaires. Electronic medical records were reviewed and data from a 15 year period on total and IBS-related events were analyzed using Chi-square, Fisher's exact, and Wilcoxon rank sum test. IBS-specific (IBSQOL) and general quality of life (VR-12) was assessed using validated questionnaires.

Results: The mean age of IBS patients was younger, whereas the racial breakdown and BMI for IBS and control patients was similar (Table 1). Basic demographics were similar between Whites (W), Blacks (B), and Hispanics (H) (Table 2). Significantly more GI visits and IBS-related PCP visits overall were noted in IBS patients ($p<0.0001$; $p=0.005$). PCP and GI office visits of W-IBS with B/H-IBS patients were higher for all office visits and IBS-related GI visits ($p=0.05$). IBSQOL was significantly lower ($p<0.0001$) in IBS patients compared with controls. General QOL in both the physical (pcs) and the mental component (mcs) were significant lower ($p<0.0001$, and $p=0.02$, respectively) for all IBS patients. Racial disparity of IBSQOL exists ($p=0.018$) when IBS patients from all racial groups were compared with lowest scores seen in H and highest in W, but mcs ($p=0.2$) and pcs ($p=0.33$) scores were not different. IBSQOL subdomains for body image ($p=0.37$) and food avoidance ($p=0.15$) did not differ in all racial groups, whereas the dysphoria ($p=0.006$) and sexual score ($p=0.03$) were significantly different. Similarly, IBSQOL health worry, social reaction, and overall score were significantly different ($p=0.02$, $p=0.008$, and $p=0.04$) among all racial groups with H scoring lowest in all subdomains.

Conclusions: This is the first prospective study of IBS in a racially diverse population and demonstrates utilization of office visits is substantially higher for non-white IBS patients. General QOL is profoundly reduced in all IBS patients as compared to controls, but no racial differences were noted. In contrast, IBSQOL scores among IBS patients from all racial groups differed significantly with lowest scores noted in Hispanics.

Category: Oral abstract - Clinical Research

The lymphocyte count predicts the overall survival on novel immunotherapies: A Clinical Study

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ABSTRACT

Introduction: Check-point inhibitors provide significant survival benefit for patients with solid malignancies. The aim of our study was the discovery of clinical and laboratory predictive markers for patients on immunotherapies.

Patients and Methods: Retrospective analysis of 66 patients with metastatic malignancies on Ipilimumab, Nivolumab, Pembrolizumab or Atezolizumab, treated at Boston Medical Center was performed. ECOG status, BMI, absolute neutrophil count (ANC), absolute lymphocyte count (ALC), and albumin at baseline and ANC and ALC at 2, 3, 6 and 12 weeks on treatment were recorded. Multiple regression analysis and Kaplan-Meier estimates were employed for the statistical analysis.

Results: BMI was positively associated with OS (P=0.023). ALC and ALC ratio at baseline were positively correlated with OS (P<0.0001, P=0.037) and overall time on treatment (OTT) (P<0.0001, P=0.004). ANC ratio and ANC/ALC ratio at baseline, ANC/ALC ratio at 4 weeks and ANC, ANC ratio and ANC/ALC ratio at 6 weeks were negatively associated with treatment outcomes. ALC and ALC ratio were positively correlated with OS (P<0.001) and OTT (P=0.001, P<0.001) at 6 weeks. ALC was positively correlated with OS at 12 weeks (P=0.041). Kaplan-Meier analysis at baseline, 6 and 12 weeks showed different OS between groups with different ALC. The presence of adverse events (AEs) was associated with improved OS (P=0.016) and AEs after the first 2 weeks are positively correlated with OTT (P=0.038).

Conclusions: Our results show that elevated ALC at baseline and during the follow up period predicts better treatment outcomes highlighting a positive impact of peripheral lymphocytes on the immunotherapies efficacy. The development of AEs and particularly after the first 2 weeks is associated with favorable treatment outcomes.

Category: Case-vignette

Atypical Presentation of Complicated Appendicitis in the Elderly: A Case Report and Review of the Literature

P.I. Lakireddy, J. Walker, K. Aronis, S. Levine

Introduction: Intra-abdominal abscess is a complication of appendicitis and classically presents with abdominal pain, fever and nausea, best managed with IR-guided or direct surgical drainage and IV antibiotics. Elderly patients, however, often present with atypical symptoms and confounding comorbidities that delay diagnosis and intervention. Early diagnosis is crucial as mortality in this population remains high.

Case description: An 80 year-old Haitian Creole-speaking patient with history of multiple myeloma and a recent small bowel obstruction 2 months prior to admission presented to the hospital with 3 weeks of decreased appetite, generalized malaise, and productive cough. On day of admission the patient was febrile to 102.5F with leukocytosis of 16.3 K/ μ L with 73% PMN's, absent gastrointestinal symptoms, and normal abdominal exam. A respiratory viral panel was positive for RSV. Over the next 2 days, the patient's cough resolved with supportive care alone yet she remained febrile with persistent leukocytosis. Given concern for abscess formation at the known fistula site, CT of the abdomen and pelvis with IV contrast was performed. Imaging revealed an 8.9 x 9.3 x 8.2cm right lower quadrant collection consistent with an abscess related to complicated appendicitis or perforated diverticulitis. CT-guided drainage with pigtail catheter placement was performed and the patient was started on IV antibiotics.

Discussion: This case illustrates the atypical presentation of an intra-abdominal abscess formation secondary to complicated appendicitis in an elderly patient. The classic symptoms of abdominal pain, anorexia, and leukocytosis occur in only 20% of appendicitis cases in the elderly.¹ Providers should maintain increased suspicion for intra-abdominal abscess formation in elderly patients with known risk factors who present with persistent fever or leukocytosis even in the absence of abdominal pain or gastrointestinal symptoms. These patients may benefit from a lower threshold for CT of the abdomen.

¹ Horattas, MC, DP Guyton, and D Wu. *A reappraisal of appendicitis in the elderly. Amer Jour of Surg.* (1990) 160 (3): 291–293

Category: Clinical Research

Provider Perceptions of Colorectal Cancer Surveillance in Older Adults

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Background: Little data exists regarding when to stop surveillance colonoscopy (SC) among adults aged ≥ 75 (older adults). This will become an increasingly important issue as the population ages.

Aim: To determine gastroenterologist (GI) and primary care provider (PCP) attitudes towards SC in older adults and assess factors influencing the decision-making process.

Methods: We designed a 17-question survey which we distributed to GI attendings and fellows who were members of the Massachusetts Gastroenterology Association or worked at a single academic safety net hospital. We distributed a similar survey to PCPs in Internal Medicine, Family Medicine, and Geriatrics at the same hospital. We performed descriptive statistics and chi square tests to compare results by specialty and training

Results: In 10/15-11/15, we surveyed 30 GIs (53% academic, 40% private practice, 3% VA, 3% mixed) and 87 PCPs (67% IM, 20% FM, 13% geriatrics). **GIs:** All GIs endorsed having recommended SC in older adults. Findings on the most recent and prior colonoscopies were ranked as the most important reasons (Figure 2). Though, 50% “sometimes” and 40% “frequently” recommended against continued SC with the majority (58%) ranking co-morbidities as the most important factor. These included CHF NYHF class III-IV (100%), COPD on oxygen (90%), dementia (80%), CKD 3-4 (77%), and cancer (63%). 57% stated that patient preference factors into the decision “always” or “frequently.” The majority of GIs (63%) would stop SC in an older adult with poor function and low risk findings, but in a healthy older adult with a higher risk lesions, 58% would continue SC. 56% of GIs felt that the primary decision about SC should be between GI and the patient. GIs in private practice vs. academics were more likely to discuss SC with PCPs (85% vs 44%; $p=0.08$); other responses did not vary by practice setting. **PCPs:** 75% of PCPs had less than half of their older patients undergo SC. Life expectancy (40%), GI recommendation (26%) and patient preference (12%) were the most important factors in their decisions (Figure 1). Exam findings ranked much lower among PCPs (10%) compared to GIs. PCPs felt decisions around SC should be between the patient and PCP (72%). Geriatricians (50%) were more likely than IM (11%) and FM (17%) to consult GI regarding SC ($p=0.004$). A majority of GIs (87%) and PCPs (76%) felt that existing literature on SC in older adults was at best only “somewhat helpful” and that the development of guidelines would be more helpful than provider or patient tools.

Discussion: GIs and PCPs weigh factors differently when deciding to recommend SC in older adults. GIs value findings on prior colonoscopies whereas PCPs value patient preference and life expectancy. Both groups agree that the current literature on SC in older adults is lacking and that guidelines would be the most helpful in their practice.

Category: Clinical research

Nasal Epithelial Gene Expression Profiling in Sarcoidosis

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Rationale: Sarcoidosis is characterized by the formation of granulomas in the lungs and other organs of the body, a process poorly understood at the molecular level. Molecular phenotyping of nasal epithelium as a surrogate for distal airways, employing the "field of injury" hypothesis, has the potential elucidate the processes underlying various diseases. Sampling of the nasal epithelium in patients with granulomatosis with polyangiitis (Wegener's) yielded differential transcriptomic expression patterns, suggesting airway based expression profiling is feasible and informative in other conditions affecting the airway. We hypothesized that nasal epithelial gene expression is altered in patients with sarcoidosis, reflecting changes underlying the systemic disease.

Methods: Nasal brushings were obtained from individuals with sarcoidosis (n = 18) and healthy controls (n = 22). Significantly more individuals in the sarcoid group were taking oral steroids. RNA from epithelial cells obtained from brushings was processed and hybridized to Affymetrix U133A v2.0 microarrays. Differential gene expression between individuals with and without sarcoidosis was identified using a linear model adjusting for gender and smoking status, with a false discovery rate (FDR) of < 0.05 and a fold change of > 1.25. Enrichment of biologic pathways was explored using Gene Set Enrichment Analysis (GSEA).

Results: A total of 183 genes were differentially expressed in the nasal epithelium of individuals with sarcoidosis (Figure 1). Of the genes identified, 86 were upregulated and 97 were down-regulated. Genes whose expression was altered in sarcoidosis were enriched in multiple biologic immunerelated pathways, including chemokine mediated recruitment and polarization of T cells into Th1 and Th2 cells, pathways that have been previously linked to sarcoidosis.

Conclusions: Our data describe the identification of a 183gene expression signature in individuals with sarcoidosis using a minimally invasive method of sampling the nasal epithelium. While our initial analysis may be confounded by smoking status and oral steroid use, the findings suggest that nasal epithelial gene expression is altered in sarcoidosis and these changes may shed light on the molecular mechanisms of this disease. Future work will include validation of perturbed pathways, replication of this gene expression signature using external samples, and comparing this gene expression signature to that seen in other granulomatous diseases.

Category: Case-vignette

Hiking to heart block

Mukunda, Shilpa

Case: A thirty-three year old male with no significant past medical history presents with new onset of palpitations. The patient had gone on a hiking trip in New Hampshire, during which he had not noticed any ticks. Three weeks later, he had presented to urgent care with fevers to 102 F and a pruritic, circular lesion in his left popliteal area. He was diagnosed with cellulitis (Lyme IgG and IgM were negative at this time) and given a one-week course of cephalexin. After two more weeks, he had re-presented to his primary care doctor due to persistent myalgia, arthralgia, and low-grade fevers. At this time, the diagnosis of Lyme disease was made with positive Lyme EIA to 2.1 with confirmatory positive Western blot for both Lyme IgG and IgM antibodies, and the patient was started on doxycycline 100mg twice daily.

The patient's complaint was a new onset of transient palpitations, which started the day after he had been diagnosed with Lyme disease. The patient reported feeling uncomfortable with the palpitations, but denied chest pain, shortness of breath, syncope, or dizziness. Physical exam revealed tachycardia and hyperpigmentation in the left popliteal fossa at the site of his former rash. EKG showed sinus tachycardia with 1st degree AV block with PR of 336 msec.

The patient was admitted to the hospital and started on intravenous ceftriaxone 2g daily. His PR interval decreased through admission to 320ms on day 2 and 288ms on day 3. He remained asymptomatic through admission without palpitations. He was discharged on oral amoxicillin 500mg three times a day for a total 28-day course.

Discussion: Lyme disease, caused by the spirochete *Borrelia burgdorferi*, is the most common vector-borne disease in the United States and Europe.¹ This patient initially presented with fevers and a pruritic rash, which was misdiagnosed as cellulitis. His rash was likely erythema migrans, which is the most common sign of early localized infection in Lyme disease.² Erythema migrans is a rapidly expanding, erythematous skin lesion that appears at the site of the tick bite 1-2 weeks later.² The diagnosis of erythema migrans should be based on the clinical history, including potential exposure to ticks, and physical exam.³ Importantly, serologic tests for antibodies *B. burgdorferi* are not useful in patients with erythema migrans during the acute phase, as false negative results can occur in 50 % of patients, as was noted in this patient.² While cellulitis is in the differential diagnosis for patients with erythema migrans and both can be warm and erythematous, cellulitis is often at the site of trauma to skin, usually tender, and is rarely circular.³

Days to weeks after the onset of erythema migrans, *B. burgdorferi* spreads hematogenously to other sites.¹ This stage, known as early disseminated infection, is often accompanied by headache and myalgias¹, and includes extracutaneous manifestations such as neurologic and cardiac complications.³ Most cases of Lyme carditis are clinically asymptomatic, though some patients present with palpitations, syncope, and chest pain.⁴ While Lyme disease affects men and women equally, Lyme carditis is more common in men with a ratio of 3:1.⁴ The most common cardiac abnormality is heart block. Patients with minor cardiac involvement, defined as 1st degree AV block and PR interval <0.3 seconds, can be treated orally with doxycycline or amoxicillin.⁵ Patients with PR interval greater than 0.3 seconds have a higher risk of

developing complete heart block, a progression that can occur in minutes.⁵ For this reason, patients with first degree AV block with a PR>0.3 seconds, as well as those with second or third degree block, should be hospitalized and treated with IV ceftriaxone 2g daily or high dose penicillin G.⁵ Complete recovery of Lyme carditis is seen in 90% of patients.⁵ After advanced heart block resolves, treatment can be completed with an oral agent, such as doxycycline or amoxicillin, for a total 21-28 day course.² This patient had complete recovery from his carditis and has had no further sequelae from his Lyme disease.

Conclusion: An important concept learned from this case is that one should exercise caution in interpreting negative serological tests for early Lyme disease, and rely on clinical diagnosis based on history and physical examination. While no established guidelines, an EKG should be performed in all patients with Lyme disease, patients should be asked about any cardiac signs and symptoms. All patients with PR prolongation > 300 ms should be admitted to the hospital for telemetry monitoring and IV antibiotics, as oral doxycycline is not sufficient to treat Lyme carditis.

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Category: Basic research

Myokines as a mediator of anti-NAFLD benefit in exercise: Clinical and biological implications

Jonathan T. Ohm, Samuel J. Miller, Michelle Zhang, Priyanka Majety, Sanjib Chowdhury, Navneet Momi, Ashish K. Tiwari, Hemant K. Roy

Background: The prevalence of fatty liver diseases continues to rise in the current obesity pandemic. As a matter of fact, NAFLD/NASH is projected to become the most common cause of cirrhosis in the future and a major contributor to global hepatocellular carcinoma (HCC) burden. Exercise (even without weight loss) has been shown to improve steatosis and clinical parameters in fatty liver disease, but significant lifestyle changes in the population is difficult to achieve. Therefore, there is an incentive to understand the molecular mechanisms involved in order to develop therapeutic agents that may confer similar benefits as exercise. Based on emerging literature, our group and others have focused on myokines (cytokines released from contracting muscles) as presumed mediators of the beneficial effects of exercise. We aimed to use a novel cell culture model of exercise to demonstrate the presence of myokines and their role in hepatocyte metabolism with the overarching goal of elucidating the mechanism behind the anti-NAFLD effect of exercise.

Methods: We developed a cell culture platform in which mouse skeletal muscle cells (C2C12) are differentiated into tubules and rhythmically contracted using electrical pacing (C-Pace). Exercise-conditioned media was compared to media from non-contracted cells by using them to treat human liver cancer cells (HepG2), then harvesting the cancer cells to conduct lipidomic analysis (mass spectroscopy), immunoblotting, and Seahorse extracellular flux (XF) analysis.

Results: A higher overall concentration of myokines in the exercise-conditioned media was confirmed with a 40-gene cytokine array. Lipidomic analysis showed a 30% decrease in total fatty acids when HepG2 cells were treated with myokine-rich media. Immunoblot analysis was used to explore the signaling pathways involved in cell metabolism. This showed that HepG2 cells treated with myokine-rich media increased expression of phosphorylated AMP-activated protein kinase (pAMPK), phosphorylated acetyl CoA carboxylase (pACC, the rate limiting enzyme in fatty acid oxidation), and phosphorylated protein kinase B (pAKT) by 100%, 150%, and 70%, respectively ($p < 0.05$). Furthermore, treatment with myokine resulted in a 25% decrease in the extracellular acidification rate (ECAR) in HepG2 cells as determined by Seahorse XF analysis, indicative of decreased glycolysis and less production of acetyl CoA, a key substrate for fatty acid synthesis. The aforementioned findings were absent when exercise-conditioned media limited to molecular weight >50 kDa was used (the majority of myokines have a molecular weight <50 kDa), further implicating myokines as the effector molecules in the exercise-mediated benefit noted in NAFLD.

Conclusion: We were able to demonstrate that myokines released from exercising skeletal muscles can decrease liver fat potentially through both increased oxidation and decreased synthesis of fatty acids. This provides a platform to further investigate the precise molecular targets of myokines. Additional studies are underway to identify specific myokines that mediate

Category: Clinical vignette

Toxic Megacolon: A Serious Complication of Clostridium difficile Infection

Okada, Tomoko; Faculty Advisor: Dr. Catherine Rich

Learning Objectives: 1. Clostridium difficile (C diff) infection without diarrhea may have serious consequences. 2. Recognize that high index of suspicion for serious C.diff infection is required for a certain patient population, such as for patients with dementia. 3. Review diagnostic criteria for toxic megacolon

Case: A 55 year-old non-English speaking male with a history of ESRD on HD, HIV on HAART (CD4 >500 cells/mcL, VL undetectable) complicated by dementia, hypertension, type 2 diabetes mellitus gastroparesis, cirrhosis, chronic proton pump inhibitor (PPI) user, admitted on a surgical team for a planned AV fistula revision. A vascular surgery was conducted without complication. His WBC was $20 \times 10^9/L$ immediately after the operation, which down-trended to $12.9 \times 10^9/L$ a few days later. However, it started to gradually rise again back to $19 \times 10^9/L$. Patient was tachycardiac and relatively hypotensive, especially after hemodialysis sessions, but remained afebrile. Per chart review, the patient has labile blood pressure and heart rate in the outpatient setting with few occasions of systolic blood pressure around 100 mmHg and heart rate around 100 beats/minute. He also has a history of post-dialysis hypotension requiring midodrine during a previous admission. The patient had very few complaints, except for occasional nausea and pain at the surgical site. On physical examination, he was mildly tachycardic, and his abdomen was distended and diffusely tender on palpation. As for gastrointestinal problems, he only acknowledged that he has chronic constipation and a vague “stomach problem”.

Given leukocytosis, tachycardia and relative hypotension, sepsis workup was initiated which revealed a positive procalcitonin level, negative blood cultures, unremarkable urinalysis, unremarkable chest x-ray, and CT - abdomen and pelvis without acute intra-abdominal process. Surgical site did not appear to be infected. CT - pulmonary angiogram was negative for PE. After aggressive bowel regimen to obtain stool specimen, C.diff stool PCR assay was sent two days after initial workup began, which returned positive. Patient was started on oral vancomycin, rectal vancomycin, as well as intravenous metronidazole. WBC increased to $34 \times 10^9/L$ on the day of diagnosis. On the next day, patient was noted to be lethargic, with his blood pressure was unmeasurable by machine or manual cuff. IVF bolus was started. STAT lab was notable for WBC $42 \times 10^9/L$. KUB obtained showed dilated loops of bowel with no free air (Image 1). Surgery was consulted for concern for toxic megacolon. Patient underwent an emergent exploratory laparotomy, and total abdominal colectomy with end ileostomy was subsequently performed. Surgical pathology results showed that “small and large bowel with mucosal ulceration, necrosis, cryptitis, crypt abscess, and pseudomembrane formation distributed on a non-continuous pattern most in keeping with c.difficile enterocolitis”.

Discussion: The patient developed a toxic megacolon due to a severe C.diff infection. He was at high risk of C.diff infection due to his immunosuppressive state (HIV, ESRD, Cirrhosis), chronic PPI use, and as a long-term nursing home resident. The diagnosis of C. diff megacolon was delayed due to a lack of diarrhea, patient’s history of gastroparesis/chronic constipation masking abdominal distention, and difficulty assessing symptoms due to his dementia. C.diff infection should be suspected with a

sudden rise of WBC $>15 \times 10^9/L$ even without diarrhea, as fulminant colitis can present as ileus. The diagnosis of toxic megacolon should be considered in all patients with abdominal distention and tenderness, altered mental status, and sepsis physiology. The diagnosis requires radiographic evidence of colonic distention, frequently greater than 6cm. Multiple air-fluid levels in the colon are commonly seen, and the normal colonic haustral pattern is severely disturbed. The patient had multiple abdominal imaging to assess abdominal distention and constipation, but none of them was read as abnormally dilated or obstructed. The initial treatment plan for toxic megacolon is medical therapy. However the patient developed severe sepsis despite maximum antibiotics therapy and IVF, which prompted an emergency surgical intervention.

CATEGORY: CASE VIGNETTE

A FURTHER LOOK INTO ALTERNATE ROUTES OF TRANSMISSION FOR ALPHA-GAL ALLERGY: A CASE REPORT AND REVIEW OF THE CURRENT LITERATURE
GAYATRI PATEL MD, SHAHAB VIRANI MD, FREDERIC LITTLE MD

Background: Galactose- α -1-3-galactose (α -gal) is a carbohydrate epitope found on proteins of non-primate mammals by which sensitization can cause secondary “red meat allergy”. This allergy was discovered in patients from a specific region of the US who had anaphylaxis after cetuximab (α -gal epitope on Fab of heavy chain) and linked to prior tick bites. These patients had delayed type I hypersensitivity reactions which occurred 3-6 hours after pork, lamb or beef ingestion. Primary vectors include the tick species *Ixodes spp* (identified in Europe, Australia), *Amblyomma spp* (USA, South America). A role for helminths (esp. cestodes, nematodes) has been described. We discuss a case of delayed red meat hypersensitivity that may be mediated by an alternate mechanism of α -gal sensitization.

Aim: The objective of this case report is to highlight nuanced clinical presentation of suspected α -gal allergy and increase awareness of uncommon routes of sensitization that can be evaluated.

Case: A 24 year old healthy Brazilian female with no significant atopic history presented with recurrent angioedema every 3-4 months for 1.5 years associated with leg pruritis. Her last episode was 2 weeks prior to visit. She moved from Brazil to Boston 2 years prior. She recalled having no clear precipitant but recalls taking Ibuprofen and/or eating meat (pork or beef) a few hour prior to some of the episodes. She endorses red meat intake without associated episodes, but no clear spontaneous U/A. She does not recall any history of tick bites. There were no pets at home, but had been around house pets in Brazil. Medications included Implanon and Ibuprofen PRN.

| Allergen | Dog | Cat Dander | Pork | Beef | Alpha-Gal |
|------------|-------|------------|-------|-------|-----------------|
| Neg: <0.35 | <0.35 | 0.60 | <0.35 | <0.35 | 1.30 in 12/2015 |
| | | | | | 1.10 in 3/2016 |

Management and Outcome: Labs tests were obtained (Table 1) including α -gal given possible meat exposure prior to her episodes. The patient was asked to keep food diary and avoid NSAIDs. She was instructed to avoid beef and pork to assess symptom evolution. On 3-month follow, patient had reported decreased episodes after largely eliminating pork in diet. She had 2 episodes in January which were associated with beef consumption. Repeat α -gal specific IgE had minimally decreased.

Next steps: Patient advised to continue pork and beef abstinence. Avoidance of meat triggers with α -gal can decrease IgE levels and reduce clinical sensitivity³. Her relatively low α -gal specific IgE suggests that she can tolerate well-cooked (vs. rare) pork and beef, which may explain why she does not consistently have reactions to all pork and beef ingestion. Patient will return in 6 months for repeat α -gal IgE. If levels do not decrease, she may need to refrain from all α -gal products including gelatin.

Discussion: Patients with low levels of α -gal IgE in a region with low tick prevalence has poor positive predictive value for diagnosis. The known prevalence in USA general population (asymptomatic) for α -gal IgE >0.35 is <1% in Boston compared to Southeastern states which is ~20%⁵. Differences are thought to be due to locale of certain tick species which have been closely linked to α -gal sensitization. This patient poses a diagnostic dilemma given limited history and no recollection of tick bites. Bites, however, can go unnoted particularly by small larval ticks, thus clinicians should still investigate if clinically appropriate. This patient also had cat dander specific IgE, raising the possibility that cat sensitization contributed to α -gal sensitivity. Cat major allergens include Fel d 5 (cat IgA) which has an α -gal epitope while Fel d 1, Fel d 2 and Fel d 4 do not⁴. It has been hypothesized that respiratory exposure to cat dander or skin breakdown in atopic patients allowing cat dander through skin entry are alternate routes of transmission. Available studies have not supported this mechanism. Instead it is likely that there is α -gal specific IgE cross reactivity with Fel d 5 that can lead to positive cat IgE. Additionally, eating meat cannot induce this allergy. The tick salivary proteins which are very immunogenic are believed to be critical in modulating the T- cell response which leads to the allergy⁵. This is ongoing research by investigators.

Category: Oral abstract- clinical research

30-Day Readmissions after Coronary Artery Bypass Graft Surgery in the United States: Insights from the Nationwide Readmission Database

Sumeet Pawar, Shanti Patel, Pratik Mondal, Priti Poojary, Girish Nadkarni

Introduction: Readmissions and associated healthcare costs readmissions following coronary artery bypass graft (CABG) surgery remain high with significant regional variation suggestive of potential room for improvement. With penalties being imposed on hospitals for readmissions, it is important to identify the causes and predictors of readmissions following CABG surgery.

Methods: Patients undergoing CABG surgery (International Classification of Diseases-Ninth Revision- CM codes 410.xx) between January 2013 and November 2013, were extracted from the healthcare cost and utilization project's (HCUP) national readmission database (NRD) National Readmissions Database (NRD). Incidence, predictors and causes of readmission were analyzed.

Results: Of the 161733 patients that underwent CABG surgery nationally during the year 2013, 18952 (11.7%) had at least one unplanned 30-day readmission. The top diagnoses for readmissions were congestive heart failure (12.2%), post-operative infection (10.5%), atrial fibrillation (4.9%). Those who were readmitted were more likely to be older, females and more likely to have comorbidities such as congestive heart failure, end-stage renal disease, peripheral vascular disease, atrial fibrillation, COPD, diabetes mellitus. Readmissions were also higher in those patients who were in the income category below the median, patients admitted through the emergency department, those admitted for non-electively, had longer length of stays in the hospital, had Medicare or Medicaid as their primary insurance and those discharged to nursing facility.

Conclusion: Readmissions within 30 days of discharge after CABG continue to remain high in 2013. Awareness and identification of predictors may help to identify and target high risk patients. Further work is required to design interventions that may reduce readmissions.

Category: QI research

CLOT BUSTERS: Promoting Implementation of the CHEST 2016 Guidelines to Optimize Patient Care and Safety

Pooja P, Pulido V, Stevenson M, Qian R, Kircher J, Thomson N, Arnold L, Sloan MJ

Background: In February 2016, the CHEST guidelines regarding venous thromboembolism (VTE) management were revised, now recommending the use of novel oral anticoagulants (NOACs) over warfarin for management of newly-diagnosed non-malignancy related VTE.

Project aim: An interdisciplinary team of public health students, internal medicine (IM) residents, and members of the hematology and pharmacy departments collaborated to improve prescriber awareness of the guidelines. The primary aim of this project was to strategize an intervention to improve IM residents' knowledge of the new guidelines by 25% in order to reduce adverse events associated with older therapies as well as to decrease the duration of inpatient hospitalization for patients admitted with this diagnosis.

Project design/ strategy: The team created a fishbone diagram which was used to identify the multifactorial barriers to the implementation of the new CHEST guidelines (Figure 1). An educational intervention highlighting the content of the new guidelines was targeted at the "people" sector of the fishbone diagram, which included the IM house-staff of our hospital. This included an educational conference dedicated to this topic. To reinforce the guidelines further, the team delivered a residency-wide informational e-mail summarizing the key CHEST recommendations. Pre- and post-intervention surveys (which provided a clinical scenario and asked residents to name the agent they would use to manage a patient diagnosed with a new non-malignancy VTE) were conducted to assess the efficacy of the intervention.

Outcomes: The pre-intervention survey revealed that only 16% of IM residents at our hospital identified NOACs as the first-line agent for newly diagnosed non-malignancy VTE management. A post-intervention survey conducted amongst a cross-section of the house-staff demonstrated a marked increase in overall awareness of the guidelines to 45% (Figure 2).

Conclusions and next steps: Awareness of changes in VTE guidelines is low amongst IM residents. Recommendations from new guidelines are easily disseminated among house-staff with simple interventions, such as lectures and e-mails. Future directions of this project include expanding these interventions to the emergency room as well utilizing the hospital's electronic medical record, thereby optimizing the quality of patient care.

Category: Clinical research

Effects of Incidental Coronary Artery Calcification Visualized during Lung Cancer Screening on Cardiovascular Risk Prediction

Mina Pirzadeh, Auyon J. Ghosh, Karin A. Sloan, and Allan J. Walkey

Rationale: In addition to findings pertinent to early detection of lung cancer, low dose lung cancer screening computed tomography (LDCT) frequently reveals incidental findings of uncertain significance. Coronary artery calcifications (CAC) are incidental findings of LDCT that may indicate increased risk for cardiovascular events. Cardiology Guidelines suggest that the presence of CAC may be used to improve risk prediction and guide primary cardio-preventive treatment among patients predicted to have intermediate risk via traditional models (e.g. the American College of Cardiology Atherosclerotic Cardiovascular Disease (ASCVD) Risk Estimator). We hypothesized that incidentally-detected CAC on LDCT would modify cardiovascular risks as calculated by the ASCVD score, and alter Guideline-recommended primary prevention therapeutic recommendations (statin therapy) for many patients following LDCT.

Methods: We reviewed charts of all subjects who underwent lung cancer screening at our institution from January 2015 through June 2016. We excluded subjects who did not receive primary care at our institution and those with prior diagnosis of MI or CAD by ICD code. We abstracted radiology reports, medication lists, BP readings, cholesterol levels, smoking history, race and gender in order to calculate 10-year cardiovascular risk using the ASCVD Risk Estimator. We determined appropriateness of statin therapy as recommended by 2013 ACC/AHA Practice Guidelines, first based on ASCVD risk estimates alone, then based upon risk estimated from ASCVD plus the presence of CAC. Based on Guidelines, risk category was upshifted (i.e. low to intermediate, intermediate to high) if CACs were visualized on LDCT.

Results: Among 98 patients undergoing LDCT, 55 (56%) had data available for calculation of ASCVD risk scores. Average 10-year ASCVD risk of patients receiving LDCT was 19% \pm 13% with 85% classified as high risk, 9% intermediate risk, and 5% low risk. CAC was identified among 30 (55%) subjects, shifting cardiovascular risk categories upward for 4 (7%) patients, 2 of which shifted from intermediate to high risk. 51% of subjects were on appropriate statin therapy prior to application of CAC data on risk category while 53% of subjects were on appropriate statin therapy after CAC data applied to risk category.

Conclusion: We found that the majority of patients at our institution who qualified for LDCT fell into the high-risk category for 10-year ASCVD risk. Despite only a small proportion of subjects affected, with the large and growing number of LDCTs performed per year, identification and structured reporting of CACs on LDCT has the potential to influence Guideline-recommended cardio-preventive therapeutic changes.

Category: Clinical research

Improved antibody response to three additional hepatitis B vaccine doses following initial vaccination failure in inflammatory bowel disease patients.

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Introduction: Cases of severe hepatitis B have been reported in IBD patients on immunosuppressive medication regimens used to treat both Crohn's disease (CD) and ulcerative colitis (UC). It is crucial to obtain and document protective levels of serum HBsAb in these patients. While previous studies have demonstrated poor response to initial HBV vaccination series in IBD patients, little data exists on the utility of subsequent "booster" vaccinations. Our aim was to analyze the association between additional vaccination doses and HBsAb seroconversion in IBD patients.

Methods: This is an IRB-approved retrospective cohort study of patients seen in a large tertiary care facility from 2000-2014. Inclusion criteria: age ≥ 18 , diagnosis of CD/UC, prior vaccination history/presence of ≥ 1 +HBsAb level < 10 IU/l, follow-up HBsAb level after re-vaccination. Exclusion criteria: +HBcAb/+HBsAg. Subjects were separated into groups based on the number of additional vaccine doses received: 1 or 2 (w/in 6mos) and 3 (w/in 12mos). Follow-up serum HBsAb, demographic info and IBD medications received in the 6mos prior to titer measurements were reported. Seroprotection defined as HBsAb ≥ 10 IU/l. Logistic and linear regression were used to test dichotomous/continuous outcomes.

Results: Our cohort included 149 patients with inadequate baseline titers: 87 received 1 or 2 doses, 62 received 3 doses. Following 1 or 2, and 3 doses, average follow-up titers were 93 and 276 IU/l ($p < 0.01$), w/ seroconversion rates of 40.2% and 62.9%, respectively ($p < 0.01$). Per regression analysis, for patients of all ages, the likelihood of seroconversion rose by a factor of 1.8 and post-vaccination titers rose by a mean of 116 IU/l, w/ each additional vaccine dose ($p < 0.01$, for both). For patients age ≥ 40 years, seroconversion likelihood rose by a factor of 1.9 and follow-up titers rose by a mean of 89 IU/l, w/ each additional dose ($p = 0.03$, $p < 0.01$, respectively). Regression analysis controlled for all immunosuppressive drug exposures, interval time between vaccination/titer level measurement and demographic data.

Conclusions: In this retrospective study, revaccination of IBD patients with inadequate baseline HBsAb titer levels lead to subsequent seroconversion in 40 to 63% of individuals. Three additional vaccine doses, rather than 1 or 2 alone, were associated with a higher seroconversion rate and higher follow-up titer levels, while receipt of immunosuppressive treatment and patient age > 40 were associated with a poorer response. Additional prospective studies are needed to better define the optimal management of IBD patients with poor response to initial vaccination, but this study suggests that patients benefit from repeated vaccination attempts. Efforts to monitor HBV titer levels in previously vaccinated IBD patients and re-vaccinate as appropriate should be reinforced.

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Category: Clinical research

The 6-minute walk test in AL amyloidosis patients: a single center case series

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Introduction: The 6-minute walk test (6MWT) has been widely used as an objective evaluation of functional exercise capacity and response to medical intervention in cardiopulmonary patients. The 6MWT is currently being used as an outcome measure in randomized controlled trials of new therapies for systemic light chain (AL) amyloidosis including the VITAL Amyloidosis phase 3 study of NEOD001, an immunoglobulin G1 antibody against amyloid fibrils. However little is known about the 6MWT in this specific patient population.

Materials and Methods: We performed a retrospective study of 120 adults with AL systemic amyloidosis (60 with cardiac involvement and 60 without cardiac involvement) who had their initial evaluation at the Amyloidosis Center at Boston University School of Medicine between 2013 and 2015. All patients were referred for the 6MWT as a measure of functional exercise capacity prior to initiation of therapy. Additional baseline assessments included New York Heart Association (NYHA) class, BNP, troponin I, left ventricular ejection fraction (LVEF), and interventricular septal end diastole thickness (IVSd).

Results: Forty-seven AL amyloidosis patients with cardiac involvement and 41 AL amyloidosis patients without cardiac involvement were included in the final analysis. The mean ages were 59 and 60 years, respectively. The 6-minute walk distances (6MWD) were 368 ± 105 meters (mean \pm SD) and 420 ± 116 meters, respectively ($p=0.03$). Among AL amyloidosis patients with cardiac involvement, the 6MWD differed significantly by NYHA classes. The mean 6MWD was 426 ± 91 meters in NYHA Class I patients ($n=16$) versus 370 ± 70 meters in NYHA Class II patients ($n=21$) versus 273 ± 125 meters in NYHA Class III patients ($n=10$) ($p<0.001$). No NYHA Class IV patients were included in the analyses, as they were too debilitated to perform the 6MWT.

Discussion and conclusion: 6MWT is a valuable tool in assessing functional exercise capacity in AL amyloidosis patients. In cardiac rehabilitation programs, an improvement of 25 meters on 6MWT is considered the minimal clinically important finding.² In this single center experience, the mean difference in the 6MWT between AL amyloidosis patients with and without cardiac involvement was 52 meters. Among the AL amyloidosis patients with cardiac involvement, 6MWD correlates with NYHA class, a validated subjective measure of functional exercise capacity.

Characteristics and 6MWT results

| Characteristic | Cardiac Involvement | No Cardiac Involvement | <i>p</i> |
|------------------------------------|----------------------------|-------------------------------|-----------------|
| n | 47 | 41 | |
| λ Light chain (%) | 40 (85) | 28 (68) | 0.06 |
| κ Light chain (%) | 7 (15) | 13 (32) | |
| Mean bone marrow plasma cell, %±SD | 16.2±14.2 | 9.3±8.7 | <0.01 |
| Mean BNP, pg/mL±SD | 695±786 | 96±176 | <0.001 |
| Mean troponin I, ng/mL±SD | 0.17±0.26 | 0.016±0.034 | <0.001 |
| Mean LVEF, %±SD | 53±13 | 63±5 | <0.001 |
| Mean IVSd, mm±SD | 14±2 | 10±2 | <0.001 |
| Mean 6MWD, m±SD | 368±105 | 420±116 | 0.03 |

Category: Education

Overview of Hormone Therapies in Transgender Adults

Qian R, Safer JD

Transgender medicine is a developing field of medicine that spans multiple subspecialties to better serve the specific needs of the transgender population, defined as individuals whose gender identity differs from the assigned sex given to them at birth based on primary sexual characteristics. This poster looks at recent guidelines published by the World Professional Association for Transgender Health (WPATH) and the Endocrine Society and provides a detailed overview of the different modalities of medical therapy available for transgender individuals interested in modifying their physical characteristics, along with safety, monitoring and other considerations for patients while undergoing treatment

Category: Clinical research

Quality of Surveillance for Esophageal Varices in Patients Diagnosed with Cirrhosis via Transient Elastography

Ringwala, Jalpan and Nunes, David

Background: To determine the adherence to guidelines for surveillance of esophageal varices in patients diagnosed with cirrhosis using Transient Elastography (TE) at Boston Medical Center.

Methods: A single-center, retrospective review conducted at a teaching hospital that serves an indigent population. All patients underwent TE from March 2014 to August 2015 and patients with a liver stiffness (LS) cutoff of less than 12.5 kPa were excluded. Appropriate surveillance endoscopy data prior to or within 1 year after TE was then assessed. Degree of LS and provider specific results were also collected.

Results: A total of 414 patients were found to have cirrhosis on TE. The overall screening endoscopy rate of these patients was 41% (170/414). In patients with LS value greater than 20 kPa the overall screening rate was 48% (108/225). Provider specific rates within the gastroenterology department ranged from 38% (22/58) to 53% (25/47). The degree of LS within the groups of 12.5 to 20.9 kPa, 21 to 40 kPa and greater than 40 kPa was assessed and the results were 35.5% (76/214), 38.5% (52/135), and 67% (41/64), respectively.

Conclusions: While these numbers likely represent an underestimate of the true surveillance rate, a large percentage of patients with cirrhosis are not receiving appropriate variceal screening. Surveillance rates improve with worsening degrees of liver stiffness. Despite these considerations, methods to improve compliance with current recommendations are needed.

Utilization of Gastroenterology Electronic Consultations in the Veteran Administration Boston Healthcare System

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Introduction: Excessive wait times and geographic location represent significant barriers for access to specialty care within Veterans Health Administration (VHA). To improve access to specialty care in Gastroenterology (GI), the VA Boston Healthcare System (VABHS) began utilizing electronic consultations (EC) in 2012. In this study, we analyzed administrative data of GI ECs to determine their requestor origin, specific formulation of each question, and characterized the specific medical issue associated with each formulated request.

Methods: Administrative data of ECs (N=364) were used to determine the rates and locations from where EC originated in fiscal years 2014 (N=42) and 2015 (N=322). The specific formulations of each EC question submitted were examined and categorized using a three-tier taxonomy matrix including a primary question category, the particular medical issue addressed, and the specific GI organ involved.

Results: The total number of EC submitted to GI at the VABHS for fiscal years 2012 to 2015 were 185, 253, 346, and 322, respectively, and face to face consultations (FTFC) were 6512, 6689, 6243, and 6216, respectively. Mean patient age was 63 years (range 23 to 96) and 90% were male. Most ECs originated from Massachusetts (89%) submitted by physicians (N=204, 56%) and 115 (32%) were from Nurse practitioners. Virtually all ECs were related to medical issues (97%). Majority of EC requested review and advice of test results (N=115, 32%); review and/or scheduling of endoscopies, outpatient clinic visits, and non-endoscopic procedures (n=81, 22%); and management of known diagnosis (N= 68, 19%). Most of the medical issues discussed were related to hepatobiliary disease (N= 108, 30%) with a focus on abnormal liver tests (N= 45/108, 41%) and hepatitis serologies (n= 29/108, 27%); cancer screening and polyp surveillance (N= 68, 19%); and on GERD/ Barrett's esophagus/esophagitis (N= 30, 8%).

Discussion: The volume of GI EC has increased in the VABHS and represents 5% of all consultation requests, well above the national average of 3%. GI ECs provide timely specialty healthcare access and they may overcome the barrier of geographical distance. No definite decrease of FTFC was observed for the duration of EC availability resulting in increased work load for GI physician staff. Most commonly, interpretation and management recommendations for abnormal laboratory, imaging, and endoscopy results are requested.

Category: Oral abstract – Clinical research

Optimizing Ultrasound Settings for B-lines on Lung Ultrasound - an In-Vitro Pilot Study

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Rationale: B-lines on lung ultrasound (US) –the hallmark of pulmonary edema– are a reverberation artifact defined as vertical hyperechoic lines from the pleura to the end of the screen moving synchronously with lung sliding. Most studies on B-lines use curvilinear probes but rarely specify any US-machine settings as it is unknown if they matter. This is the first study evaluating the impact of US-machine settings on B-line visibility.

Methods: We created a model by filling an inverted plastic cup submerged in 3.5% gelatine/0.1% soap solution with a single layer of air bubbles and a partial second layer. Once hardened, it was placed on a rocker table (1.5 rpm) to simulate respirophasic motion. With the US probe fixed above, 6-second videos were recorded starting with lung presets as baseline followed by univariably changing 32 settings using two different probes. Compared with the baseline, five blinded investigators rated the quality of the B-lines using a Likert Scale (LS) from 0 to 10.

Results: Based on an ANOVA, US-machine settings were associated with significantly different ratings and explained more than half of the total variability among ratings ($R^2=53\%$; $P<0.001$). Compared with the baseline, 34% of settings were rated as worse ($LS<4$), 16% as better ($LS>6$), and 49% as same ($LS=4-6$). Surprisingly, videos obtained with the linear probe were generally rated better. For two settings the “direction” of the rating changed (e.g. worse to better) based on probe type, indicating possible effect modification.

Conclusions: This *in vitro* pilot study suggests that US-machine settings heavily influence B-line visibility and hence recognition. To assess model generalizability, an *in vivo* replication is currently in process, and further studies to assess multivariable changes are planned.

Category: Clinical research

Improvement of liver stiffness after treatment for HCV is independent of changes in aminotransferases

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Background: Treatment of chronic Hepatitis C virus (HCV) infection with direct acting antiviral agents (DAA) results in high rates of sustained virologic response (SVR). The rate and magnitude of improvement in liver fibrosis after treatment is uncertain. The objective of this study was to compare liver stiffness before and after treatment of HCV with DAA as measured by transient elastography (TE).

Methods: We conducted a retrospective analysis of patients with HCV and had multiple liver stiffness measurements (LSM). Subjects were divided into treated (LSM before and after treatment) and un-treated groups (minimum of 1 year between LSM). Subjects at risk for low quality LSM were excluded (<10 valid LSM, <60% LSM success rate, & IQR \geq 30% of median LSM). Pre- and post-treatment LSM were compared using Wilcoxon-Signed Rank Test and Mann-Whitney U (MWU) was used to compare relative change in LSM between treated and untreated subjects. Secondary analyses included assessment of association between gender, use of ribavirin, or HCV-genotype and regression of fibrosis, and univariate linear regression to evaluate for correlation with age, initial LSM, AST/ALT, or APRI/FIB-4 scores and change in AST/ALT.

Results: 79 subjects were included, 29 treated and 50 untreated (Table 1). Treated subjects had a median decrease in LSM from baseline of 21% compared to untreated subjects who had a median increase in LSM of 2% ($p<0.001$) (Fig 1). There was also a significant decrease in liver stiffness in the treated cohort to from 11.8kPa to 9.6 kPa ($p<0.001$). A total of 15/29 patients crossed a fibrosis staging threshold and 6/12 patients no longer met criteria for cirrhosis based on liver stiffness. There was no significant association between change in liver stiffness post-treatment and age, gender, use of ribavirin, initial AST/ALT or change in AST/ALT, platelet count, or initial FIB-4/APRI score. There was an association between the log value of initial liver stiffness and relative change in fibrosis ($p=0.038$) in the treated group.

Conclusions: Treatment of HCV with DAA is associated with a statistically significant decrease in liver stiffness (approx. 2 kPa), which may be increased in those with higher pre-treatment LSM. In the treated cohort, there was no correlation between change in LSM and change in aminotransferases making decreased inflammation a less likely contributing factor in our findings. Preliminary comparison against repeated scans in an untreated HCV cohort suggests this regression may be an effect of treatment. Approximately half of the treated subjects with initial LSM suggesting cirrhosis (i.e. ≥ 12.5 kPa) regressed below this threshold. Further study is required to determine whether downstream complications of cirrhosis are reduced in this population, and under what conditions variceal and hepatocellular carcinoma screening may be safely discontinued.

Category: Oral abstract- Education research

An Innovative Approach to Teaching Residents How To Address Health Care Inequities

Ashley N. Tran, Gayatri Patel, Jennifer Siegel

Introduction: Efforts to address health care inequities at the physician level have traditionally focused on improving a provider's cultural competency. While these interventions address cultural and linguistic barriers between patients and providers, they do not always highlight the institutional and socioeconomic factors outside of the clinical encounter that deeply impact health and well being. Further, these efforts are not always based on the actual concerns of the communities served. There is a need for more innovative approaches to integrate social determinants of health curricula that are accountable to community needs into internal medicine residency programs. The objective was to improve resident physicians' knowledge of the social determinants of health and awareness of community resources that can positively impact patient health.

Methods: The participants were first-year residents in the internal medicine training program at Boston Medical Center. We developed a half-day curriculum which included a brief didactic lecture providing an overview of social determinants of health followed by a more experiential learning approach. The residents were taken on a guided walking tour of the neighborhood surrounding Boston Medical Center. Residents visited various community sites including a homeless shelter, medical respite facility, substance use treatment center, and hospital food pantry. Leaders in community health at these sites also had the opportunity to share their experiences with patient advocacy. A survey was completed by 20 residents three months post intervention. It assessed the quality and impact of the new curriculum on their existing clinical practice.

Results: Overall, feedback from participants was overwhelmingly positive. Fifty percent of residents stated that the session moderately improved their knowledge of the social determinants of health. In addition, sixty percent of residents stated that the tour increased awareness of local resources by a great extent. These changes were also reflected in a self-reported increase in the number of resident referrals to the food pantry, inpatient and outpatient substance use services, and better coordination of care when discharging patients to homeless shelters. Residents also had a better understanding of community health, and the majority felt better equipped in utilizing external resources for patient care.

Discussion: Our curriculum provided context for understanding the socioeconomic barriers facing patients on a daily basis. Residents had an improved understanding of their patients' community and awareness of the resources available to help address health care inequities. Additionally, residents could begin building community partnerships earlier in their training. This approach can be a model for other residency programs seeking to teach residents about social determinants of health.

Category: Education

Artificial Intelligence in Oncology

Nicolai, Wohns

In 2011, IBM and Quest Diagnostics partnered with Memorial Sloan Kettering Cancer Center and the Broad Institute of MIT and Harvard to bring artificial intelligence to bear on the management of cancer. IBM's Watson is an advanced question-answering computer system that is most famous for winning the quiz show *Jeopardy* in 2011. It is now being used to make treatment recommendations and connect patients with on-going clinical trials. I argue that the promise of a new revolution in care is far from reality, but that increasing use of advanced computer systems and large bio-banks indeed have the potential to advance patient care. Special care must be taken, however, regarding the ethical and legal complications of such developments.

Category: Clinical research

VE/VCO₂ is a powerful predictor of mortality in Wild-type Transthyretin Amyloidosis

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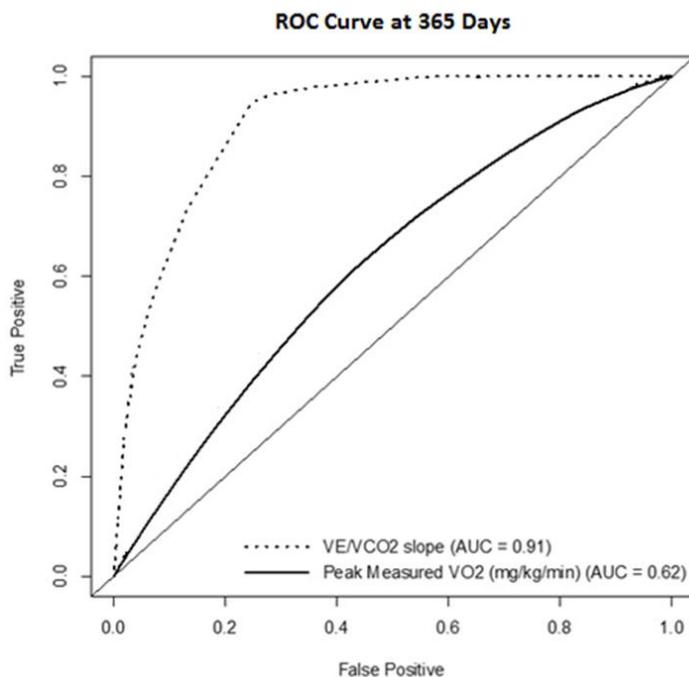
Background: Wild-type transthyretin amyloidosis (ATTRwt) results in a progressive cardiomyopathy (CMY). The utility of cardiopulmonary exercise testing (CPX) in determining prognosis in ATTRwt CMY is unknown. Given the recent emergence of novel drug therapies to treat ATTRwt, we investigated the prognostic value of VE/VCO₂ and peak VO₂ by CPX on mortality in a cohort of ATTRwt CMY patients.

Methods: Between 2005-2015, of 121 patients with biopsy and immunohistochemically proven ATTRwt, 56 were prospectively evaluated with CPX as part of a NIH ATTRwt substudy at the Boston University Amyloidosis Center.

Results: The patients were all male, predominantly white (69.9%) and elderly (75±6yrs). Univariate Cox regression analysis showed VE/VCO₂ slope and peak VO₂ were significant predictors of mortality (P < 0.05). Area under the ROC curve was greatest for VE/VCO₂ slope (**Figure 1**). Diabetes, OSA, BP, LVEF, BNP, CRP, sodium, creatinine and A-velocity were also independent predictors of mortality by univariate analysis. Only CRP [HR 1.10 (1.03-1.18)], sodium [HR 0.77 (0.59-1.01)], creatinine [HR 7.95 (2.13- 29.63)] and VE/VCO₂ [HR 1.13 (1.05-1.22)] were predictors of mortality by multivariate analysis (P < 0.05). Peak VO₂, a traditional prognostic marker in non-amyloid CMY, was insignificant in this model.

Conclusion: VE/VCO₂ slope is a powerful predictor of mortality in ATTRwt and demonstrates enhanced prognosis in a model that includes CRP, sodium and creatinine. VE/VCO₂ may be used to gauge therapy response.

Figure 1: ROC curves at 1 year for VE/VCO₂ slope versus peak VO₂



Category: Case-vignette

Central Serous Chorioretinopathy in an Ulcerative Colitis Patient with Pouchitis on Budesonide-EC

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Background: Budesonide-EC is a corticosteroid which was developed as an oral formulation with pH and time-dependent release to increase drug delivery to the ileum and colon with low systemic absorption. This drug is approved for use in mild to moderate Crohn's Disease and has been used off label in patients with pouchitis. Central Serous Chorioretinopathy (CSC) is a rare ophthalmologic disorder characterized by visual disturbance such as blurred or distorted vision and color blindness associated with use of oral corticosteroids as well as alternative routes of administration including topical, inhaled, intranasal, intra-articular and epidural injection. Here we present describe a case of CSC after treatment with Budesonide-EC.

Case: A 44-year-old man with a history of ulcerative colitis status post ileal pouch anal anastomosis complicated by pouchitis treated with budesonide-EC presented to his ophthalmologist complaining of decreased vision and foreign body sensation in his right eye for ten days. Past eye exams had been unremarkable and he denied any prior ophthalmologic symptoms. On eye exam at presentation, his right eye had decreased visual acuity, an area of sub-retinal fluid in the macula, fluid underneath the retina with single serous retinal pigment epithelial detachment. Given the exam findings and recent use of budesonide-EC, a diagnosis of acute CSC associated with budesonide-EC was made.

The patient was advised to stop the budesonide-EC immediately. He returned for follow up 6 weeks later and had considerable decrease of blurry vision in his right eye, marked resolution of sub retinal fluid with improved but persistent retinal detachment. At 13 weeks follow up, vision in his right eye was normal with correction and he had complete resolution of both sub-retinal fluid and retinal detachment.

Discussion: To our knowledge, budesonide-EC has not been associated with CSC. The rapid improvement after discontinuation of budesonide-EC supports the association between this medication and CSC in this patient. Gastroenterologists should be aware of this disorder in the setting of both budesonide-EC as well as systemic corticosteroid use. Although budesonide has substantially reduced systemic side effects, it has been associated with similar side effects as seen with systemic corticosteroids. Being cognizant of this potential adverse drug reaction may prompt physicians to discontinue corticosteroids or budesonide and refer for urgent ophthalmology consultation.