Internal Medicine Residency Program
Boston University Medical Center

Senior Resident Academic Day

May 23, 2025

Handbook of Abstracts

Table of Contents

Acknowledgement of Mentors

Carlos J Acuna-Villaorduna, MD
Sonia Ananthakrishnan, MD
Nir Ayalon, MD
Monica Ahluwalia, MD
Nicholas Bosch, MD MSc
Tony Breu, MD
Lisa Caruso, MD
Laura Chiu, MD
Maureen Dubreuil, MD
Camille V. Edwards, MD
Joseph D. Feurestein, MD – Beth Israel Deaconess Medical Center
Jessica Fetterman, PhD
Deepa Gopal, MD
Robert Helm, MD
Christopher Huang, MD
Karen Jacobson, MD
Christopher Kearney, MD
Elizabeth S Klings, MD
Garen Kroshian, MD
Amy Linsky, MD
Justin K. Lui, MD
Hiroshi Mashimo, MD, PhD
Lisa Mendelson, NP
Nicole Mushero MD, PhD
Arpan Mohanty, MD
Matthew Nayor, MD
Craig Noronha, MD
Connor O'Neill-Dee, MD
Ludwine D. Paul, MSN
Margot Rogers, MD
Matt Ronan, MD
Frederick L. Ruberg, MD
Vaisali Sanchorawala, MD
Ayelet Shapira-Daniels, MD
Pranay Sinha, MD

Katrina Steiling, MD
Umit Tapan, MD
Pedro Urena Velasquez, MD – Medicina Cardiovascular Asociado, Santo Domingo, DR
Maura Walker, PhD
Horst Christian Weber, MD
Christine Wendt, MD – University of Minnesota/ VA Minnesota
Vanessa Xanthakis, PhD

Senior Talks

‘Things We Do for No Reason’
Julian Maldonado-Alers

‘Personal Finance for New Physicians’
Kevin Savage

'Clinical Reasoning Conference: A Classic with a Twist'
Lucy Witchell

Oral Abstracts

Category: Oral abstract

Validation of ICD-10 codes for Identifying Acute Chest Syndrome in Patients with Sickle Cell Disease

Augusta K Alwang MD, Anish Vora MD, Nicholas Bosch MD MSc, Elizabeth S Klings MD

Introduction: Claims data with International Statistical Classification of Diseases, Tenth Revision (ICD-10) codes are routinely used in clinical research. Acute chest syndrome (ACS) is the 2nd most common cause of hospitalization in patients with sickle cell disease (SCD), yet our understanding of risk factors, severity classification, and the impact of supportive therapies on clinical outcomes is limited. Real-world data utilizing electronic health records offer an opportunity to study current management practices. However, ICD-10 codes to identify Acute Chest Syndrome (ACS) in patients with sickle cell disease (SCD) have yet to be validated. Our objective was to understand if ICD-10 coding was reliable in real-world datasets to correctly identify patients with SCD diagnosed with ACS.

Methods: This study identified consecutive patients 18 years of age and older listed in the patient registry of Boston Medical Center who were hospitalized between 1/1/2021 and 12/31/2022. Primary and secondary ICD-10 diagnosis codes for ACS (D57.01, D57.211, D57.411, D57.431, D57.451, D57.811). Manual chart abstraction identified patients with ACS according to the diagnostic criteria of a new infiltrate involving at least one lung segment on chest imaging, not due to atelectasis, associated with chest pain, dyspnea, fever, and signs of respiratory compromise. We calculated the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) for any (1) ACS diagnostic code and (2) Primary diagnosis of ACS. For patients, with multiple hospitalizations, each one was included in the analyses. In a sensitivity analysis, we studied only patients with hemoglobin (Hb)SS disease.

Results: 125 of 404 patients in the registry had at least one hospitalization during the study time period (542 hospitalizations). The median age was 30 years (20-67), 51% were female, and 72% had HbSS disease. Fifty-four (9%) of patients required the intensive care or step-down unit during their hospitalization. 119 (22%) hospitalizations met diagnostic criteria for ACS and 88 (16.2%) had a discharge ICD-10 diagnostic code for ACS. The presence of any ACS ICD-10 code had a sensitivity of 65.8% (95% CI 57.3-74.3%), specificity of 97.6% (95% CI 96.4-99.2%), PPV of 89.8% (95% CI 84.3-96.1% and NPV of 90.7% (95% CI 88.3-93.6%). The presence of a primary diagnosis code for ACS had a sensitivity of 55% (95% 46.2-63.9%), a specificity of 98.3% (95% CI 93.6-97.2%), a PPV of 90.4% (95% 83.6-97.2%), and a NPV of 86.5% (95% CI 85.6-91.4%). In those with HbSS disease (192 hospitalizations), the results were similar: the presence of any acute chest syndrome ICD-10 code sensitivity 68.7% (95% CI 59.5-78%), specificity 98.4% (95% CI 97-99.8%), PPV 92.9% (95% CI 87-98.9%) and NPV 91.2% (95% CI 88.1-94.2%).

Conclusions: In this single-center study, ICD-10 diagnostic codes for ACS had moderate sensitivity and high specificity, with high positive and negative predictive values. These findings suggest that ICD-10 codes for ACS in electronic health record-based datasets could be utilized to better understand ACS epidemiology and clinical outcome.

Category: Oral abstract

Association of Cardiovascular Health with Hepatic Steatosis and Fibrosis in the Framingham Heart Study

Alejandro Campos MD, Arpan Mohanty MD, Brenton Prescott MS, Tianyu Liu MS, Jintao Ma PhD, Vanessa Xanthakis PhD, Maura Walker PhD

Background: Metabolic dysfunction–associated steatotic liver disease (MASLD), metabolic and alcohol-related associated Liver Disease (MetALD), and hepatic fibrosis are increasingly prevalent liver conditions with shared behavioral and cardiometabolic risk factors. The American Heart Association's Life's Essential 8 (LE8) cardiovascular health (CVH) score offers an integrative tool to assess health behaviors and clinical factors. However, the association of LE8—and its behavioral subset, LE4—with MASLD, MetALD, and hepatic fibrosis remains understudied.

Methods: We analyzed 2,955 participants from the Framingham Heart Study who underwent vibration controlled transient elastography to assess hepatic steatosis and fibrosis. LE4 included diet, physical activity, smoking, and sleep; LE8 included LE4 plus BMI, blood pressure, blood glucose, and non-HDL cholesterol. Steatosis was defined as a controlled-attenuation parameter of ≥274 dB/min in VCTE. MASLD was defined as steatosis with ≥1 cardiometabolic risk factor and mild alcohol intake (<140 g/week for women or <210 g/week for men) and MetALD was defined as steatosis with ≥1 cardiometabolic risk factor, but with moderate alcohol intake (140–350 g/week for women or 210–420 g/week for men). Hepatic fibrosis was defined as liver stiffness ≥8.0 kPa by VCTE. Multivariable logistic regression models adjusted for demographic and clinical covariates were used to examine associations, with genetic risk score (GRS) and alcohol intake tested as effect modifiers.

Results: Each 10-point increase in LE4 was associated with lower odds of MASLD (OR 0.87; 95% CI: 0.81–0.92; $p < 0.001$), driven by higher diet, nicotine, and physical activity scores. LE4 was not associated with MetALD overall, but GRS significantly modified this relationship ($p<0.0001$). Higher LE8 was associated with reduced odds of fibrosis (OR 0.83; 95% CI: 0.78–0.88; $p < 0.001$), mainly driven by higher scores in diabetes, BMI, blood pressure, and physical activity, with no effect modification by GRS or alcohol intake.

Conclusions: Better cardiovascular health, particularly behavioral factors, is associated with lower odds of MASLD and hepatic fibrosis. Genetic predisposition may amplify the protective effects of CVH in individuals with MetALD.

Category: Oral abstract

Novel Heart Failure Stages Incorporating Cardiorespiratory Fitness are Differentially Associated with Heart Failure Risk in the Community

Danielle Davis, MD[1], Priya Gajjar, MS[2], Vanessa Xanthakis, PhD[2,4], Donald Lloyd-Jones, MD[2,3,4], Matthew Nayor, MD, MPH[2,3,4]

1. Department of Medicine, Boston Medical Center, Boston University Chobanian & Avedisian School of Medicine, Boston, Massachusetts, USA
2. Preventive Medicine and Epidemiology Section, Department of Medicine, Boston University Chobanian & Avedisian School of Medicine, Boston, Massachusetts, USA
3. Cardiovascular Medicine Section, Department of Medicine, Boston Medical Center, Boston University Chobanian & Avedisian School of Medicine, Boston, Massachusetts, USA
4. Framingham Heart Study, Framingham, MA

Background: Heart failure (HF) progresses through stages as depicted by the AHA/ACC/HFSA guidelines. These stages advance from the presence of risk factors (stage A), to asymptomatic structural heart disease, elevated filling pressures, or abnormal biomarkers (stage B), to clinical HF (stage C). However, even among individuals classified as having the highest pre-clinical risk (stage B), the majority do not progress to clinical HF. This highlights the need to identify new risk factors to refine preclinical HF phenotypes. Impaired cardiorespiratory fitness (CRF) is a powerful predictor of HF risk but is not currently considered in HF staging. Accordingly, we hypothesized that HF substages incorporating CRF would be differentially associated with HF risk.

Methods: We investigated Framingham Heart Study participants with submaximal exercise testing (up to Bruce protocol stage 2) at a routine exam. CRF was estimated based on stage 2 heart rate, weight, age, sex, treadmill grade, and velocity. We evaluated the association of HF substages (categorized by CRF above vs. below sex-specific median) with incident HF using Cox models adjusted for age and sex.

Results: Our sample included 1683 individuals, 55% women, mean age 58±8 yrs, with estimated CRF 35±3mL/kg/min in women and 40±4mL/kg/min in men. A total of 522 individuals (31%) were classified as having no HF risk factors ("healthy"; stage H), 693 (41%) as stage A, and 468 (28%) as stage B. Over a median follow up of 20 years, 99 incident HF events occurred. Stage B participants with estimated CRF above the median did not have a significantly higher risk of HF compared to stage H participants, but those with stage B and low CRF had an over 2.5-fold higher risk of HF (hazard ratio [HR] 2.75, 95% CI 1.50-5.07, P<0.01). Among stage B participants, every 1-SD higher CRF was associated with lower HF risk (HR 0.57, 95% CI 0.43-0.76, P<0.001). We did not observe an association of CRF with incident HF among individuals categorized as stage A.

Conclusion: Incorporating CRF into HF staging criteria may improve risk assessment and facilitate precision targeting of preventive therapies, especially among individuals classified as stage B HF.

Category: Clinical research- Oral abstracts

Rifampin versus Isoniazid completion rate for Tuberculosis Infection: A 6-year Experience at a Safety-Net Clinic

Maria F Martins[1,2], Juan M Teran Plasencia[3], Karen R Jacobson[1,4], Tara C Bouton[1,4], Katrina E Traber[1,5], Michelle Canning[1,6], Daniel L Bourque[1,4], Vishakha Sabharwal[1,7], Robert Michaud[1], Pranay Sinha[1,4], and Carlos J Acuña-Villaorduña[1,4]

1 Boston Medical Center, Boston
2 Section of Internal Medicine, Boston University Chobanian & Avedisian School of Medicine
3 Section of Infectious Diseases, University of Nebraska Medical Center, Lincoln, NE
4 Section of Infectious Diseases, Boston University Chobanian & Avedisian School of Medicine
5 Section of Pulmonary and Critical Care Medicine, Boston University Chobanian & Avedisian School of Medicine
6 Boston Public Health Commission
7 Section of Pediatrics, Boston University Chobanian & Avedisian School of Medicine

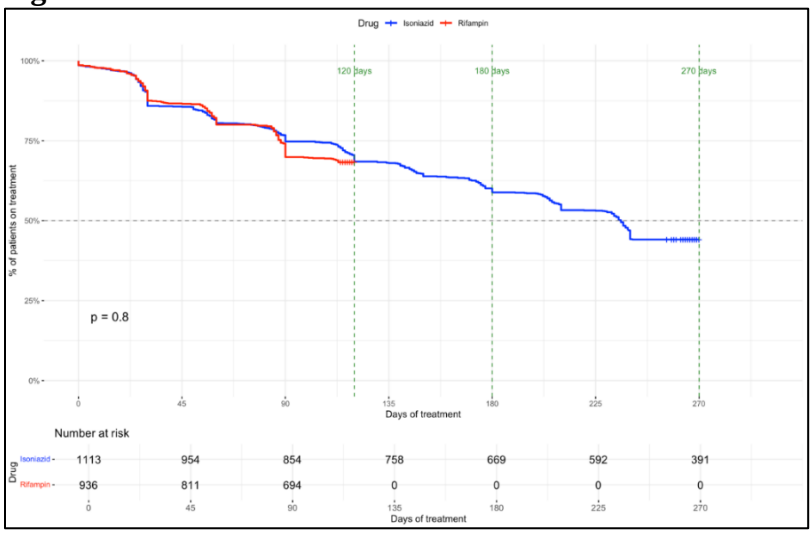
BACKGROUND: Treatment of tuberculosis infection (TBI) is a crucial component of tuberculosis (TB) elimination in the United States (US).

METHODS: We conducted a retrospective cohort analysis of patients treated for TBI with 4 months of rifampin (4R) or 9 months of isoniazid (9H) from May 2015 to September 2021. A multivariable logistic regression was performed to compare treatment completion for those treated with 4R compared to 9H.

RESULTS: A total of 2,049 patients with a median age of 40.8 years (IQR 22.4) were treated for TBI. Of these, 936 (45.7%) received 4R and 1,113 (54.3%) received 9H. A greater proportion of patients completed 4R compared to 9H: 639 (68.3%) versus 491 (44.1%), respectively ($p < 0.001$). After adjusting for age, sex, comorbidities, immunosuppression, time since immigration, and place of birth; 4R was associated with a more than two-fold higher odds of treatment completion (adjusted odds ratio: 2.85; confidence interval: 2.35-3.47; $p < 0.001$). A Kaplan-Meier curve showed similar rates of treatment discontinuation over time between both regimens during the first 4 months of treatment.

CONCLUSION: The completion rates for 4R are higher than those for 9H, largely due to the shorter treatment duration. Shorter treatment regimens can help increase tuberculosis treatment completion rates.

Figure 1. Rate of Treatment Discontinuation over Time for Rifampin versus Isoniazid



Category: Oral abstract

Factors contributing to disparities in opioid use in cancer patients at a safety net hospital

John F. Murphy M.D.[1], Sarika Gurnani M.D.[1], Jessica Zambuto[3], Vidriana Catanzaro[3], Janice Weinberg ScD[3], William Vincent PharmD, BCCCP [4], Bob Michaud[5], Umit Tapan M.D.[6], & Lisa Caruso M.D.[1]

[1]Department of Medicine, Boston University Chobanian & Avedisian School of Medicine, and Boston Medical Center
[2]Boston University Chobanian & Avedisian School of Medicine
[3]Department of Biostatistics, Boston University School of Public Health
[4]Department of Pharmacy, Boston Medical Center
[5] Department of Information Technology Services, Analytics and Public Reporting, Boston Medical Center
[6]Section of Hematology & Medical Oncology, Boston University Chobanian & Avedisian School of Medicine, and Boston Medical Center

Objectives: The purpose of this study is to identify factors associated with disparities in inpatient PRN opioid use in cancer patients at Boston Medical Center.

Methods: We conducted a retrospective chart review on cancer patients admitted to resident-led general medicine and sub-specialty teams at BMC from 6/1/23 to 11/30/23. We collected demographic, hospitalization, and medical predictor variables to assess their relationship to outcomes in opioid use. Primary outcomes were PRN opioid availability, PRN opioid receipt, dose of PRN opioid available, and ratio of amount of PRN opioid received from available.

Results: Patients with palliative care consultation had over ten times the odds of having a PRN opioid available. Patients older than 75 years old had 33% lower PRN doses available to them. Patients located on Menino 6 East had 50% lower PRN doses available to them than patients located elsewhere in the hospital. Patients with higher average pain scores had higher doses of PRN opioids available, received a higher ratio of available PRNs, and were more likely to have a PRN available and receive a PRN opioid. There were no other significant differences in opioid use among the other predictor variables.

Discussion: Our study suggests that older cancer patients and patients admitted to our cancer unit face disparities in PRN opioid use, while palliative care consultation leads to increased PRN opioid availability. Future studies should include a larger patient population and focus on cancer pain specifically.

Category: Oral abstract

Facilitators and Barriers to Postmortem Organ Donation for Research Biobanking Among Historically Marginalized Racial and Ethnic Groups: A Systematic Review

Camilo Toro, MD, Oseiwe B. Eromosele, MD, David B. Flynn, MS, Andrew A. Wilson, MD, Darrell N. Kotton, MD, Timothy M. Hughes, PhD, Jesse Moreira-Bouchard, PhD, Wendy S. Post, MD, MS, Alain Bertoni, MD, MPH, Emelia J. Benjamin, MD, Deepa M. Gopal, MD, MS, MD, Jessica L. Fetterman, PhD

Importance: Research biobanks of human cells and tissues, particularly of tissues only accessible postmortem, are crucial for advancing our understanding of human pathophysiology. Research biobanks are bereft of tissues from diverse study participants, thus, limiting the generalizability of biobank findings.

Objective: Understanding the factors related to participation in postmortem organ donation is imperative to building tissue biobanks that better reflect the diversity of the population. We set out to conduct a systematic review on the barriers and facilitators to postmortem organ donation among historically marginalized groups.

Evidence Review: Consulting a medical librarian, we searched the published literature in PubMed, Embase, Web of Science, and PsycINFO using controlled vocabulary terms. We excluded studies in which organ donation was not for research, studies examining pediatric organ donation, narratives or perspectives, and studies that did not examine attitudes or beliefs toward organ donation. Two authors independently coded and performed a thematic synthesis of eligible studies.

Findings: Eighteen studies were included, most of which were restricted to studies evaluating perceptions, attitudes, and beliefs among Black/African American and Hispanic/Latiné individuals towards postmortem brain donation (N=16). We identified five themes that informed the decision to donate: information and misconceptions, mistrust, family involvement, religious and cultural beliefs, and altruism. Mistrust and religious and cultural beliefs were largely barriers to considering organ donation. Misconceptions about organ donation were common, particularly regarding the process involved in donation and purpose of biospecimens for research. However, addressing misconceptions and providing culturally relevant education on organ donation often overcame concerns about postmortem organ donation. Family involvement was both a barrier and a facilitator. Participants expressed concerns of discussing organ donation with family and that their ultimate wishes may not be honored. However, most participants suggested early family engagement in shared decision-making would promote consent. Altruism, particularly the understanding that organ donation would benefit the participants' community, was a facilitator to participation.

Conclusions and Relevance: Longitudinal and culturally sensitive programs for biobanking should address prospective participants' concerns about organ donation, misconceptions about the donation process, and engage family members in shared decision-making to increase participation of individuals from underrepresented groups in research biobanks.

Category: Oral abstracts

"I don't appreciate the confidence comments" - Resident Survey on Perspectives in Confidence-based Feedback

Maxwell Uetz MD, Craig Noronha MD, Olivia Colman MPH, Sonia Ananthakrishnan MD

Background: In resident education, "confidence" is one point of feedback, yet its frequency of use and emotional implications are unclear.

Objective: This study aims to provide a resident perspective on "confidence"-based feedback examining how residents perceive this feedback.

Methods: In July 2023, an eight-question survey was administered obtaining quantitative and descriptive data regarding resident experiences receiving "confidence"-based feedback to all Internal Medicine residents at Boston University Medical Center. Residents were asked a series of self-identified demographic data questions. Survey respondents were asked if they have received "confidence"-based feedback, the emotional impact of this feedback, what was the role of the feedback giver, as well as two open-ended questions regarding the role of confidence in feedback and training.

Results: The survey had a 47% (65/137) completion rate, with the study population having similar demographics to nation-wide statistics. 70% (48/69) of respondents received "confidence"-based feedback during their training, most of the time coming from attending physicians. Compared to men, women were both more likely to receive this type of feedback and have a negative emotional impact from the feedback. Asian and Black identifying respondents were less likely to receive "confidence"-based feedback yet those that did had a more negative emotional impact compared to White identifying respondents.

Conclusions: This novel survey demonstrated that most residents received feedback about their "confidence", and differences across gender and race/ethnicity highlight the need to reconsider educator utilization of "confidence" as a feedback point. Institutions should work on faculty development in this area to limit bias in feedback

Category: Oral abstract

Differential Association of Transthyretin Kinetic Stability With Variant and Wild-Type Transthyretin Cardiac Amyloidosis (ATTR-CM): The SCAN-MP Study

Manuel Urina Jassir[1], Sergio Teruya[2], Denise Fine[3], Natalia Sabogal[3], Stephen Helmke[2], Carlos Rodriguez[2], Felix J. Tsai[4], Tatiana Prokaeva[5], Rachel H. Foster[5], Brian H. Spencer[5], Jeffery W. Kelly[4], Mathew S. Maurer[2], Frederick L. Ruberg[3,5]

[1]Department of Medicine, Boston University Chobanian & Avedisian School of Medicine and Boston Medical Center, Boston, Massachusetts, USA

[2]Section of Cardiovascular Medicine, Department of Medicine, Columbia University Irving Medical Centre, New York, New York, USA

[3] Section of Cardiovascular Medicine, Department of Medicine, Boston University Chobanian & Avedisian School of Medicine and Boston Medical Center, Boston, Massachusetts, USA

[4]Departments of Chemistry and Molecular Medicine, Scripps Research Institute, La Jolla, California

[5]Amyloidosis Center, Boston University Chobanian & Avedisian School of Medicine, Boston, Massachusetts, USA

Background: Transthyretin (TTR) protein tetramer dissociation is rate-limiting for amyloidogenesis in TTR amyloid cardiomyopathy (ATTR-CM). Quantifying TTR instability reflected by hastened tetramer subunit exchange could become a novel biomarker for ATTR-CM identification and afford insight into pathogenesis.

Methods: Utilizing plasma samples from the Screening for Cardiac Amyloidosis with Nuclear Imaging in Minority Populations (SCAN-MP) study, we assessed TTR stability measured by subunit exchange (K_{ex}) rates, with higher rates indicating more unstable TTR. *TTR* genotype was determined by PCR, and ATTR-CM was established by nuclear imaging (PYP scan). Differences between groups were determined by pairwise comparison analysis ($p < 0.05$).

Results: Eighty-nine subjects were included. They were classified as 11 V122I variant carriers without ATTR-CM, 11 wild-type ATTR-CM (ATTRwt-CM), 7 V122I variant ATTR-CM (ATTRv-CM), and 60 non-amyloid, *TTR* wild-type controls. A normal range for K_{ex} was established using data from controls ($0.007 – 0.023\ h^{-1}$). K_{ex} was significantly higher in V122I carriers ($0.025 \pm 0.006\ h^{-1}$ vs $0.015 \pm 0.004\ h^{-1}$; $p < 0.0001$) and V122I ATTRv-CM ($0.021 \pm 0.005\ h^{-1}$ vs $0.015 \pm 0.004\ h^{-1}$; $p = 0.006$) than in controls. TTR was more unstable in V122I carriers and ATTRv-CM when compared to ATTRwt-CM ($0.016 \pm 0.003\ h^{-1}$). TTR levels were lower in ATTRv-CM than in ATTRwt-CM ($p = 0.0021$). No differences in K_{ex} were seen between ATTRwt-CM and controls. All ATTRwt-CM cases had normal TTR stability (**Table 1**).

Conclusions: Our findings suggest that TTR instability may contribute differently to the pathogenesis of variant V122I and ATTRwt-CM. The differential association of stability measures and *TTR* genotype merits further investigation.

Table 1:

Table 1. Baseline characteristics and transthyretin stability according to transthyretin genetic analysis and PYP scan.

	Classification according to TTR genetic analysis and PYP result[1]				
	Non-amyloid HF (n=60)	**ATTRwt-CM (n = 11)**	**V122I carrier (n = 11)**	**ATTRv-CM (n = 7)**	***P value***
Age (years)	77 (66.5-83.5)	83 (79-91)	66 (64-77)	82 (74-85)	***0.0074 - ****
Female – n (%)	23 (38.3)	4 (36.4)	6 (54.6)	2 (28.6)	0.7031
Black – n (%)	43 (71.7)	11 (100)	10 (90.9)	7 (100)	0.5021
Hispanic – n (%)	18 (30)	1 (9.1)	1 (9.1)	1 (14.3)	0.321
BMI (kg/m^2)	30.7 (27.2-35.8)	27.5 (25.3-31.4)	25.9 (24.3-28.7)	28.3 (25.8-30.3)	0.0543
NYHA class – n (%)					***0.0016***
I	7 (11.7)	1 (9.1)	7 (63.6)	0 (0)	
II	36 (60)	7 (63.6)	4 (36.4)	3 (42.9)	
III	17 (28.3)	3 (27.3)	0 (0)	3 (42.9)	
IV	0 (0)	0 (0)	0 (0)	1 (14.3)	
EF (%)	60 (53-65)	61 (50-65)	61 (55-69)	52 (34-56)	0.0762
eGFR (ml/min/1.73m^2)	48.6 (34-64.9)	47.3 (36.4-51.6)	64.9 (46.6-78.2)	45.1 (24.9-71.4)	0.3246
TTR (mg/dL)					***<0.0001 - ^***
Mean ± SD	25 ± 6.5	23 ± 5	19.4 ± 5.9	12 ± 5.2	
Median (IQR)	25 (21- 28.5)	24 (20-25)	20 (17-22)	12 (8-17)	
RBP4 (µM)	3.1 (2.4-3.7)	2.7 (2.1-3.5)	2.3 (2.2-2.9)	2.1 (1.9-2.9)	***0.0145***
TTR stability (K_{ex}) – h^{-1}					***<0.0001 - ****
Mean ± SD	0.015 ± 0.004	0.016 ± 0.003	0.025 ± 0.006	0.021 ± 0.005	
Median (IQR)	0.015 (0.012 - 0.018)	0.016 (0.014 – 0.016)	0.024 (0.022 -0.027)	0.021 (0.017 -0.026)	
Instability groups[2] - n (%)					
Low	1 (1.7)	0 (0)	0 (0)	0 (0)	
Normal	57 (95)	11 (100)	4 (36.4)	4 (57.1)	
High	2 (3.3)	0 (0)	7 (63.6)	3 (42.9)	

[1]Classified into non-amyloid HF (normal TTR gene testing and no ATTR); ATTRwt-CM (normal TTR gene testing and ATTR), V122I carrier (positive gene testing for V122I and no ATTR); ATTRv-CM (positive gene testing for V122I and ATTR).

[2]Instability levels were classified as follows: Low (K_{ex} <0.007), Normal (K_{ex} 0.007 – 0.023), and High (K_{ex} >0.023)

*Indicate statistically significant difference ($p<0.05$) between ATTRwt-CM and V122I carriers in pairwise comparison analysis.

^Indicate statistically significant difference ($p<0.05$) between ATTRwt-CM and V122I ATTRv-CM in pairwise comparison analysis.

All values are reported in median (IQR) unless otherwise indicated.

Abbreviations: ATTR-CM**:** transthyretin amyloid cardiomyopathy; ATTRv-CM: variant ATTR-CM; ATTRwt-CM: wild type ATTR-CM; EF: ejection fraction; eGFR: estimated glomerular filtration rate; NYHA: New York Heart Association; RBP4: retinol-binding protein 4

Poster Presentations

Category: Education / Quality Improvement

Drip Admission System at the VA West Roxbury

Alexander Braun MD; Tony Breu, MD; Matt Ronan, MD

Introduction: BMC internal medicine residents frequently rotate through the general medicine wards teams, labeled alpha through echo. For many years, admissions to the medicine service were assigned to a team using a rotating short call-long call admissions system. Each day, 2-3 teams are on short call, receiving admissions from the night team and admitting new patients in the morning, while the other 2-3 teams are on long call and admit patients in the afternoon. This system is designed for resident wellness, allowing short call teams to leave the hospital before evening sign out. However, this system also leads to multiple admissions (up to 6) in a short time for long call teams in the afternoon. This results in unsafe, rushed admissions and residents staying past 7PM sign-out to complete admissions. To address this problem, a drip admission system was established where admissions are rotated between medicine teams to avoid multiple admissions for any one team in the late afternoon.

Methods: To maintain regionalization for teams alpha-delta, two parallel drips were created, one system with Alpha, Bravo, and Echo, and another with Charlie, Delta, and Echo. Team Foxtrot (an NP led team) was also included in the alpha/brave/echo drip. To ensure team balance, Echo received every 6th admission in each drip. This system was initiated in January 2025 and has continued since that time. Two months of admissions data from before and two months of admissions data from after the drip transition were analyzed in Microsoft Excel to determine the effects of the new system.

Results: The number of week day afternoons where a single general medicine floor team admitted more than 2 patients after 2PM decreased from 26 to 1 from pre- to post-drip transition. The number of admissions was close to even between the 5 general medicine floor teams, with alpha and delta slightly higher than Charlie, Delta, and Echo. A survey was distributed to residents to assess resident satisfaction with the new system.

Conclusion: The drip system nearly eliminated multiple week day afternoon admissions for the general medicine teams at the West Roxbury VA Medical Center. This is likely to allow residents adequate time for medical decision making and medicine reconciliation, improving patient care. The majority of residents surveyed consider the drip system an improvement over the long-call, short-call system. There remain several limitations to the drip systems. First, regionalization leads to efficient patient care, but requires two parallel drips. This can undermine the drip system, especially if any team reaches the patient cap of 18 and is no longer able to accept patient. Second, the drip is ineffective on the weekend. 3 of the 5 teams do not receive daytime admissions on weekend days, with the remaining 2 teams able to receive up to 8 admissions each.

Category: Education

Inhaled Epoprostenol for Management of Acute Respiratory Failure and Pulmonary Vascular Disease

Daniel Connelly, MD, Jessica Delahanty, MD, Shyam Patel, PharmD, BCCCP,[2] Kimberly A. Ackerbauer, PharmD, BCCCP, Nicholas A. Bosch, MD, MSc, Elizabeth S. Klings, MD, Justin K. Lui, MD, MS

Inhaled epoprostenol has remained an attractive and viable option for the delivery of prostacyclin to offset abnormalities in ventilation and perfusion mismatch while minimizing the typical adverse effects associated with systemic administration. To date, there is a need to better understand pharmacologic properties of inhaled epoprostenol as well as its application to diseases affecting the cardiopulmonary system. The goal of this review is to provide an overview of inhaled epoprostenol and outline its use specifically in the medical management of acute respiratory failure and pulmonary vascular disease. Among patients with acute respiratory distress syndrome who ultimately required invasive ventilation, inhaled epoprostenol has not improved ventilator-free days, intensive care unit length of stay, or mortality. However, it may be beneficial in certain select patient populations. In the management of pulmonary hypertension, inhaled epoprostenol has allowed for continued maintenance of chronic pulmonary arterial hypertension-specific therapy and for improving right ventricular function as an attractive option in the critical care management of pulmonary hypertension.

Category: Clinical vignette

Breaking the Norm(ocytic): An Elusive Case of Anemia
Rachel Eddy

Learning Objectives:
1. Recognize the appropriate laboratory workup to make the diagnosis of B12 deficiency and pernicious anemia
2. Describe some of the ways in which B12 deficiency can mimic or be obscured by other anemia etiologies.

Case:
A 36-year-old man with no known past medical history presented to the emergency room for non-bloody non-bilious emesis x 1 month, abdominal pain, and a ten pound weight loss without melena or hematochezia. His vital signs were within normal limits and his abdomen was soft, nontender and nondistended. His Hg was 7.9 (12.4 four months prior) with MCV 93. He was determined to have likely gastro-enteritis and instructed to follow-up with PCP. He returns to outpatient care with persistent symptoms. Due to precipitous Hg drop and weight loss, urgent endoscopy and colonoscopy is scheduled. Meanwhile, labs from visit reveal ferritin 256, iron 101, tsat 47%. EGD is negative for h.pylori but shows chronic inactive gastritis; colonoscopy is unremarkable. On repeat blood work Hg is 6.7, platelets 114, and he is referred to ED for admission. He receives 1 unit of PRBCs. Peripheral smear shows schistocytes, tear drop cells and hyper segmented neutrophils. LDH is 5705, haptoglobin is undetectable, total bilirubin is normal, reticulocyte index 0.18, and platelets decrease to 102. Additional labs results include: normal folate, B12 154 (lower reference range 213), methylmalonic acid 12,974. Gastric Parietal Cell Ab is negative, anti-Intrinsic Factor is positive. He is diagnosed with pernicious anemia and started on B12 1000mg injections with subsequent improvement in his symptoms and anemia.

Impact/Discussion:
Pernicious anemia, the hematologic consequence of chronic autoimmune gastritis, can be elusive. The patient did not present with classic neuropsychiatric symptoms, and his gastrointestinal complaints along with normocytic anemia led the clinician to anchor onto occult gastrointestinal bleed for which colonoscopy and endoscopy were ordered. Although the MCV is a diagnostic differentiating tool, clinicians should be mindful of the fact that if multiple processes leading to anemia are occurring, the MCV may be altered. It is important to maintain a broad differential in the workup of anemia and consider ordering a B12 and folate level regardless of MCV.

Assays for B12 are variable between laboratories and can cause false positives and negatives. In patients with suspicion for B12 deficiency and low-normal values, clinicians should check both methylmalonic acid and total homocysteine. Patients with B12 deficiency without an obvious dietary or other malabsorptive etiology should be tested for pernicious anemia by checking both anti-intrinsic factor and gastric parietal cell antibodies.

Other labs can be abnormal in B12 deficiency. In rare cases, ineffective erythropoiesis due to B12 deficiency can result in intramedullary hemolysis and release of lactate dehydrogenase with low haptoglobin. This, in conjunction with the thrombocytopenia that sometimes occurs, can mimick a microangiopathic hemolytic anemia such as TTP with schistocytes seen on peripheral smear. They key distinguisher is the reticulocyte count, which will be low in B12 deficiency but elevated in MAHA.

Category: Clinical quality improvement

A Standardized Approach to Identifying and Addressing Health-Related Social Needs in Oncology Through Universal Patient Navigation

Robert Fain, Erin Rosenberg, Erica Christenson, Debi Amburgey, Julia Vance, Pablo Buitron De La Vega, Alyssa Georgantas, Abigail Haugen, Marina Perez, Katrina Steiling

Statement of Problem: Prior studies have established that addressing health related social needs (HRSN) impacts cancer outcomes. Patient navigation improves timely cancer care by assisting patients in overcoming barriers to accessing health care. Comprehensive workflow assessments across four key cancer types (breast, lung, head and neck, gastrointestinal) at Boston Medical Center (BMC) and collaboration with institutional and community partners identified a lack of uniformity in screening and management of HRSNs in cancer care.

Description of Intervention: The Oncology Equity Alliance (OEA) and BMC Cancer Center co-designed a standardized HRSN assessment workflow policy that uses the THRIVE screening tool and extends professional patient navigation (PN) services to every newly diagnosed patient in the Cancer Center. Process and operational outcomes included the number of Cancer Center patients that PNs attempted to contact prior to their first Cancer Center appointment, number of patients who completed a THRIVE questionnaire by the time of their first cancer center appointment, number of patients with health-related social needs identified during screening, and the number of patients who received resources prior to their first Cancer Center appointment. Quantitative and qualitative evaluation of the implementation of this universal HRSN screening workflow policy is planned. Assessments of the acceptability, reach, and adoption of the intervention will include phone surveys to evaluate patient perspectives on barriers, resource utilization, and experience, as well as qualitative interviews of Cancer Center staff and patient navigators.

Results: The universal THRIVE screening workflow policy was implemented in the BMC Cancer Center on November 18, 2024. Between implementation and February 2025, BMC intake patient navigators have reached out to 305 newly diagnosed patients. A total of 197 HRSN screenings using THRIVE were completed (64%). Housing insecurity, lack of transportation, and food insecurity were the most common HRSNs identified among patients newly diagnosed with cancer. 115 patients (58%) were provided with resources to address unmet social needs identified on THRIVE before their first appointment. In the coming year, the research team will evaluate implementation outcomes by conducting surveys and interviews with patients and patient navigators to understand the acceptability, feasibility, and impact of the intervention and highlight areas for program improvement.

Discussion: Institutional and community stakeholder partnerships combined with comprehensive workflow assessment in key cancer disease areas identified a gap in patient navigation policy limiting the reach and effectiveness of HRSN screening. Co-design of a new Cancer Center workflow policy leveraging the THRIVE screener has enabled proactive identification of health-related social needs and referral to community-based resources prior to a patient's first cancer care appointment. Findings will inform future strategies for optimizing HRSN identification and intervention in oncology care.

Category: Clinical research

Abnormal global longitudinal strain correlates with amyloidogenic light chain-induced myocardial toxicity in patients without significant amyloid fibril deposition

Grace M. Ferri[1], Josue Villegas Galaviz[1,2], Tinuola B. Ajayi[1], Richard Giadone[3], George J. Murphy[3], Andrew Staron[1], Vaishali Sanchorawala[1], Frederick L. Ruberg[1,2], and Camille V. Edwards[1,3]

[1]Amyloidosis Center, Boston University Chobanian & Avedisian School of Medicine, Boston, MA, USA
[2]Section of Cardiovascular Medicine, Department of Medicine, Boston University Chobanian & Avedisian School of Medicine and Boston Medical Center, Boston, MA, USA
[3]Center for Regenerative Medicine, Boston University Chobanian & Avedisian School of Medicine, Boston, MA, USA

Introduction: Cardiac dysfunction in light-chain amyloidosis (ALA) is caused by direct myocardial toxicity from amyloidogenic light chains (LC) and architectural distortion from amyloid fibril deposition. When amyloidogenic LC aggregate into amyloid fibrils and accumulate, organ dysfunction develops. Patients with cardiac dysfunction face poor outcomes since existing treatment modalities cannot target deposited amyloid. If cardiac ALA could be identified at the LC toxicity stage, therapies could be initiated early to prevent irreversible cardiac damage from amyloid fibril deposition.

At the molecular level, studies have shown that cardiac cells exposed to amyloidogenic LC exhibit dysregulated myocardial contractility. In clinical practice, global longitudinal strain (GLS) represents a sensitive echocardiographic measure of myocardial contractility. Since LC-induced dysfunction precedes amyloid fibril deposition and should be reversible with plasma cell-directed therapy, we sought to identify and define the entity of LC-induced cardiac dysfunction among those with no clinical or echocardiographic evidence of cardiac amyloid fibril deposition.

Methods: We analyzed clinical features of patients with non-cardiac biopsy-proven ALA seen at the Boston University Amyloidosis Center between January 1, 2011 and March 31, 2023. Direct LC-induced cardiac dysfunction and meeting the following criteria: (1) elevated cardiac biomarkers (BNP >176 pg/mL or NT-proBNP >899 pg/mL or troponin I >0.033 ng/mL, per institutional reference ranges); (2) normal echocardiographic interventricular septal thickness (<11 mm in males and <10 mm in females); (3) estimated glomerular filtration rate >60 mL/min/1.73m ^{2}; (4) absence of late gadolinium enhancement on cardiac magnetic resonance imaging (if performed); and (5) negative endomyocardial biopsy (if performed). Echocardiographic variables were collected from the electronic health record or post-processed manually using TomTec 2D CPA. Analyses were performed in GraphPad Prism version 8©.

Results: Twenty-nine patients met our criteria for direct LC-induced cardiac dysfunction. Of these patients, 76% (n=22) of patients met criteria for Boston University stage II cardiac disease with mildly elevated cardiac biomarkers (median BNP 237 pg/mL, median troponin I 0.053 ng/mL). Among 16 patients for whom GLS was available, 81% (13/16) had abnormal GLS (normal < -18%).

Conclusion: Patients with ALA can exhibit cardiac dysfunction without substantial clinical or echocardiographic evidence of amyloid deposition. We postulate that this cohort represents the novel entity of LC-induced cardiac dysfunction in AL amyloidosis and can be identified in clinical practice by abnormal GLS.

Category: Clinical research

Risk of Hip and Spine Fractures in Axial Spondyloarthritis is Associated with Treatment Class

Driscoll D[1], George N[2], Peloquin C[1], Jafarzadeh SR[1], Liew JW[1], Dubreuil M[1,3]

[1]Section of Rheumatology, Department of Medicine, Boston University Chobanian & Avedisian School of Medicine, Boston, Massachusetts, USA; [2]Section of Internal Medicine, Department of Medicine, Boston University Chobanian & Avedisian School of Medicine, Boston, Massachusetts, USA; [3]VA Boston Healthcare System, Boston, Massachusetts, USA.

Introduction/Aims: Individuals with axial spondyloarthritis (axSpA) have a risk of fracture that is nearly doubled that of the general population, and possibly related to chronic inflammation [1]. Vertebral fracture risk may be due to regional osteopenia paired with regions of excess bone stiffness [2]. We assessed the impact of treatment with tumor necrosis factor inhibitors (TNFi) and non-biologic disease-modifying antirheumatic drugs (DMARDs) on hip and spine fractures in axSpA, relative to nonsteroidal anti-inflammatory drugs (NSAIDs).

Materials and Methods: We conducted a nested case-control study using 2006-2021 data from the US-based Merative™ MarketScan® Database (**Figure 1**). We included adults 18-65 years old with ≥1 inpatient or ≥2 outpatient axSpA ICD-9 or 10 diagnosis codes separated by ≥7 days. The primary outcome was hip and/or spine fracture, defined by ICD-9 or 10 diagnosis or procedure codes. For each fracture case, we selected up to 10 controls without fracture. We evaluated medication use (TNFi, DMARDs, NSAIDs [referent], or none) hierarchically using pharmacy claims and procedure codes (for infusions). We assessed the relation of medication use with hip and spine fracture risk using unconditional logistic regression with adjustment for potential confounders.

Results: Our main analysis included 13,519 individuals with axSpA, comprising 1,229 cases and 12,290 controls. The outcome of hip or spine fracture was present in 9.1% of the study sample. Among fracture cases 25.1% were TNFi users, 9.4% were DMARD users, 17.9% were NSAID users and 27.6% were not on any medication. Individuals on TNFi had 29% lower odds of fracture compared to those on NSAIDs (OR 0.71, 95% CI 0.59-0.85), accounting for age, sex, and diagnosis year (**Figure 2**). Results for TNFi were similar in the fully adjusted model (OR 0.75, 95% CI 0.62-0.91) and when stratified by sex. There was no protective effect of DMARDs.

Conclusion: Using a large US insurance claims database, we observed a protective effect of TNFi on fracture risk in axSpA compared with use of NSAIDs or DMARDs. These findings suggest a beneficial effect of TNFi in bone remodeling in axSpA. By slowing local bone modeling within the axial spine and decreasing systemic inflammation with TNFi use, both bone density and architecture may be preserved, thus lowering risk for vertebral fractures [3]. Further research investigating the impact of timing of TNFi initiation and alternative axSpA treatment modalities such as IL-17 inhibitors and Janus Kinase (JAK) inhibitors, on fracture risk in axSpA will further enhance our understanding of how fracture risk may be mitigated in this population.

References

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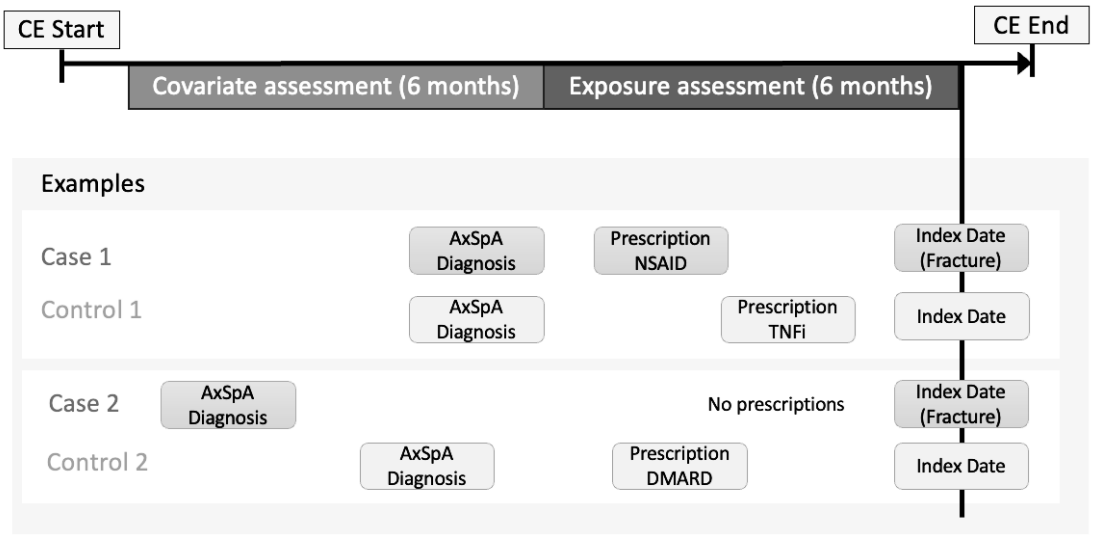
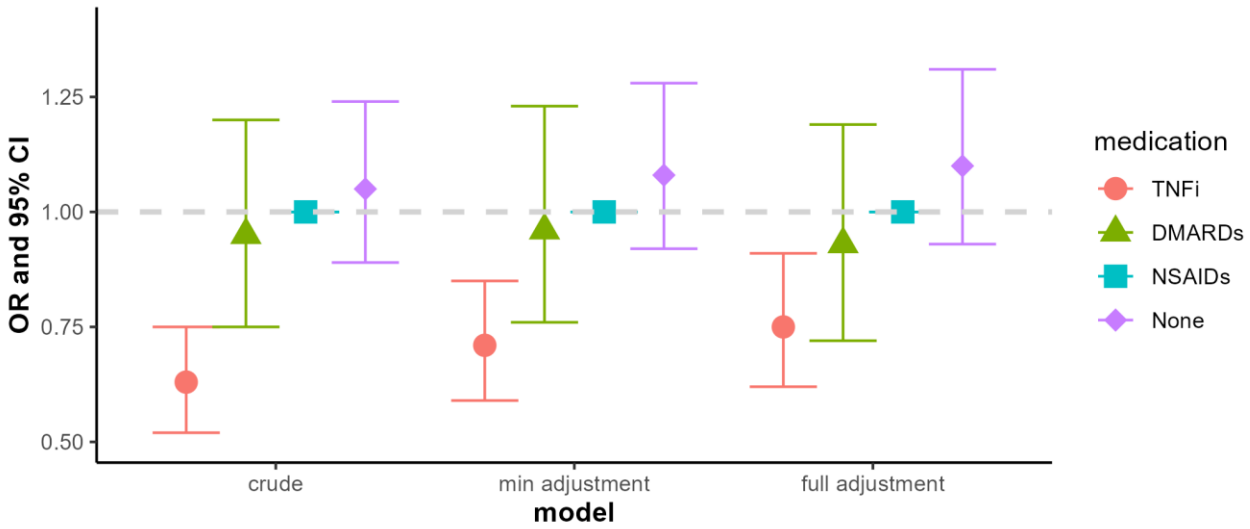
2. Vosse D et al: *Ann Rheum Dis* 2009
3. Haroon NN et al: *Arthritis Res Ther* 2015

Figure 1. Continuous enrollment, exposure assessment period, and covariate assessment period in relation to index date and disease date



Index date: fracture date for cases, and random date from the corresponding case's fracture year for controls. Disease date can be any time prior to index date. Continuous Enrollment (CE) Period was required to include 1 year prior to index date. Exposure Assessment Period was 6 months prior to index date. Covariate Assessment Period was 2 months prior to Exposure assessment period.

Figure 2. Odds of hip or spine fracture associated with axial spondylarthritis therapeutic class, with NSAIDs as the referent



Tumor necrosis factor inhibitors (TNFi) include etanercept, adalimumab, golimumab, certolizumab and infliximab. DMARDs include apremilast, auranofin, azathioprine, chloroquine, cyclophosphamide, cyclosporine, gold sodium thiomalate, hydroxychloroquine, leflunomide, methotrexate, minocycline, mycophenolate, sulfasalazine. Minimally adjusted model adjusted for age, sex, and diagnosis year. Fully adjusted model adjusted for age, sex, disease year, alcohol use disorder, antiepileptic drug use, BMI, breast cancer, chronic kidney disease, falls, glucocorticoid use, inflammatory bowel disease, osteoporosis, osteoporosis medication use, prostate cancer, tobacco use, ESR/CRP laboratory orders and number of outpatient visits (rheumatology and primary care).

Category: Clinical research

Associations Between Peripheral White Blood Cells and Pulmonary Function in US Veterans Following Deployment Exposures

N. Gurijala [1], E. Garshick[2], D. Johnston[3] , E. S. Wan [2] , V. S. Fan [4] , F. Kheradmand [5] , P. D. Blanc[6] , C. H. Wendt [7]

[1]Boston Medical Center and Boston University, Boston, MA, United States

[2]VA Boston Healthcare System and Harvard Medical School, Boston, MA, United States

[3]VA Boston Healthcare System, Boston, MA, United States

[4]VA Puget Sound Health Care System and the University of Washington, Seattle, WA, United States

[5]Michael E. DeBakey VA Medical Center and Baylor College of Medicine, Houston, TX, United States

[6]San Francisco VA Health Care System and the University of California At San Francisco, San Francisco, CA, United States

[7]Minneapolis VAMC and University of Minnesota, Minneapolis, MN, United States

Introduction
Exposure to inhaled particulate matter and lung disease are associated with systemic inflammatory responses. We investigated associations between pulmonary function and circulating white blood cells (WBC) in Veterans deployed to Iraq and Afghanistan with high particulate matter exposures.

Methods
Veterans recruited at four sites from participants in Veterans Affairs (VA) Cooperative Study, "Service and Health Among Deployed Veterans" regardless of healthcare utilization underwent spirometry, oscillometry, diffusion capacity (DLCO) measurement, and phlebotomy. Associations between pulmonary function (independent covariate) with WBC and differential counts (dependent covariate, log-transformed) were analyzed by linear regression adjusted for BMI, and age, sex, height (or included %-predicted pulmonary function).

Results
There were 118 participants (16 women); 101 never, 17 former smokers (median 1.0 packyear); mean (standard deviation;SD) age=42.7(10.3) years; 14.8(3.5) years post-deployment. %-predicted FEV_1, FVC, FEV_1/FVC, DLCO =101.6(14.5) %, 105.4(13.4)%, 96.4(7.0)%, and 98.8(14.0)%,respectively. Median ($x10^3$ cells/ul) (interquartile range) WBC=6.33(2.33); neutrophils=3.40(1.72); lymphocytes=2.01(0.64); eosinophils 0.15(0.16).
There were no significant associations between FVC, FEV_1, or FEV_1/FVC and cell counts. For each SD decrease in DLCO, total WBC increased by 6.1% (P=0.015) and lymphocyte count increased by 7.0% (P=0.004). For each SD decrease (more negative, abnormal) in X5 (reactance at 5 hertz, a measure of small airway function) and increase in small airway resistance (R5–R19 hertz), total WBC was lower (2.8%, P=0.034 and 5.1%, P=0.066, respectively).

Conclusion
In deployed Veterans with largely preserved spirometry and particulate matter exposures, a lower DLCO was associated with a higher total WBC with lymphocytic predominance, whereas small airway abnormalities were associated with lower circulating leukocytes.

Category: Clinical vignette

A case of reactivation TB disease manifesting as chronic back pain

Brittany Hansen, MD, MPH

Background:

Tuberculosis (TB) poses a significant global health burden, with ~10 million new cases reported by the World Health Organization (WHO) in 2023. Factors including socioeconomic conditions, malnutrition, and limited access to health care services contribute to persistence of the global TB epidemic. In the United States, the majority of active TB disease occurs in persons born in endemic countries, with the highest risk for reactivation within the first year after migration. Screening for TB infection and assessment of reactivation risk for cases of LTBI is an important part of health care for newly arrived immigrants. Classically, TB infection is associated with pulmonary disease, but extrapulmonary manifestations are not uncommon.

Case:

A 24-year-old female originally from India with PMH of PCOS presented to the ED with 10 months of progressively worsening back pain. She had been seen in the ED 3 months prior and was discharged with conservative treatment measures for suspected musculoskeletal back strain. Exam was notable for significant pain and positive straight leg raise test on the left, but no gross focal neurologic deficits. An MRI of the entire spine revealed multi-level discitis and osteomyelitis and numerous abscesses. TB disease was highest on the differential although other possibilities were considered, and IR guided drainage of an abscess was pursued; aspirated fluid was positive for acid-fast bacilli, and PCR testing confirmed MTB complex was present. No other non-TB microbial growth was detected.

Discussion:

TB is endemic in India, and there is a growing prevalence of multidrug resistant TB (MDR-TB) strains, complicating treatment for these patients. In this case, treatment was deferred until drug resistance testing could be initiated. Full drainage of the accessible paraspinal abscesses was pursued to reduce the risk of precipitating drug resistance in these spaces. She was then started on rifampin, isoniazid, pyrazinamide, and ethambutol (RIPE). The thoracic spine collection was not able to be safely aspirated during her hospitalization, so levofloxacin was added to improve medical therapy. Levofloxacin has better tissue penetration and retains its antimicrobial properties in acidic environments.

This case highlights the importance of considering extrapulmonary manifestations of TB disease when encountering patients from endemic countries. Obtaining source control and assessing for MDR-TB was also key; undrained abscesses could lead to failure of medical therapy and potentiation of MDR strains due to reduced tissue penetration of RIPE. Additional antimicrobials, like fluoroquinolones, outside of the traditional RIPE schema can offer treatment benefits.

Category: Clinical Vignette

A Twisted Diagnosis: Multiple Intussusceptions in a Young Adult with Cannabis Hyperemesis Syndrome Revealing a Hidden Colonic Adenoma

Hernandez, Christopher

Case:

A 30-year-old male with a history of daily cannabis use for over five years and a chart history of cannabinoid hyperemesis syndrome (CHS) presented to the emergency department with intermittent bright red blood per rectum, abdominal pain, and vomiting. He was discharged after symptomatic improvement with antiemetics, presumed to be experiencing another CHS flare.

He re-presented the following day with similar symptoms. Vital signs were stable; labs were notable for mild metabolic alkalosis and acute kidney injury. The abdominal exam was benign.

Given minimal symptom improvement, CT abdomen/pelvis was obtained and revealed three sites of intussusception: distal jejunum, proximal ileum, and distal sigmoid colon—without evidence of lymphadenopathy, bowel wall thickening, or diverticulosis. Gastroenterology and surgery were consulted. Initial colonoscopy, limited by inadequate bowel preparation, did not reveal significant pathology. Shortly after the procedure, the patient developed severe abdominal pain. Repeat CT imaging showed resolution of the intussusceptions but identified a 6 cm lobulated mass at the prior site of sigmoid intussusception.

Repeat colonoscopy confirmed a tubulo-villous adenomatous polyp with high-grade dysplasia. The lesion was deemed unresectable by two tertiary centers due to size and location. The patient subsequently underwent a laparoscopic low anterior resection with negative margins and no evidence of invasive carcinoma on final pathology.

Discussion:

Intussusception is the invagination of a proximal segment of the gastrointestinal (GI) tract into the lumen of an adjacent distal segment. While common in pediatric populations, it is rare in adults, accounting for only about 5% of all cases. Adult intussusception (AI) typically involves a pathological lead point in up to 90% of cases, including malignancies, polyps, Meckel's diverticulum, colonic diverticula, strictures, or benign neoplasms. Colo-colonic intussusception, such as in our patient, is most frequently associated with adenomas or other neoplasms (up to 65%). In contrast, small bowel intussusception is less commonly linked to a structural lead point, prompting evaluation for alternative causes when none is found.

Chronic cannabis use is becoming increasingly prevalent in the United States, especially as more states legalize its use. It has been associated with several gastrointestinal motility disorders, including cannabis hyperemesis syndrome (CHS), gastroparesis, irritable bowel syndrome (IBS), and decreased intestinal transit. These effects are thought to be mediated through cannabinoid receptor type 1 (CB1), which is widely distributed throughout the enteric nervous system. CB1 activation by cannabinoids can alter gastric and intestinal motility, reduce gastric emptying, and relax the lower esophageal sphincter.

Although chronic cannabis use is not currently recognized as a definitive cause of adult intussusception, emerging case reports and case series have suggested a possible link, particularly in cases of transient small bowel intussusception. In our patient, no organic lead point was identified for the transient small bowel intussusception, raising the possibility that it may be related to chronic cannabis use through the mechanisms described above.

Category: Clinical research

Incidence and Survival of Gastrointestinal Neuroendocrine Neoplasms in a Large Safety Net Hospital: A 21-Year Real World Experience

Grace H. Kim, Ramya Radhakrishnan, Jasmine Lee, Haesook Teresa Kim, Horst Christian Weber

Introduction: Neuroendocrine neoplasms (NEN) are a group of heterogeneous, rare tumors predominantly of the gastrointestinal (GI) tract, and less commonly, other extraintestinal tissues. The incidence has increased more than 6-fold over the last few decades; overall survival (OS) has improved but varies significantly. Given the overall rarity of NENs, a significant knowledge gap remains regarding their prognosis and demographics, particularly insight into racial differences. Accordingly, this study aimed to analyze the incidence and survival in a large cohort of NENs in a diverse tertiary safety-net hospital.

Methods: All patients at a large tertiary safety-net hospital with a pathology-proven NEN diagnosis within a 21-year period (2001-2022) were identified via the Clinical Data Warehouse. Demographic characteristics, including age at diagnosis, race, sex, and NEN localization, were collected from medical charts.

Results: A total of 946 patients received a diagnosis of NEN between 2001 and 2022 (483 female [51.1%], 435 White [45.9%], 313 Black [33.1%], 31 Asian [3.3%], 107 Hispanic or Latino [11.3%]) with a median age at diagnosis of 60 years (range 1-92). The NEN frequencies (Fig. 1) show lung as the most common site (N=347, 36.7%), followed by GI (N=250, 26.4%) and pituitary (N=105, 11.1%). Of all GI NENs, most localized to the rectum (N=59, 23.6%), followed by pancreas (N=53, 21.2%), stomach (N=50, 20%), small intestine (N=41, 16.4%), appendix (N=25, 10%), and colon (N=19, 7.6%). OS was significantly lower in lung NENs compared to GI NENs (3-year OS 33% vs. 87%) and other sites ($p<0.0001$) (Fig. 1). A significant difference of 3-year OS was also noted between GI NEN subtypes ($p=0.03$; Fig. 2), ranging from 82% in the pancreas to 95% in the appendix. OS of Black patients with GI NENs was significantly higher than that of White patients (3-year OS 90% vs. 79%, $p=0.005$) (Fig. 2). Male sex was not a risk factor for OS in GI NENs (3- year OS 83% vs. 91% $p=0.1$), but age above 65 was a significant risk factor for poor OS (3-year OS 71% vs. 94% $p<0.0001$).

Conclusions: In concordance with prior studies, we identified age as a significant risk factor for poor survival in GI NENs, and OS of GI NENs differed by anatomical site. In contrast to other studies, however, this study showed sex was not associated with survival, and OS of GI NENs was lower in White patients compared to Black patients. Differences among GI NENs warrant further investigation to elucidate site-specific tumor biology and demographic factors to improve diagnosis and treatment outcomes.

Category: Clinical research

Housing status and overall survival in people with lung cancer: Utilization of a housing insecurity screening and referring program

Alexander Lazzaro, MD[#1]; Laura B. Amin, MD[#1]; Chinmay Jani, MD[2]; Sara Young, MD[1]; Hyerim Jang, MD[1]; Monica Abou-Ezzi, BS[1]; Amr Radwan, MD[3]; Omar Al Omari, MBBS[4]; Mohini Patel, MPH[5]; Harshitha Dudipala, MD[1]; Mariam Markouli, MD[1]; Pablo Buitron de la Vega, MD[1]; Matthew H. Kulke, MD[3]; Umit Tapan, MD[3]

[1]Department of Medicine, Boston University Chobanian and Avedisian School of Medicine and Boston Medical Center, Boston, MA
[2]University of Miami / Sylvester Comprehensive Cancer Center, Miami, FL
[3]Section of Hematology and Medical Oncology, Boston University Chobanian and Avedisian School of Medicine and Boston Medical Center, Boston, MA
[4]Mount Auburn Hospital, Harvard Medical School, Cambridge, MA
[5]Boston University School of Public Health, Boston, MA
[#]Contributed equally

Background: Social determinants of health (SDOH), including housing insecurity, have been linked to poorer lung cancer outcomes.

Methods: We investigated the relationship between housing status and overall survival of people with lung cancer. Our study examined all patients with lung cancer evaluated at Boston Medical Center (BMC), a tertiary care academic medical center and New England's largest safety-net hospital, between 2015 and 2021. Data was collected from electronic health records and THRIVE, a program that screens and refers for SDOH.

Results and Conclusion: We conducted univariable and multivariable survival analyses on 346 participants (housing secure: n = 308; housing insecure: n = 38). Results showed no statistically significant association between housing security and overall survival (HR 1.40, 95% C.I. 0.78 - 2.53, p = .27). While our findings suggest that standardized SDOH screening and referral programs may help reduce health disparities among housing insecure people with lung cancer, prospective studies are needed to establish causality.

Category: Clinical research / Quality Improvement

Factors Associated with Clinician Confidence in Communication during Goals of Care Discussions

Ma, Jessica; Wormwood, Jolie; Wachterman, Melissa W.; Linsky, Amy

Background:

High-quality goals of care (GOC) discussions should be founded on shared decision-making (SDM) -eliciting patients' values and preferences while providing adequate information for patients to make decisions. One metric of high-quality GOC discussions is the degree to which patients are adequately informed.

Objective:

To identify clinician GOC discussion attitudes and behaviors associated with clinician confidence that they conveyed adequate information to patients.

Methods:

We conducted a secondary analysis of national survey data from Veterans Affairs clinicians assessing attitudes toward and behaviors during GOC discussions. We used stepwise multivariable logistic regression models to identify factors associated with clinician confidence that during GOC discussions they provided patients with adequate information to make informed decisions following .

Results:

Among the 253 clinician respondents, there was high confidence that they provided adequate information (M=4.09 on a 5-point scale, SD=0.69). Higher confidence was associated with practicing in Geriatrics/Palliative Care in bivariate analyses, but not when controlling for clinician behaviors during GOC discussions. In the final multivariable model, two behaviors were statistically significantly associated with increased confidence: "identify proxy/surrogate" (β=0.21, p=0.015) and "suggest decision consistent with patients' values" (β=0.16, p=0.045). These behaviors also occurred significantly more often in Geriatrics/Palliative Care compared to other specialties.

Conclusion:

Specific clinician behaviors in GOC discussions differed across specialties and were significantly associated with clinicians' confidence that they conveyed adequate information. Our findings can inform strategies to enhance palliative care training across specialties and improve care processes to support clinicians in performing behaviors conducive to high-quality GOC discussions.

Category: Clinical research

Patterns of tuberculosis medication adherence seen via directly observed therapy in an observational cohort

Madhuri Martin,[1] Tara Bouton,[1,2*] Samantha Malatesta,[3] Selvin Marroquin,[2] Jennifer Rooney,[2] Tara Carney,[4,5,6] Bronwyn Myers,[4,5,7] Elizabeth J. Ragan,[2] Charles D. H. Parry,[4,8] Helen McIlleron,[9] Laura F. White,[3] Danie Theron ,[10] C. Robert Horsburgh,[11] Robin M. Warren,[12,13] Karen R. Jacobson,[1,2]

[*]Joint first author (equal contribution)
1 Department of Medicine, Boston University Chobanian & Avedisian School of Medicine, United States of America
2 Section of Infectious Diseases, Boston Medical Center, United States of America
3 Department of Biostatistics, Boston University School of Public Health, United States of America
4 Mental Health, Alcohol, Substance Use and Tobacco Research Unit, South African Medical Research Council, South Africa
5 Department of Psychiatry and Mental Health, University of Cape Town, South Africa,
5 Department of Psychiatry and Mental Health, University of Cape Town, South Africa,
6 Department of Psychology, Johannesburg, South Africa
7 Curtin enAble Institute, Faculty of Health Sciences, Curtin University, Australia
8 Department of Psychiatry, Stellenbosch University, South Africa
9 Department of Medicine, University of Cape Town, South Africa
10 Brewelskloof Hospital, Worcester, South Africa
11 Departments of Epidemiology, Biostatistics & Global Health, Boston University School of Public Health, United States of America
12 Department of Science and Technology, National Research Foundation Centre of Excellence in Biomedical Tuberculosis Research, South Africa Medical Research Council for Tuberculosis Research, South Africa
13 Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa

Background: Tuberculosis (TB) treatment adherence patterns under directly observed therapy (DOT) are not well-documented. Identifying patterns of poor adherence, treatment phases, and treatment interruptions is essential for developing successful tailored adherence interventions.

Methods: We analyzed Monday through Friday DOT data in a drug-susceptible TB cohort study over a six-month treatment period. Demographic and clinical data were collected to determine predictors of adherence. We analyzed weekly adherence patterns across four groups: <60%, 60-90% with short interruptions, 60-90% with long interruptions, and >90%. Differences between intensive and continuation phases of treatment were assessed.

Results: Among 284 participants, median adherence was 86% (IQR 71-92). In the four groups, 49 (17.25%) had <60%, 28 (9.86%) had 60-90% with longer interruptions, 114 (40.14%) had 60-90% with shorter interruptions, and 93 (32.75%) had >90% adherence. More DOT days were missed during the continuation phase. Smoked substance use and younger age were predictors of poorer adherence.

Conclusions: Relying solely on the overall percentage of doses to measure adherence overlooks the considerable variation in adherence patterns that may influence adherence's effect on sterilization and outcomes. Understanding these patterns along with additional drivers such as age and substance use is critical for developing tailored interventions and sustaining cure.

Category: Clinical vignette

Chagas and the Broken Heart Sagas: A Case Report of Cardiomyopathy Secondary to Chronic Chagas Disease

Effie Mathew, MD

Learning Objectives: Medical Knowledge: Recognize Chagas disease as a cause of non-ischemic cardiomyopathy and diagnose T. cruzi infection with the appropriate confirmatory antibody testing. Patient Care: Distinguish patients who may benefit from treatment based on disease course and identify patient populations who are appropriate for Chagas screening.

Case: A 45-year-old male with a history of hypertension (HTN) presented to the emergency department for 2 months of gradually worsening lower extremity edema, orthopnea, and dyspnea on exertion. The patient was originally from El Salvador and immigrated to the USA 20 years ago. He reported rare alcohol intake (<1 beer per month), with no other drugs. He had no family history of sudden cardiac death or premature ASCVD. He took losartan 50mg daily for HTN.

Physical exam was significant for tachycardia, abdominal distension, and 2+ bilateral lower extremity edema. Labs showed BNP elevation to 1700 and stable Hs-troponin elevation (14 to 15). ECG showed tachycardia with no ST-segment changes. Chest x-ray showed pulmonary vascular congestion. TTE demonstrated a dilated left ventricle, reduced LVEF of 15% with diffuse global hypokinesis and grade 3 diastolic dysfunction. The patient was admitted to the hospital for aggressive diuresis, resulting in 10kg weight loss and reported improvement in his symptoms by the time of discharge.

As part of the patient's work up for new-onset heart failure, TSH was within normal limits and HIV testing was negative. Left heart catheterization showed no evidence of coronary artery disease. Sleep study was non-concerning for obstructive sleep apnea. Given patient's country of origin, *T. cruzi* IgG antibody was sent and resulted positive. Secondary confirmatory testing by the CDC was also positive.

Impact/Discussion: Chronic Chagas disease (CCD) is a cause of non-ischemic cardiomyopathy. Its pathogenic agent, *T. cruzi*, is a parasite endemic to Central and South America, and infects humans through vector bite wounds. CCD is diagnostically confirmed by identifying IgG antibodies to *T.cruzi* by both ELISA and IFA; one single test is not sufficient in specificity for confirmatory diagnosis. Benznidazole is first-line therapy because of its better side effect profile, in comparison to nifurtimox. However, the decision on therapy for patients with cardiac manifestations depends on severity of heart failure; patients with ACC Stage C or D heart failure, as in this clinical vignette, have not been shown to benefit from treatment. Screening *for T. cruzi* infection should be considered in patients from endemic areas; appropriate treatment for patients in the indeterminate phase of disease – between acute and chronic manifestations– prevents cardiac and gastrointestinal complications.

Conclusion: In select patient populations, CCD should be recognized as a cause of non-ischemic cardiomyopathy. Treatment at late-stage manifestations of the disease has not shown clinical benefit; therefore, screening programs for patients from endemic areas should be considered and implemented on a larger scale in relevant communities.

Category: Clinical research

The Impact of Urinary Sodium Biomarker on Diuresis for Acute Decompensated Heart Failure Patients at a Safety Net Hospital

Sophia F. Mercadante, MD, Ross A. Okazaki, MD, Kyle Jones, MD, Deepa M. Gopal, MD, MS

Background: In acute decompensated heart failure (ADHF), poor diuresis has been linked to worse outcomes. Recent studies have demonstrated more effective diuresis when using urinary sodium (UNa) as a biomarker to assess natriuretic response to loop diuretics. However, the efficacy of this approach has not yet been validated for use in diverse patient populations.

Aim: We examined whether utilization of UNa to guide diuresis would improve urine output (UOP) and frequency of diuretic dosing at a safety net hospital.

Methods: This is a retrospective study at a single safety net Boston hospital. Encounters with a ADHF discharge diagnosis from August 2022 to December 2023 that were initiated on intravenous diuretics within 48 hours of admission were included. Outcomes of encounters utilizing UNa 1-6 hours after diuretic administration were compared with those without UNa utilization. Admission creatinine levels (AdCr) > 3.0 mg/dL were excluded. T-test, Fisher's exact test, and linear regression analyses were performed.

Results: Of the 718 encounters identified, the UNa group comprised 85% (n=610) and non-UNa group comprised 15% (n=108). There were no differences in age, sex, race, language, AdCr, pro-BNP, hospital service, or ICU admission. The mean age and AdCr was 67 years and 1.4 mg/dL, respectively. Most patients were non-white (n=565, 79%) and English speaking (n=539, 75%). There was greater UOP in the first two days of admission (2,928 vs 2,448 mL, p=0.03), more frequent diuretic doses per day (1.6 vs. 1.4, p=0.002), and greater rates of acute kidney injury (AKI) (43% vs 32%, p=0.03) in the UNa group. The association between the UNa biomarker and UOP was maintained in multivariable analysis. Of the 76 encounters with low UNa (<=65 mEq/L), 76% increased their diuretic dose compared to only 31% of non-UNa encounters (p<0.001).

Conclusion: In this diverse patient population, UNa was associated with increased diuresis and dose frequency. There were also higher rates of dose augmentation in the low UNa group, suggesting appropriate utilization of the biomarker to guide diuresis management. Caution in CKD populations may be advised given increased rates of AKI in the UNa group.

Category: Clinical research

Early Findings of a Remote Pulmonary Artery Pressure Monitoring Program in a Safety Net Hospital: Avenues and Roadblocks to Success in a Diverse Patient Population

Sheikh Moinul, MD[1], Manuel Urina-Jassir, MD[1], Deepa M. Gopal, MD, MS[2], Nir Ayalon, MD[2], Ludwine D. Paul, MSN, ACNP-BC, AACC[2]

1- Evans Department of Medicine, Boston Medical Center, Boston, Massachusetts.

2- Evans Department of Medicine, Section of Cardiology, Boston University Chobanian & Avedisian School of Medicine and Boston Medical Center, Boston, Massachusetts.

Background
Recurrent heart failure hospitalizations (HFH) increase mortality. CardioMEMS™ (CM), a pulmonary artery pressure monitoring device, decreases HFH, but its efficacy in diverse populations is unclear. We describe our initial experience of a CM program at an urban safety net hospital.

Methods

Retrospective electronic medical record review of patients referred for CM from January 2020 to October 2023 at Boston Medical Center. For between-group comparisons, paired t-tests were used for statistical analysis using p-value ≤ 0.05 for statistical significance.

Results

Of the 61 patients who were referred for CM, 29 individuals (48%) were not implanted; 24% were denied by insurance despite meeting implantation criteria, and 31% refused or missed appointments. Most were African American with non-ischemic cardiomyopathy and preserved ejection fraction from high Area Deprivation Index areas. Of the 16 who reached one-year follow-up, we found statistically significant reductions in hospitalization length-of-stay (LOS). A subset of 11 patients who answered $\geq 66\%$ of study staff phone calls had statistically significant reductions in both HFH and LOS.

Conclusions

This initial CM project with diverse patients showed statistically significant reductions in HFH and LOS. Recruitment is needed to improve study power, but our promising data highlights the importance of patient engagement. Future studies should assess insurance, unstable housing, and healthcare access as barriers to CM success.

Demographic and Clinical Characteristics of Study Population

Data of patients referred to CardioMEMs program at Boston Medical Center (n=61)		
	Not implanted (n=29)	**Implanted** (n=32)
Age, years (mean ± SD)	59.5 ± 11.9	62.3 ± 12.0
Race/Ethnicity n (%)		
Black	20 (68.9)	16 (50.0)
White	4 (13.7)	12 (37.5)
Hispanic/Latino	5 (17.2)	4 (12.5)
Body mass index, kg/m^2	36.7 ± 11.4	42.5 ± 7.46
Female n (%)	15 (51.7)	17 (53.1)
Homelessness history	8 (27.6)	5 (15.6)
HF class		
HFpEF	14 (48.3)	20 (62.5)
HFmrEF	3 (10.3)	5 (15.6)
HfrEF	12 (41.4)	7 (21.9)
Non-ischemic etiology	25 (86.2)	26 (81.3)
ADI by state decile n (%)		
≤3rd	6 (20.7)	6 (18.8)
4th - 6th	15 (51.7)	20 (62.5)
7th – 10th	8 (27.5)	6 (18.8)
Reason for no CM implantation		
Insurance denial	7 (24.1)	N/A
Patient non-adherence/refusal	9 (31.1)	
CKD IV/V	4 (13.8)	
Active homelessness	5 (17.2)	
*Other exclusion criteria****	4 (13.8)	

Data of patients who had completed one-year follow-up post-implantation **(n=16*)**			
	Patients who completed one-year follow-up (n=16)	**Patients with sufficient contact with staff**** (n=11)	**Patients with insufficient contact with staff**** (n= 5)
HF-related hospitalizations during pre-implantation year (mean ± SD)	1.25 ± 0.05	1.55 ± 0.09	0.60 ± 0.19
HF-related hospitalizations during post-implantation year (mean ± SD)	0.69 ± 0.16	0.36 ± 0.07	1.40 ± 0.41
P value of HF-related hospitalization comparison	0.09	**0.003**	0.18
Mean hospitalization LOS during pre-implantation year (days ± SD)	7.06 ± 5.72	7.36 ± 4.23	6.40 ± 8.79
Mean hospitalization LOS during post-	2.25 ± 3.81	2.18 ± 4.42	2.40 ± 2.31

implantation year (days ± SD)			
P value of hospitalization LOS comparison	**0.01**	**0.01**	0.21

Table 1. *Sample size consists of patients who completed one-year follow up post-implantation; ten had not yet reached one-year follow-up, three expired before one-year follow-up, and three were excluded post-implantation due to CM nonadherence. **Defined as answering ≥66% of study staff phone calls; eleven met this criteria. ***Included active hospitalization, lack of heart failure admissions, or ongoing workup. **Abbreviations:** ADI: Area Deprivation Index via Neighborhood Atlas® with higher deciles indicating socioeconomic disadvantage; CKD: chronic kidney disease; EF: ejection fraction; HF: heart failure; HFmrEF: heart failure with moderately reduced ejection fraction; HFpEF: heart failure with preserved ejection fraction; HfrEF: heart failure with reduced ejection fraction; LOS: length-of-stay; SD: standard deviation

Clinical Implications

Understand that congestive heart failure patients enrolled in a CardioMEMS™ program, even at a safety net hospital, may experience improvements in heart failure-related hospitalizations and hospitalization length-of-stay, especially if they maintain consistent contact with study staff. Providers should also note that insurance, unstable housing, and healthcare access may serve as a major barriers to successful outcomes in this patient population.

Category: Clinical vignette

An unusual presentation of acute hepatitis C (HCV) causing severe acute liver injury

Tatyana Nguyen, Caroline Ross, Margot Rogers

Background: Hepatitis C (HCV) is a blood borne viral infection that causes liver injury. In the U.S., the main mode of transmission of HCV is via sharing needles or syringes. People who are infected with HCV tend to be asymptomatic. However, in rare occasions, acute HCV can lead to acute liver injury, and even fulminant liver failure. Here we discuss a case of acute HCV that led to severe liver injury with impaired synthetic function that was concerning for acute liver failure and our approach to management.

Case: 49-year-old male with PMHx of active drug use on methadone presented to the ED with 2 weeks of intermittent fever, jaundice and dark colored urine. He reported a recent needle stick at work, recent travel to Mexico and increased drug use. He had a history of hepatitis C that had spontaneously cleared. HCV viral load was undetectable 3 weeks prior to presentation. Vitals showed fevers with Tmax of 103F and tachycardia to 110. His labs were significant for elevated AST 647 U/L, ALT 839 U/L, PT 17.5 sec and INR 1.49. Liver ultrasound demonstrated hepatic steatosis without portal vein obstruction.

We performed a comprehensive workup including infection, toxin and autoimmune hepatitis antibodies, all of which were unremarkable; except his HCV antibody was positive and HCV viral load resulted at 11.9 million. On day 2, his liver enzymes and synthetic functions continued to worsen to AST 2921 U/L, ALT 3842 U/L, PT 21.2 sec and INR 1.79, raising concern for progression to acute liver failure (ALF). He was started on N-acetylcysteine (NAC) but he developed fever and flushing with NAC infusion so this was subsequently discontinued. He also received 3 days of vitamin K to correct any nutritional deficiencies. He showed no signs of encephalopathy during his hospitalization.

Given the degree of liver injury, the primary team, GI, and ID were in consensus to start inpatient HCV treatment. On day 3, his fever resolved and the liver enzymes began to trend down. Glecaprevir/pibrentasvir was initiated on day 4. Ultimately the patient was discharged on day 6 with significant improvement in his liver enzyme and normalized synthetic function. He also received counseling regarding his opioid use and up-titration of his methadone. He will be followed-up in the hepatology clinic.

Impact/Discussion: This case demonstrates an unusual presentation of severe liver injury in the setting of acute HCV infection, as the patient had a negative HCV viral load 3 weeks prior to presentation. It is possible that prior HCV infection that was cleared may have predisposed the patient to severe disease when reinfected. There also may have been unidentified toxins in the substance he was injecting that caused a superimposed drug induced liver injury. Regardless, treatment should be initiated in patients with a high risk of progressing to ALF. A case report has suggested ledipasvir and sofosbuvir can prevent ALF due to rapid clearance of HCV. In our case, as the genotype had not yet come back, we chose glecaprevir/pibrentasvir which is a pan genotypic direct acting antiviral.

Conclusion: HCV can present acutely with systemic signs and significant liver injury which requires starting in-patient treatment of HCV to prevent progression to ALF. Thorough workup should be performed to identify any other cause that can superimpose on HCV.

A multidisciplinary approach including GI, ID, and Addiction Medicine can be helpful to prevent relapses and reinfection in patients with opioid use disorder and acute hepatitis C.

Category: Clinical vignette

Recognizing Inequities in the Inpatient Management of Incarcerated Patients

Oza, Akash, MD; Mushero, Nicole, MD, PhD

Learning Objectives:

1. Recognize the barriers to examining and treating patients who are incarcerated in an inpatient setting.
2. Identify the disparities that exist towards coordinating a safe disposition for incarcerated patients.

Case Description:

A 62-year-old incarcerated man with diabetes complicated by neuropathy, end-stage renal disease, COPD, and hypertension presented to the hospital from a prison medical facility for concern for osteomyelitis in the setting of a diabetic foot ulcer. Initial examination was performed in the emergency department hallway and was limited due to shackling of the patient. Two security guards were present throughout admission at bedside and frequently answered for the patient. Podiatry performed lateral foot excision to the level of the muscle and patient was discharged. He represented 6 days after discharge with necrosis of the surgical wound and concern for osteomyelitis. On that admission, the patient reported receiving only 5 of 7 days of antibiotics and less than the recommended dressing changes. Amputation as source control of infection was delayed due to concern for availability of appropriate wound care at his facility. He eventually received amputation and was discharged to his facility.

Impact/Discussion:

This case demonstrates the complexity of structural disparities faced in delivery of medical care to incarcerated patients. Shackling represents a unique physical challenge towards examination, limiting the ability to physically move and examine patients properly. This patient was under constant surveillance by two officers at bedside, obscuring accurate history taking and raising concerns about privacy violations. Issues of patient autonomy are also raised by the security officers' answering for him. These issues threaten the safety and autonomy of the patient and the ability to craft a physician-patient therapeutic alliance.

This case further raises concerns about the standard of care provided in prison settings. It is estimated that more than 20 percent of incarcerated people go without routine health care for chronic health conditions[1]. This patient received an inadequate course of antibiotics and limited wound care resulting in re-hospitalization and amputation which may have been avoided otherwise. In light of this, hospital teams need to be more vigilant in advocating for our patients and ensuring correctional facilities have the ability to provide the post-acute care required.

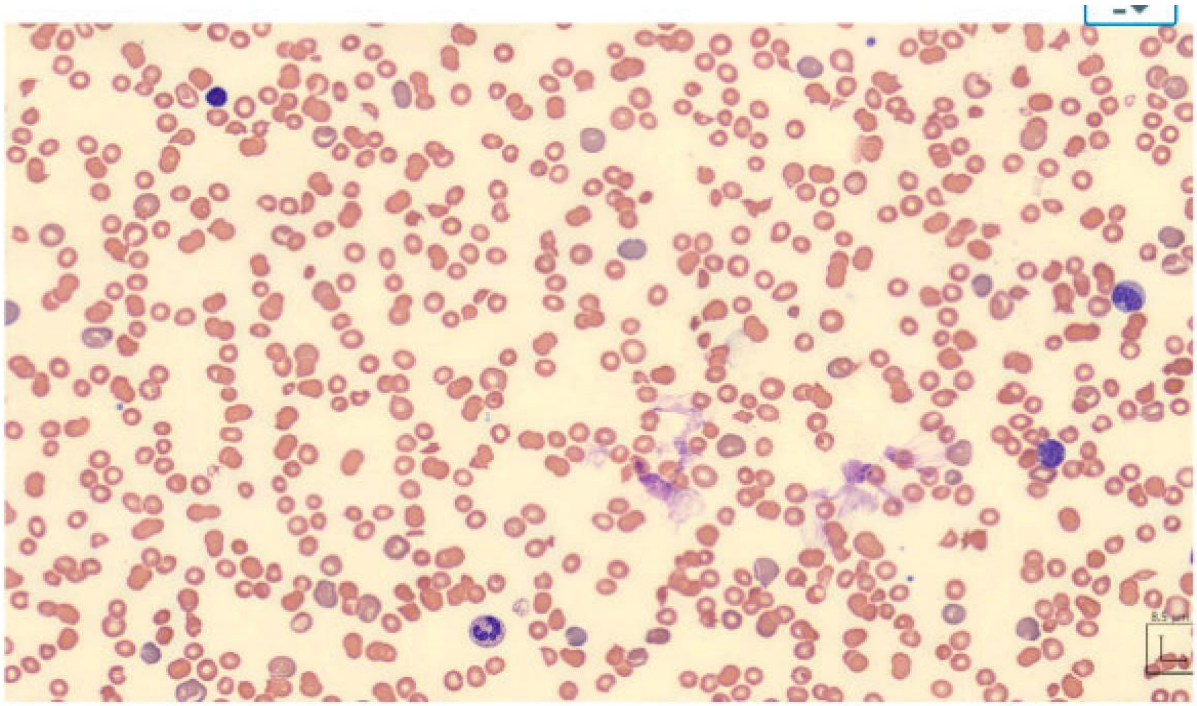
Conclusion:

- Shackling is a physical restraint which limits appropriate care of patients without clearly improving safety and policies around routine shackling should be re-examined.
- Constant surveillance of incarcerated patients within the hospital setting damages the therapeutic provider-patient relationship and raises questions of patient privacy
- Healthcare providers need education around decision making ability of incarcerated patients.
- Providers should advocate for the appropriate post-acute care for our incarcerated patients when planning disposition.

Category: Clinical Vignette

A dizzying case of thrombocytopenia

Perkinson, Emily



Peripheral smear confirms schistocytes, severe thrombocytpenia, polychromasia

Finding a platelet count of 18, 000/ml is not entirely surprising on an internal medicine service; we see HIT, liver dysfunction, chronic viral illnesses, bone marrow disorders, DIC, immune thrombocytopenia. Ever present further down on the deferential list as seen on board exams is thrombotic Thrombocytopenic purpura (TTP). The NIH estimates TTP as 1-6 cases/million per year, making it a rare, but potentially fatal, disorder. In late February 2025, TTP rocketed to the top of the deferential.

Mr. C, a 31-year-old man with a history of lupus nephritis, usually in a stable state of health and independent presented one evening to an outside hospital at the request of his family. He had been having flu-like symptoms for the past 7 days and suddenly was newly dizzy and confused; at the OSH, when asked the date, he stated April 2020. In the ED he was further noted to have transient expressive aphasia. CT non-contrast head was unrevealing. His initial work up included a CBC, which was instantly notable for anemia with hemoglobin of 7.9, a platelet count of 18, elevated bilirubin. At the OSH, hematology consulted in the setting of thrombocytopenia and altered mental status; agreed that the top deferential was TTP, and so he was transported to BMC for consideration of plasmapheresis.

On arrival to BMC, vital signs were notable for temperature to 102.5F, HR 106, P 136/90, RR 25, O2 Sat of 95%. BMI of 18.99. Ceftriaxone and Vancomycin were started, given 1 liter LR. Labs at BMC notable for hemoglobin of 7.2, platelets to 14, LDH 4185, fibrinogen 371, INR 1.14, haptoglobin less than 8. Hematology was consulted, and a peripheral smear was obtained, as illustrated above, confirms a microangiopathic hemolytic anemia, with multiple schistocytes. He was noted to have a PLASMIC score (range of 0-7) of 6, indicating high risk for TTP and ADAMTS13 deficiency. He was then admitted to the MICU for ongoing plasmapheresis.

Over the course of his inpatient hospitalization, there was rapid improvement of his neurological status and Mr. C felt as if he was back to his mental baseline.

Overall, this case illustrates the importance of maintaining a broad deferential diagnosis when assessing patients and their clinical presentations; zebras can be lurking around the corner. Important messages to take away include assessing the peripheral smear and the PLASMIC score in patients with thrombocytopenia.

Category: Clinical vignette

A Case of Paraneoplastic Autoimmune Myositis with Interstitial Lung Disease in a Patient with Metastatic Prostate Adenocarcinoma

Rab, Sayeeda, Noronha, Craig

Case: A 68-year-old man with type 2 diabetes presented with a one-year history of unintentional 30-pound weight loss, fatigue, diffuse joint pains and mild muscle pain. He denied fever, night sweats, or cough. Initial workup for weight loss revealed unremarkable CBC and CMP, negative HIV and QuantiFERON gold, elevated ESR/CRP, and a PSA of 49.2 ng/mL. CT chest/abdomen/pelvis showed invasive prostate cancer with regional lymph node involvement and bilateral lung fibrosis with bronchiectasis.

The patient was referred to urology, oncology, and pulmonology. A prostate biopsy confirmed Gleason 4 + 5 = 9/10 adenocarcinoma. The weight loss was deemed disproportionate to the prostate cancer burden. The elevated inflammatory markers, arthralgias, and lung disease warranted further investigation and a referral was made to rheumatology.

At his rheumatology evaluation, the patient reported progressive dyspnea on exertion and joint pain. Physical examination revealed depigmented scalp rash, hyperpigmentation over the knuckles and abdomen, and palpable synovitis in bilateral PIP joints. Significant laboratory findings included elevated creatine kinase (CK) at 1282 U/L and positive anti-OJ antibody on a myositis panel. Based on the clinical picture and labs patient was diagnosed with anti-synthetase syndrome (ASS), which is characterized by myositis, interstitial lung disease (ILD), arthritis, and skin findings.

The pulmonology evaluation identified findings consistent with ASS as the likely cause of the patient's ILD and dyspnea. The pulmonology team noted that while ASS is often idiopathic, in this case, it may represent a paraneoplastic phenomenon secondary to metastatic prostate cancer, although proving this connection is challenging. CT imaging revealed fibrotic NSIP as the predominant pattern, with traction bronchiectasis and no honeycombing. Pulmonary function tests (PFTs) demonstrated restrictive lung disease and decreased DLCO, further supporting the ILD diagnosis.

The patient was diagnosed with anti-synthetase syndrome with autoimmune myositis and ILD, likely paraneoplastic in origin. Immunosuppressive therapy with prednisone and rituximab was initiated, resulting in resolution of the myositis, rash, and joint pain. While his pulmonary fibrosis remained irreversible, systemic immunosuppression stabilized his ILD and prevented further progression.

Discussion: This case underscores the importance of avoiding anchoring on a diagnosis, in this case metastatic prostate cancer, when a patient presents with multiple symptoms. In certain situations, it is important to utilize a multidisciplinary approach in evaluating unexplained systemic symptoms. Anti-synthetase syndrome is a rare autoimmune condition associated with myositis and ILD. While most cases are idiopathic, this presentation suggests a paraneoplastic origin due to underlying prostate adenocarcinoma. Autoimmune conditions may precede or accompany malignancy. This serves as a reminder that weight loss in older adults may uncover multilayered diagnoses requiring nuanced investigation and multidisciplinary care.

Category: Clinical research / Case series

The Amyloidosis Intersection: Dual Amyloid Types in a Single Host

Soumya Ramireddy[1], Tatiana Prokaeva[2,3], Hui Chen[3], Brian Spencer[2], Sherry Wong[2], Surendra Dasari[4], Linda Dao[5], Ellen D. McPhail[5], Vaishali Sanchorawala[2], Lisa Mendelson[2]

[1]Department of Medicine, Boston University Chobanian & Avedisian School of Medicine, Boston, MA, USA
[2]Amyloidosis Center, Boston University Chobanian & Avedisian School of Medicine, Boston, MA, USA
[3]Department of Pathology & Laboratory Medicine, Boston University Chobanian & Avedisian School of Medicine, Boston, MA, USA
[4]Department of Health Sciences Research, Mayo Clinic, Rochester, MN, USA
[5]Department of Laboratory of Medicine and Pathology, Mayo Clinic, Rochester, MN, USA

Background:
Advances in fibril typing by mass spectrometry have improved the accuracy of amyloidosis diagnosis. Dual amyloidogenic proteins have been reported in deposits in a sole or different host organs.

Methods:
Five patients with dual amyloidosis were diagnosed between 1995-2022 by Congo red staining and fibril typing using the best available methods at the time of evaluation. Sequencing of *TTR* and *GSN* genes was performed. The literature search identified 46 additional patients.

Results:
Three patients exhibited Waldenström macroglobulinemia-associated AL (n=3) amyloidoses in conjunction with ATTRwt or AGel amyloidosis; two patients featured AL/ATTRwt and AA/ATTRwt amyloidoses. One patient demonstrated dual amyloidosis within one anatomical site; three patients featured two amyloidosis types at different anatomical sites; and one patient had dual amyloid deposits in single anatomical site along with different sites. The time interval between diagnoses was 0 to 288 months, with the heart and kidneys being the most affected organs.

Conclusions:
Our findings underscore the complexity of clinical presentation in amyloidosis as multiple amyloid types can co-exist in a single individual and affect various anatomical sites. Accurate assessment of the clinical phenotype and thorough amyloid fibril typing from the target organs are essential for precise diagnosis and tailored treatment.

Category: Education / Quality Improvement

Implementation of an Add-on Lab Guide to Decrease Double Morning Phlebotomizing of Admitted Patients

Al Braun, Grace Kim, Akash Oza, Brando Salussolia

Introduction:
Hospitalized patients often undergo multiple lab draws in the morning after rounds identify issues needing further workup. Resident practices around ordering add-on labs vary—some call the lab, others place orders without confirmation, and some wait for the next phlebotomy round. Patient samples are typically stored for 4–5 days, and add-on labs can be run depending on individual test stability. However, residents receive no formal education on which labs can be added to existing samples.

Methods:
A tip sheet was created to guide add-on lab ordering, listing common labs used by internal medicine teams along with the required tube color. This alphabetized guide was placed in four team rooms to raise awareness and streamline the ordering process. Baseline data on double AM lab draws (defined as multiple blood draws between 4 a.m. and 1 p.m.) was collected from one medicine team over one week. After the guide was introduced, double AM lab draws were tracked for a second week across four teams. A post-intervention survey was also distributed.

Results:
Before the intervention, 14 double AM lab draws were recorded. After introducing the guide, the number dropped to 8 (averaged across four teams). Survey responses from all observed teams showed that 67% of residents discussed add-on labs during most rounds, 83% used the guide most days or daily, and 100% found it useful.

Discussion:
Reducing unnecessary repeat phlebotomy improves the patient experience. Without guidance, residents may default to ordering repeat labs instead of checking for add-on feasibility. The add-on lab guide aimed to simplify this process and reduce double AM lab draws. Our small-scale intervention suggests the guide was effective in promoting more efficient lab ordering and improving patient care. Limitations included small sample size, baseline data drawn from a single team, and challenges in tracking data for patients discharged before data collection for the day.

Category: Clinical vignette

Uncontrolled hypertension? Give ENaC channel blockers a try. A case of suspected Liddle Syndrome

Alexandro Segarra, Connor O'Neill Dee

Case:

32-year-old male with history of uncontrolled hypertension (previously on 6 medications + loop diuretic) complicated by prior hypertensive emergencies, HFrEF, CKD 3b who presented to the emergency department with nausea and vomiting found to be in hypertensive emergency (BP 232/167) in the context of medication non-adherence. Work-up of other common secondary causes of hypertension, such as primary hyperaldosteronism, renal artery stenosis, pheochromocytoma, Cushing's Syndrome, aortic coartcation and thyroid disorders had been ruled out. Patient also had strong family history of resistant hypertension. During admission, BP continued 170s/110s despite carvedilol 50 twice daily, hydralazine 75 three times daily, nifedipine 60 once daily along with spot doses of labetalol 20 IV. Patient was subsequently started on amiloride 5 daily. After a single dose, his blood pressure improved from 180s/110s to 130s/80s and in the subsequent days, hypokalemia resolved. Patient was eventually discharged on amiloride 20 once daily, nifedipine 60 once daily and carvedilol 50 twice daily.

Impact/Discussion:

Liddle syndrome is a rare diagnosis which is rarely thought as a cause of secondary hypertension. In this case, we presented a young male with severe resistant hypertension who had been ruled out of most common causes of secondary hypertension. Given his strong family history, young age at presentation, prior hypertensive emergencies and hypokalemia, primary hyperaldosteronism was initial diagnosis. However, renin/aldosterone results were low/normal and patient's BP did not adequately respond to mineralocorticoid receptor antagonists (MRA). Despite this, patient was started on up to 6 anti-hypertensive medications, and still his blood pressure was uncontrolled. However, none of those 6 medications were an ENaC channel blocker. Once amiloride, an ENaC channel blocker was started, the patient's blood pressure improve dramatically. Although at the time of this writing the patient's diagnosis has not been confirmed by genetic testing, given the impressive response to amiloride and resolution of hypokalemia, as well as his strong family history of uncontrolled hypertension, Liddle syndrome is the primary diagnosis.

Conclusion:

In patients with severe uncontrolled hypertension, trial of ENaC channel blocker as a 4th or 5th line medication seems like a reasonable option given its potent anti-hypertensive properties and potential to suggest Liddle Syndrome in patients whom primary hyperaldosteronism has been ruled out. This is evidenced by the fact that outpatient was discharged with only 3 anti-hypertensive medications, compared to the 6 he was on prior to admission, albeit he was felt to be non-adherent to medications.

Category: Clinical research

Closing the gap: A novel pilot program to improve H-pylori screening and treatment in the US refugee population

Ramya Radhakrishnan, MD, Sarah Kimball, MD, Robert C. Lowe, MD, Laura S. Chiu, MD

Introduction: The refugee community in the US is an understudied population with the distinctive challenge of having endemic health morbidities, yet is screened under guidelines for the undifferentiated US population. Namely, although H. pylori infection has relatively lower prevalence in the US, it is endemic to much of the global population and likely exists at higher rates among US refugee populations. This study aims to identify disparities in H. pylori screening and treatment, as well as design a model pilot program to improve education on screening guidelines, barriers to testing and treatment compliance within a refugee clinic patient setting.

Methods: We identified the total cohort of patients in the Immigrant and Refugee Health Center (IRHC) at Boston Medical Center with ICD-9/ICD-10 codes or chief complaints of upper gastrointestinal symptoms at ambulatory visits using the SlicerDicer (Epic data exploration) tool. The number of patients who were ordered for and completed H. pylori stool or breath testing and antibiotic therapy were identified. A workshop curriculum comprised of 4 core modules on 1) patient-centered risk factors for acquiring H. pylori, 2) familiarity with screening tests and treatment options, 3) test-of-cure algorithm and 4) strategies to improve testing and treatment compliance was presented with our clinical pharmacist team in serial didactic sessions for IRHC medical trainees and faculty physicians. De-identified surveys evaluating understanding of targeted objectives were administered through Qualtrix to participants before and after curriculum presentation.

Results: Among a cohort of 1600 refugee patients in IRHC, 792 present with upper GI symptoms, yet only 168 patients (21.2%) were ordered for H. pylori screening. Less than 10% of the patients who tested positive for H. pylori completed quadruple therapy treatment. A comparative analysis of pre-education and post-education survey responses demonstrated on average a 22.9% increase in comprehension of H. pylori absolute screening indications and international screening guidelines, 38.9% increase in understanding of H. pylori transmission, pathogenesis, and 22.2% increase in comprehension of treatment guidelines.

Conclusion: This study demonstrates the feasibility of implementing a novel pilot program to address disparities in H. pylori screening and treatment in the refugee community. This educational intervention by a multidisciplinary team significantly increased the knowledge of providers in H. pylori management, impacting care for an important public health problem. Future studies will aim to provide a longitudinal evaluation of post-intervention H. pylori screening and treatment compliance rates. This intervention may serve as a pilot for future quality-based programs in refugee clinics in other high-risk hospital systems.

Category: Case Vignette

A case of refractory ventricular arrhythmia in a patient with ATTR Amyloid Cardiomyopathy treated with dual sequential external defibrillation

John Stone[1], Christopher Kearney[2]
[1] Department of Medicine, Boston Medical Center and Boston University Chobanian & Avedisian School of Medicine, Boston, MA
[2] Section of Pulmonary, Allergy, Sleep and Critical Care Medicine, Boston Medical Center and Boston University Chobanian & Avedisian School of Medicine, Boston, MA

Case Presentation:
An 84-year-old male with history of HFpEF, hypertension, hyperlipidemia, and sick sinus syndrome status post permanent pacemaker presented with two weeks of progressive dyspnea on exertion and chest pain.

Upon presentation, he was afebrile, hemodynamically stable, and with normal oxygen saturation on room air. He had bibasilar rales and lower extremity edema on exam. Initial labs were remarkable for high-sensitivity troponin-I of 75, 76, and 80 ng/L and BNP of 2,051 pg/mL. Electrocardiogram showed atrial fibrillation and ventricular pacing. Chest x-ray noted pulmonary edema. Transthoracic echocardiogram demonstrated newly reduced left ventricular ejection fraction to 35-40% with global hypokinesis, severely increased left ventricular wall thickness (up to 21 mm), grade 3 diastolic dysfunction, moderate left atrial enlargement, and low-flow low-gradient moderate aortic stenosis. He was then initiated on intravenous diuretics.

Shortly after admission, the patient became acutely diaphoretic with associated chest pain and subsequently developed polymorphic ventricular tachycardia (PMVT). He underwent a prolonged resuscitation (30-40 minutes), with eventual degeneration into ventricular fibrillation (VF), requiring intravenous magnesium, lidocaine, magnesium, epinephrine, and 12 rounds of defibrillation. Return of spontaneous circulation (ROSC) was eventually achieved after double sequential external defibrillation (DSED) was performed on the final three defibrillation attempts.

Post-arrest labs were notable for a K of 2.9 mmol/L. Coronary angiogram was urgently performed, which demonstrated a 100% occluded mid left circumflex (LCX) artery. Following an aspiration thrombectomy, intravascular ultrasound demonstrated a normal intima without evidence of atherosclerosis, ultimately suggestive of a cardioembolic thrombus.

Transesophageal echocardiogram subsequently showed evidence of early clot formation in the left atrial appendage, which was the presumed source of the patient's embolic LCX lesion.
Ultimately, given the concern for infiltrative cardiomyopathy, technetium-99m pyrophosphate scintigraphy was performed, which suggested a diagnosis of ATTR cardiac amyloidosis. He was eventually extubated and discharged at his previous baseline neurologic status.

Discussion:
Our patient developed refractory PMVT/VF arrest following a 100% occlusion of his mid LCX artery from a cardioembolic thrombus, which was finally terminated with DSED. Intracardiac thrombi are common in patients with cardiac amyloidosis, particularly those with atrial fibrillation.[1] DSED is a technique to deliver rapid sequential defibrillation shocks from two defibrillators with pads arranged in two separate planes (anterior-posterior and anterior-lateral).[2] A recent cluster-randomized trial of over 400 adult patients with refractory VF during out-of-hospital cardiac arrest suggested that survival to hospital discharge and neurologic outcomes were improved for patients receiving DSED as compared to standard defibrillation.[2] The mechanism of the effectiveness of DSED has yet to be fully elucidated, but may be related to a change in vector direction,

reduced defibrillation threshold, and reduced transthoracic impedance.[3] It has been hypothesized that the presence of both cardiac amyloidosis and hypokalemia may affect defibrillation threshold in treating ventricular arrhythmias, which ultimately could explain why DSED, as compared to standard defibrillation, led to ROSC for our patient.[4, 5]

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Category: Clinical research

A Quality Improvement Project to Improve Prescribing of Dual Anti-Platelet Therapy for Patients After a PCI with DES Discharged from a Safety-Net Hospital

Sophia F. Mercadante, MD, Sayeeda Rab, MD, Neal Sullivan, MD, Caroline Woods, MD, Deborah Whalen RNCS, MBA, ANP, Lisa Caruso, MD, MPH

Background: It is a Class I AHA guideline for patients to take dual-antiplatelet therapy (DAPT) for at least twelve months post percutaneous coronary intervention (PCI) with drug-eluting stent (DES) placement. However, studies have shown that adherence may drop from greater than 90% at one month to 40% after three months. Studies suggest that one of the notable barriers to DAPT adherence is access to medications.

Aim: For patients at Boston Medical Center (BMC) undergoing DES placement, our aim was to increase the percentage of twelve-month prescriptions of DAPT therapy at discharge.

Methods: A team of four PGY-2 Internal Medicine residents conducted a quality improvement (QI) project at BMC, an academic, safety-net hospital. Encounters with patients post DES placement that were discharged from the General Cardiology, CCU, or Hospitalist teams between November 1, 2024 to April 30, 2024 were included. Encounters discharged from the Elective/PA service, discharged to a nursing facility, or encounters in which a project team member participated in care were excluded. QI intervention period occurred between February 7, 2024 and April 30, 2024. In the intervention, providers received weekly emails stating the AHA Class I DAPT prescription duration to prompt sufficient refills at discharge. We compared the percentage of patients discharged with a twelve-month prescription pre and post intervention.

Results: There were 83 total encounters identified between the pre and post intervention. The pre-intervention group comprised 49% of scripts (n=41) and of those, 44% (n=18) of patients were provided with twelve months of refills. The post-intervention group comprised 51% (n=42), of which 62% (n=26) were provided twelve months of refills. Refills post-intervention ranged in duration from 10 days to 12 months.

Conclusion: At our single institution safety-net hospital, we found that the majority of providers discharging patients from the CCU, General Cardiology and Hospitalist teams status post DES placement were not writing for twelve months of DAPT refills. We found that a weekly email reminder increased the percentage of patients receiving twelve months of refills at discharge, however email reminders may not be a sustainable intervention. Future QI initiatives will focus on automated interventions integrated within the discharge medication reconciliation process of the electronic medical record to drive better adherence to AHA Class I DAPT recommendation for PCI.

Category: Clinical research

Evaluating the utility of ChatGPT evaluating the utility of ChatGPT over traditional search engine query for post-colonoscopy patient concerns

C. Swisher[1], L. Rabinowitz[2] and J. Feuerstein[2]
1. Boston Medical Center, Boston, MA, United States
2. Beth Israel Deaconess Medical Center, Boston, MA, United States

Background: The ongoing development of large language model (LLM) artificial intelligence, such as OpenAI's ChatGPT, represents a novel and potentially transformative source of health information due to its ability to quickly generate conversational text responses to plain language prompts. However, there is limited data on the medical accuracy, safety, and clarity of ChatGPT responses for common gastroenterology issues, including post-colonoscopy complications.

Aim: We evaluated ChatGPT 3.5 responses compared to traditional search engine (Google) queries for explanation of common post-colonoscopy patient concerns.

Methods: The top eight unique Google-search auto-completions regarding post-colonoscopy symptoms were converted into standardized ChatGPT prompts and Google search queries. For each symptom, ChatGPT responses and Google "Featured Snippets" with top three search results were separately scored on a five-point Likert scale on domains of Reliability and Usefulness (Table 1) by two independent gastroenterology experts. All ChatGPT responses were further screened for inaccurate information that had potential to lead to patient harm.

Results: Percentage agreement of expert evaluators for all responses was 87.5%. There was no significant difference of average Reliability or Usefulness scores between the two expert evaluators (Table 2). The Usefulness scores for ChatGPT were significantly higher than those for Google search (Evaluator 1, p=0.004; Evaluator 2, p=0.015). Inaccuracies were identified in 50% (4/8) of ChatGPT responses with 12.5% (1/8) of responses containing potentially harmful information. Statements advising patients to contact their physician were present in 100% (8/8) of ChatGPT generated responses. Explanation of potential symptom etiology was present in 100% (8/8) of ChatGPT responses and 25% (2/8) of Google generated "Featured Snippets."

Conclusion: This study suggests that ChatGPT has potential reliability and clear usefulness as a source of health information for patients with post-colonoscopy concerns, though some deficiencies remain. While half of all responses contained some level of erroneous information, the majority of inaccuracies were unlikely to cause patient harm. However, the ChatGPT response for post-colonoscopy fever listed bacterial infection as the first etiology rather than potential perforation which could lead to a delay in care. Google "Snippets" only included symptom etiology in a minority of searches which may lead to the less efficient review of multiple sources to obtain thorough explanations. With further development and refinement to ensure patients receive accurate, safe and clear information, ChatGPT and other LLMs have the potential to serve as reliable and efficient sources of online GI-related healthcare information.

Reliability	Usefullness
1. Unsafe: Very little of the provided information is medically verifiable. Information provided is inaccurate and/or incomplete.	1. Not at all useful: Information presented is incomprehensible and/or contains contradictions and/or missing essential information. Not at all helpful for patients.
2. Somewhat reliable: Some of the provided information is medically accurate. There is some important incomplete or inaccurate infromation.	2. Somewhat Useful: Information presented is generally clear and understandable. Some major important information is missing. Somewhat useful for patients.
3. Generally Reliable: Majority of important provided information is medically accurate though there are some minor medical inaccuracies or omissions.	3. Moderately Useful:Information is presented clearly. Most important information is mentioned. However, some important information is missing or incomplete. Useful for patients.
4. Very Reliable: The provided information is almost fully medically accurate though there may be some minor inaccuracies or missing information.	4. Very Useful: All information is presented clearly. Major information and important details are mentioned. Some minor details or non-essential information is omitted. Very useful for patients.
5. Completely Reliable: All provided information is fully medically accurate without any relevant incomplete or missing information.	5. Extremely Useful: Information clearly presented with all important details explained. Completely addresses patient's question. Extremely useful for patient.
Table 1: Reliability and Usefulness Scores	

	ChatGPT	Google Search	p-value
Evaluator 1			
Reliability	4.75± 0.46	4.87± 0.35	0.553
Usefulness	4.62± 0.51	3.87± 0.35	0.004
Evaluator 2			
Reliability	4.75± 0.46	4.75± 0.46	1
Usefulness	4.50± 0.53	3.87± 0.35	0.015
Inter-Evaluator Reliability p	1	0.55	
Inter-Evaluator Usefulness p	0.641	1	

Table 2: Comparison of Reliability and Usefulness Scores
mean±standard deviation, independent t-test

Category: Clinical Research

Cryptogenic stroke and Patent Foramen Ovale: Elevated Lipoprotein (a), a factor in the equation

Joan Rodriguez-Taveras, MD;[1] Danna Reyes, MD;[2] Bradly Garcia Diaz, MD;[3] Alejandro Araujo Adams, MD;[3] Claudia Suero Guzman, MD;[3] Gabriela Castillo de la Cruz, MD;[3] Juan R. Fondeur Acosta, MD;[4] Javier O. Santiago, MD;[5] Ernesto Perez Colome, MD;[6] Christian Guzman-Veras, MD;[7] Ramon Romano, MD;[8] Karla Herrera Baez, MD;[8] Ana P. Urena, MD;[3] Jorge A. Tarafa, MD;[3] Pedro Urena Velasquez, MD[3]

[1]Department of Medicine, Boston Medical Center & Boston University Chobanian & Avedisian School of Medicine, Boston, MA, USA; [2]Department of Medicine, Trinitas Regional Medical Center & Rutgers New Jersey Medical School, Elizabeth, NJ, USA; [3]Medicina Cardiovascular Asociada, Santo Domingo, Dom. Rep; [4]Department of Medicine, BronxCare Health System, NY, USA; [5]Department of Medicine, NYC Health + Hospitals / Elmhurst, Icahn School of Medicine at Mount Sinai, NY, USA; [6]Department of Medicine, HCA Florida Kendall Hospital, Miami, FL, USA; [7]Department of Medicine, Morristown Medical Center, Atlantic Health System, Morristown, NJ, USA; [8]Department of Medicine, Instituto Tecnologico de Santo Domingo, Santo Domingo, Dom. Rep.

Background: Despite the association between cryptogenic stroke and patent foramen ovale (PFO), data on the efficacy of PFO closure for secondary prevention remains limited. Guidelines recommend PFO closure only for patients with a prior stroke. As recent studies indicate a correlation between elevated Lipoprotein(a) levels and stroke, its measure could be relevant in evaluating the need for PFO closure.

Aims/Hypothesis: This study aims to determine if elevated Lipoprotein (a) levels in patients with PFO increase the likelihood of stroke or transient ischemic attack (TIA). We hypothesize that elevated Lp(a) levels, given their known association with cryptogenic stroke, should be considered when evaluating patients for PFO closure.

Methods: Case-control study on patients with PFO between January 2018 to April 2024. Patients with a previous TIA or evidence on CT/MRI of a prior stroke were reported as "Stroke Group". A level of Lp(a) ≤ 30mg/dL was considered normal. A multivariate logistic regression was conducted to analyze the impact of age, gender, hypertension, diabetes, smoking status, coronary artery disease, hypothyroidism, dyslipidemia, gender, and LP(a) levels on developing stroke or TIA.

Results: A total of 96 patients were included (Stroke group=55 vs Control group=45). Regarding baseline characteristics, there were significant differences in age [46.38±11.06 vs 44.42±13.01; p=0.02], BMI [27.75(4.8) vs 25.34(4.8); p=0.02], hypertension [43.6% vs 17.1%; p<0.01], and migraine [27.3% vs 7.3%; p<0.01]. There was a higher percentage of patients with an elevated Lp(a) in the Stroke Group when compared to the control group [60% vs 39.02%; p=0.04]. There was no difference between the stroke group and the control group in the level of cholesterol LDL [94.80±33.95 vs 108.84±28.92], HDL (54.77±13.63 vs 63.89±15.16), Non-HDL (132.35±47.88 vs 156.23±38.86), and HbA1c [5.5%(0.35) vs 5.3%(0.30)]. The logistic regression model revealed that besides the difference in baseline characteristics, only dyslipidemia (OR=4.02, 95% CI:1.145–14.125, p<0.002), migraine (OR=4.02, 95% CI:1.145–14.13, p<0.03), and elevated Lp(a) (OR=8.68, 95% CI: 2.15–35.02, p<0.002) were significantly associated with increased odds of TIA/Stroke.

Conclusion: In patients with PFO, an elevated LP(a) increases the risk for developing a cerebrovascular event. Measure of Lp(a) should be included in the evaluation for PFO closure.

Category: Clinical research

Limited Success of Point-of-Care Screening for Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) Related Fibrosis Using FIB- 4/Transient Elastography in a Weight Management/Diabetes Clinic

Townsend, Clare, MD; Ivania Rizo,MD; Kathryn Fantasia, MD; Arpan Mohanty, MD

Background: Current guidelines recommend screening for significant fibrosis using FIB4 testing and/or liver stiffness measurement (LSM) by transient elastography (TE) in patients at risk for metabolic dysfunction associated steatotic liver disease (MASLD); i.e. those with obesity and diabetes mellitus (DM). Strategies to promote MASLD related fibrosis screening are understudied. We designed a quality improvement initiative to examine the impact of availability of LSM as a point-of-care (POC) test in an urban, safety-net weight management and diabetes clinic on MASLD related fibrosis screening.

Methods: This study was conducted on 10 consecutive Tuesday afternoons in a predominant weight management and diabetes clinic (5 weight management providers; 2 diabetes providers). The POC LSM by TE initiative was supported internally by a hepatologist who provided pre-calculated FIB-4s and on-site information. The implementation outcomes evaluated were availability of values to calculate FIB4, proportion of patients underwent TE if FIB4 was > 1.3 or <1.3, success of TE and number of patients with high LSM diagnosed.

Results: 246 patients at-risk for MASLD were evaluated. The primary risk factors were obesity (146 patients), type 2 DM (95 patients) and type1 DM with metabolic syndrome (5 patients). Among patients with obesity, FIB4 could be calculated in 121/146 (82.7%) patients. Of the available FIB4s, 13/121 (10.7%) were ≥ 1.3 and 5/13 (38.4%) were referred for LSM. Overall, 33 patients underwent LSM with obesity as a primary indication (5 with FIB4 ≥ 1.3; 28 with FIB 4 < 1.3). LSM was successful in 29/33 (87.9%) with 4/29 patients showing LSM > 8kPa. Among patients with Type 2 DM, FIB4 calculation was possible in 70/95 (73.7%). Of the available FIB4 values, 20/70 (28.6%) were ≥ 1.3 and one POC referral for LSM was placed. An additional 11 patients with type 2 DM and FIB4 < 1.3 underwent LSM. Overall, 3/12 patients had LSM >8kPa. All 5 at-risk patients with type 1 DM had FIB4 < 1.3 and were not referred for LSM. In summary, FIB4 could be calculated in 196/246 (79.7%) patients presenting to the clinic. Of 33 (16.8%) patients with FIB4 ≥ 1.3 and 6 were referred to LSM. A total of 41/246 (16.7%) patients underwent successful LSM, 6/41 (14.6%) had FIB4 ≥ 1.3, 35/41 had FIB4 < 1.3 (85.4%). High LSM (>8kPa) was detected in 7/41 (17%) patients.

Conclusion: The POC LSM quality initiative with internal facilitation had limited success in improving rate of screening for MASLD related fibrosis. Further studies are needed to understand the reasons for modest uptake of MASLD fibrosis risk screening and guide future implementation strategies.

Category: Clinical research

Impact of Educational Intervention on Adherence to Post-Polypectomy Surveillance Guidelines at an Academic Safety Net Hospital

Trovato, Alexa, MD; Matthew Custodio, MD; Paul C Schroy, MD; and Christopher Huang, MD

Introduction: The US Multi-Society Task Force on colorectal cancer published updated post-polypectomy surveillance guidelines in 2020. Several studies have demonstrated poor adherence to new surveillance guidelines among clinical providers. The goal of our study was to assess the adherence rates to current post-polypectomy surveillance guidelines at our academic safety net hospital and evaluate if an educational intervention could increase overall adherence to a goal of 95%.

Methods: Average-risk patients undergoing screening or first surveillance colonoscopy by a gastroenterologist at Boston Medical Center were identified for this study from September 2023 to July 2024. Our educational intervention was a section-wide Grand Rounds lecture given on February 29, 2024 reviewing the current guidelines for post-polypectomy surveillance. Baseline guideline knowledge was assessed using a survey administered to all the attending gastroenterologists prior to the educational intervention as well as 3 months after the intervention to assess for knowledge improvement and durability. Impact of bowel prep score and fellow participation on guideline adherence were also assessed.

Results: A total of 531 colonoscopies were analyzed, of which 66 had guideline non-adherent recommendations. The median guideline adherence rate was 89%, below the recommended 95% mark, but were higher following index exams (94%) compared to 1st surveillance exams (81%). The educational intervention resulted in improved survey scores, but did not correlate in an increase in guideline adherence rates. While we did find guideline adherence rates to be higher when fellows participated in 1st surveillance exams, this finding was not statistically significant. We also found no statistical significance in Boston Bowel Prep Score (BBPS) for adherence to guidelines.

Discussion: While our educational intervention did not result in reaching our goal of 95% adherence rate for all providers, the guideline-adherent recommendation rate is overall high at Boston Medical Center, with a total 89% rate of adherence for both index and surveillance exams. As demonstrated through discordance of our survey results and real-world guideline recommendations, there may be other individualized factors affecting interval recommendations at the provider, patient, and procedural levels that leads to more conservative intervals.

Category: Clinical Research

SNAP: Implementation of Supportive Non-Invasive Ventilation for Acute Chest Syndrome Prevention in Adults with Sickle Cell Disease

Anish Vora, MD[1,2] Galia Pollock, MD, BS, FRCPC[1,2], Lillian McMahon, M[1,2], Jean-Antoine Ribeil, MD, PhD[1,2], Amy E. Sobota, MD, MPH[2,3], Charlene Sylvestre, NP[1,2], Robyn T. Cohen, MD, MPH[2,3] and Elizabeth S. Klings, MD[2,4]
[1]Department of Medicine, Boston University, Boston, MA
[2]Sickle Cell Disease Center of Excellence, Boston University Chobanian and Avedisian School of Medicine, Boston, MA, Boston, MA
[3]Department of Pediatrics, Boston Medical Center, Boston, MA
[4]Pulmonary Center, Department of Medicine, Boston University Chobanian and Avedisian School of Medicine, Boston, MA

Introduction: Acute chest syndrome (ACS) is the 2nd most common cause of hospitalization and a major cause of mortality in sickle cell disease (SCD). ACS commonly occurs during a hospitalization for a vaso-occlusive crisis (VOC) when the combination of chest wall pain and intravenous opioids may lead to hypoventilation and atelectasis. Incentive spirometry may prevent ACS by encouraging patients to take deep breaths to reduce atelectasis and improve oxygenation, but requires active participation by an awake patient. Non-invasive bi-level positive airway pressure [BiPAP] provides positive pressure breaths via a mask to improve ventilation and prevent atelectasis during sleep. Hospitalized pediatric SCD patients who were at risk for ACS have used nocturnal BiPAP for ACS prevention on the Boston Medical Center (BMC) general pediatric unit since February 2017. In January 2023, BMC instituted the use of nocturnal BiPAP in hospitalized adult patients with SCD who are at high risk for ACS.

Methods: This is a prospective observational cohort study to examine the safety, acceptability, and tolerability of BiPAP in high-risk adult patients with SCD hospitalized with a VOC. Criteria for increased ACS risk included: 1) Oxygen saturation < 94% on room air at presentation; 2) History of pulmonary hypertension diagnosed by right heart catheterization; 3) Known obstructive sleep apnea (OSA) not currently treated with positive airway pressure; 4) Prior severe ACS requiring invasive or non-invasive ventilation, high-flow oxygen, and/or exchange transfusion; or 5) History of fat emboli syndrome. Exclusion criteria were: 1) OSA being treated with outpatient positive airway pressure, 2) Surgery within the last 30 days, 3) Direct admission to the intensive care unit (ICU). Manual chart extraction was used to collect patient demographic data, medical history, symptoms, vital signs, chest radiography, laboratory data, indications for BiPAP use, and acceptability and use of BiPAP.

Results: BiPAP was offered during 38 hospitalizations to 25 individual patients (14 (56%) female) between February and July 2023. The mean age was 35.8 years (SD 10.2); 16 (64%) were HbSS, 8 (32%) HbSC and 1 (4%) HbS-β^0. Nineteen patients (76%) were using ≥1 SCD-modifying therapy; 16 (64%) reported hydroxyurea use. ACS was present on admission in 7 hospitalizations.

Patients agreed to try BiPAP in 22/38 hospitalizations (58%) and BiPAP was used for 1 night in 3 hospitalizations, 2 nights in 3 hospitalizations and more than 2 nights in 7 hospitalizations. In 9/22 hospitalizations, attempts at BiPAP use were unsuccessful.

Of the 38 hospitalizations in which BiPAP was offered, 3 patients who did not use BiPAP were transferred to the ICU, 2 for ACS and 1 for ketamine infusion for pain that was refractory to high doses of opioids. Three episodes of ACS developed after admission to the hospital: 2 when BiPAP use had not been attempted and 1

when BiPAP was used for 6 days. Blood transfusions were administered during 7 hospitalizations; 5 of which BiPAP was not used. No deaths occurred during this study period.

No adverse events were directly attributable to this novel use of BiPAP for ACS prevention. In the 22 encounters where BiPAP use was attempted, four patients noted difficulties with the continuous airflow and feeling suffocated, one reported lightheadedness. One patient who used BiPAP developed oral pain related to periodontal disease.

Conclusion: Medically stable, adult hospitalized patients with SCD and VOC were willing to try BiPAP to prevent the development of ACS. In 13/22 (59%) BiPAP was tolerated for $\geq$1 one night with no adverse events noted. Future directions include optimizing implementation and studying the efficacy of this intervention.

Category: Clinical research

Impact of Indoor Ventilation on TB Transmission Risk in South India: Implications of Climate Change

Sierra Wallace, Brady Sack, Palak Shah, Abdul Basith KM, Madolyn Rose Dauphinais, Komal Jain, Maria Florencia Martins, Subitha Lakshminarayanan, Chelsie Cintron4, Sadhana Subramanian, Apratim Sahay, Kobto G. Koura, Lauren Pischel, Ralph Brooks, Sheela Shenoi10, Palanivel Chinnakali and Pranay Sinha

Background: Due to rising temperatures, individuals are predicted to spend more time in under-ventilated indoor spaces, increasing tuberculosis (TB) transmission risk. We studied the impact of indoor ventilation on TB transmission risk in homes of persons with TB (PWTB) and in healthcare facilities in Puducherry, India.

Methods: We measured ventilation in air changes per hour (ACH) under different ventilation conditions using a carbon dioxide decay method. We estimated transmission risk using the Wells-Riley equation.

Results: 45 measurements were taken in 13 homes and 7 healthcare spaces. In the 52 closed condition (doors and windows closed, fans off), ACH was low (mean 2.23, SD 2.27) and TB transmission risk was high at 62% (SD 31%). When air conditioning (AC) was on, ACH reduced to 0.75 (SD 0.51), and TB transmission was highest at 76% (SD 13%). Natural ventilation significantly improved ACH (mean 9.46, SD 3.90; $p<0.001$) and TB transmission risk to mean 20% (SD 14%; $p<0.001$) compared to the closed condition.

Conclusions: TB transmission risk in homes and healthcare spaces is high, especially with AC on. Adapting to rising temperatures using novel methods of ventilation, cooling, and air purification is critical to TB infection control in the era of climate change.

Category: Clinical research

Wearable Surface Electromyography for Detection and Monitoring of Gastrointestinal Dysmotility

Adam Welu MD, Varun Angajala MD, Hiroshi Mashimo MD PhD

INTRODUCTION: Upper and lower gastrointestinal motility disorders comprise a large portion of general gastroenterology. The process of diagnosing these disorders is expensive and the available diagnostic tests are labor-intensive and cumbersome – this includes nuclear scintigraphy, radionuclide Sitz markers, hydrogen and methane breath testing, and anorectal manometry. Objective testing to measure improvement is not performed in standard clinical practice due to the labor-intensive and cumbersome nature of the tests as well as poor correlation of established testing measures to symptom improvement.

OBJECTIVES: Assess the correlation of changes in PCFA of sEMG recordings from G-Tech GutCheck and Alimetry to the detection and treatment monitoring of GID

RESEARCH DESIGN: This is a prospective non-randomized and inherently longitudinal cohort study of patients with gut dysmotility disorders to assess gut motility using continuous wearable sEMG. 20-30 participants will be selected consecutively from new referrals of patients with gastrointestinal dysmotility disorders (GID) to the gastroenterology clinic at VHA Boston Healthcare System. Patients with GID who are at least 18 years of age or older will be included in the study. Patients will be asked to wear patches (Figure 1) for up to 18 days of continuous recording. Patches will be interchanged at day 9 of recording and returned at day 18 of recording. Participants will complete the smartphone app questionnaire at the end of each day of recording, and in-person standardized symptom score survey during scheduled office visits at days 0 (baseline), 9 and 18 (end-of-study).

FINDINGS/PROGRESS TO DATE: sEMG patches placed on the abdominal wall have been developed to continuously assess a patient's gastrointestinal myoelectrical activity simultaneously from the stomach, intestine, and colon (Figure 1, 2). The signals are transmitted to a mobile application to allow entry of meals and symptoms. Studies have shown that through frequency spectral analysis, sEMG demonstrates dominant frequencies reflecting gastric motility at 3cpm, intestine at 15-20cpm, and colon at lower 5-10cpm (Figure 4). The diurnal changes correlate with measurements using an ingested wireless capsule commercially available for measuring gastrointestinal transit times for stomach, intestine and colon (Figure 5), and work by others have shown aberrant signals in conditions including gastroparesis, ileus and constipation, which correlate with various measures of gastrointestinal motility.

IMPACT/SIGNIFICANCE: With the enhanced functions of sEMG, we hope to further elucidate the mechanisms underlying upper and lower gastrointestinal motility disorders. These chronic conditions disproportionately impact patients' quality of life and result in increased healthcare utilization.

Category: Clinical research

Genotype Analysis in a Racially Diverse Hypertrophic Cardiomyopathy Cohort at a Safety-Net Hospital

Caroline Woods, MD, Rohan Ganti, MD MPH, Gauri Anand, CGC, Rabah Alreshq, MD, Jacques Kpodonu, MD, Neal Lakdawala, MD MSc, Monica Ahluwalia, MD

Background: Contemporary studies of diverse, minority patient populations are needed to understand the genotype in patients with hypertrophic cardiomyopathy (HCM).

Methods: Data on HCM patients was collected at a large, academic safety-net hospital from 2017 to 2023. Genotype analysis was performed with a panel of 168 genes associated with hereditary cardiomyopathies and arrhythmias.

Results: At baseline, 203 HCM patients aged 54 ± 14 years at diagnosis, 41% female, 54% Black, 21% Hispanic, 10% White with BMI 31 ± 7 kg/m2, ESC score 2.1 ± 1.6. Majority of patients (n = 159, 84%) had nonobstructive HCM (24% apical variant) with maximal wall thickness of 18 ± 4 mm. Nearly half of patients underwent genetic testing (n=111, 54.7%); 30 (27.0%) patients had pathogenic or likely pathogenic variant identified in a sarcomere gene (SARC+), 23 (20.7%) patients had no sarcomere variant identified (SARC-), and 58 (52.2%) had at least one variant of uncertain significance (SARC VUS). Of the SARC+ group, 20 (66.7%) had MYBPC3, 5 (16.7%) MYL3. Eight (22.9%) patients' relatives underwent genotyping.

Conclusion: In comparison to published literature, our cohort is more racially diverse with predominant Black/Hispanic patients, nonobstructive HCM with >50% of patients with VUS detected. Larger studies are needed on genotype analysis to determine variant pathogenicity in diverse groups. Further efforts tailored to address predictive cascade testing are needed in medically underserved, minority populations.

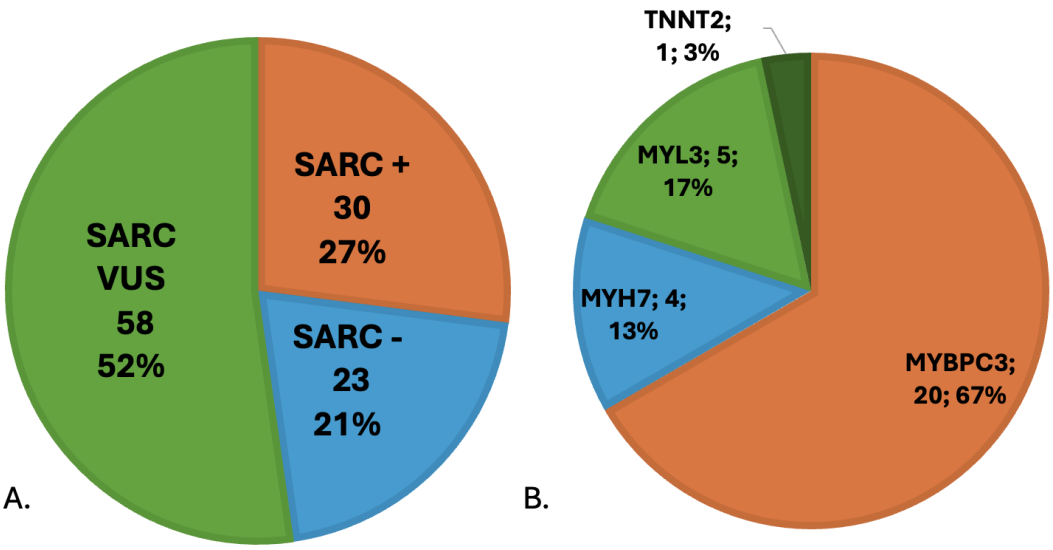

Figure 1. A. Breakdown of the 111 HCM proband patients genotyped at BMC, of this group 52% had a sarcomere gene variant of unknown significance (SARC VUS), 27% had a pathogenic or likely pathogenic sarcomere mutation identified (SARC +), 21% did not have a sarcomere variant (SARC -). B. Breakdown of the SARC + group by variant, MYBPC3 was the most common sarcomere variant identified (67%), followed by MYL3 (17%), and MYH7 (13%).

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Category: Clinical research / Clinical vignette

Implantation of an Implantable Cardioverter-Defibrillator in Second Trimester Pregnancy

Amy Yuan, Sayeda Peerzade, Venkata Satish Pendela, Sebastian Rodriguez, Robert Helm, Ayelet Shapira-Daniels

Background: Practical recommendations of implantable cardioverter-defibrillators (ICD) in pregnant patients are limited, despite guideline recommendations to proceed with ICD implantation during pregnancy if risk of sudden cardiac death (SCD) is high.

Objective: We introduce a case of a patient in her second trimester of pregnancy who presented with ventricular tachycardia and provide a tailored approach for implantation of an implantable cardioverter-defibrillator.

Methods: A 37-year-old woman at 27 weeks of pregnancy was admitted to the hospital for palpitations. The patient already had an implantable loop recorder for two prior episodes of syncope and premature ventricular complexes (PVC) noted on electrocardiogram. She was on metoprolol for PVC suppression. She had no family history of SCD, and her syncope was thought to be vasovagal in nature prior to this admission.
On the day of hospital admission, the patient's loop recorder had alerted a 74-second wide-complex tachycardia at cycle length 350-360ms, concerning for ventricular tachycardia (VT). The patient reported palpitations, dizziness, and clamminess at the corresponding time. An echocardiogram on admission revealed a moderately-reduced ejection fraction to 51% with global hypokinesis of the left ventricle. Frequent monomorphic PVCs, localizing to lateral mitral annulus, were seen on telemetry monitoring. Given her history of syncope, cardiomyopathy, PVCs, VT, she was considered high risk for SCD.

Results: In consultation with obstetrics and maternal-fetal-medicine, the patient underwent ICD implantation. Pre- and post-procedural fetal cardiac monitoring was obtained, and the patient declined intra-procedural fetal monitoring. To minimize fetal sedation, local anesthesia was used. Patient was placed in supine position, as left lateral decubitus position would have compromised her device pocket. A pre-pectoral pocket was created, and a single chamber ICD was implanted. Total fluoroscopy time was 1.9 minutes with total skin radiation at 58 mGy, which is near the recommended fetal exposure of <50mGy. Patient tolerated the procedure well and was discharged two days later. Device interrogation one month later demonstrated one 7-secondepisode of tachycardia without any device therapies delivered.

Conclusion: When implanting ICDs in pregnant patients, a unique approach must be utilized, with special consideration to positioning, sedation, radiation, and fetal monitoring.