Hyperuricemia and Osteoarthritis, a Potential Link

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Introduction

- Osteoarthritis (OA) is the leading cause of musculoskeletal pathology worldwide and its prevalence is expected to rise. OA typically affects the lower extremities, most commonly the hip and knee joints, and is the leading cause of lower extremity disability in older adults.

- Though the overlap between normal structure changes in aging and the pathological process of OA present a challenge to epidemiological studies, it is estimated that OA affects approximately 15% of the world population, with an estimated lifetime risk of developing OA being 60% in men and 41% in women.

- Given the expected rise in prevalence of OA, it is important to better understand the inflammatory process and vascular dysfunction that is associated with OA and further identify biomarkers that may be associated with severe osteoarthritis.

- Gout, a state of excess uric acid, may be associated with a greater risk of developing knee osteoarthritis.

Objectives

- Pilot and survey studies have previously documented a positive correlation between asymptomatic hyperuricemia and knee osteoarthritis, however, data from molecular assays regarding this topic is sparse.

- The goal of this study is to use a commercially available uric acid assay to retrospectively look at the level of uric acid and knee in patients who have gone total knee replacement surgery, potentially consisting asymptomatic hyperuricemia as an independent risk factor for knee osteoarthritis. In this case, severe knee arthritis that was significant enough for a total knee replacement.

Methods

- Ongoing data collection

- The goal is to see a trend between advanced OA and uric acid

- If there is a positive correlation, this could potentially imply that gout and any state of excess uric acid my accelerate OA

- This may translate into clinical medicine as less chance of OA development and progression with stricter uric acid control

Results

Ongoing data collection

References

The Role of Structural Violence in Acute Myeloid Leukemia Outcomes

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1University of Illinois at Chicago, 2University of Chicago, 3Northwestern University, 4Rush University Medical Center, 5Loyola University Medical Center, 6John H. Stroger, Jr. Hospital of Cook County

Introduction

- Non-Hispanic Black and Hispanic patients with Acute Myeloid Leukemia (AML) have higher mortality rates than non-Hispanic White (NHW) patients despite lower incidence, more favorable genetics, and a younger age at presentation (Storbeyr, Blood Adv. 2017).
- We performed a multilevel analysis of disparities in AML, to investigate the contribution of structural violence (neighborhood disadvantage exacerbated by social, economic, and political systems) on racial/ethnic differences in leukemia-specific survival.

Methods

- Adult AML (non-AML) patients diagnosed between 2012 and 2018 at six academic cancer centers in the Chicago area were included.
- Census tract data was collected using the FFTEC Geocoding/Mapping System and computed tract disadvantage and tract Cronbach’s alphas were categorized into distribution tertiles (low,medium, high).
- Time to relapse and death from leukemia were examined, adjusting for age, gender, and race/ethnicity (dataset models), and for potential mediators of racial disparities including dialysis (Charlson Comorbidity Index (CCI), weight, comorbid medical conditions, and comorbid medical conditions).
- We investigated if the relationship between neighborhood disadvantage and mortality is mediated by socioeconomic factors (e.g., income, education level, employment status). We also examined if the relationship between neighborhood disadvantage and mortality is mediated by structural violence (e.g., racism, economic policies).

Results

Patient characteristics are shown in Table 2 (1 in 82). Significant heterogeneity in age and comorbidities at diagnosis was observed, with Hispanic patients being the youngest and with the lowest CCI. Mortality was more prevalent in NH and Hispanics (27% and 33%, respectively) compared with NHW (11%) patients. Payer source also differed significantly; private insurance was twice as frequent among NHW than NH (3% vs. 25% patients), while the largest uninsured population was Hispanic.

ELN adverse risk disease was most prevalent in NHW subjects. NPM1 mutations were more prevalent in Hispanic patients, and p53 mutations were more prevalent in NHW (25%) compared to NHW (13%) and Hispanics (5%) although due to low numbers this did not reach significance (p=0.13). NB and Hispanic patients tended to reside in more disadvantaged and less affluent areas.

Treatment variables were assessed for 756 patients (Table 2). 75% received intensive induction therapy and chemotherapy. All patients received intensive therapy (59% intermediate risk, 33% high risk, 8% standard risk). NPM1 and ELN scores differed by race/ethnicity, and race/ethnicity and socioeconomic status.

Minority (vs. NHW) ethnicity was associated with a 42% increased hazard of death from leukemia (HR=1.42, 95% CI 1.05-1.89), and a 33% increased hazard of death from all causes (HR=1.38, 95% CI 1.07-1.72), each after controlling for age, gender, and study site.

Discussion

This study is the first to integrate data at the individual patient level with neighborhood characteristics, using census tract level variables to examine their contribution to AML patient outcomes.

To date, formal mediation methods have not been employed to disentangle socioeconomic disparities in adult AML survival. Our mediation analysis shows that census tract level SES explains a substantial proportion of the disparity in hazard rate of death from leukemia. In addition, the observed disparities in treatment complications of induction therapy, as reflected by ELN adhesions, and the continued disparity in allo-geneic transplant utilization all warrant further study. These results draw attention to the need for deeper investigation into the social and economic barriers to successful treatment outcomes for leukemia patients and represent an important first step toward designing strategies to mitigate these persistent health inequities.

References

Correlation of Cellular Indices and D-dimer/Fibrinogen Ratio to Gender Differences in 6-Minute Walk Test Distance in Patients Presenting with Acute Pulmonary Embolism

Nathalie Antonios, MD; Katerina Porcaro, MD; Dailla Masic, PharmD; Sorcha Allen, MD; Alexandru Marginean, MD; Ahmad Manshad, MD; Shannon Kuhrau, PharmD; Ibrahim Chowdhury, PharmD; Karim Merchant, MD; Lucas Chan, MD; Stephen Morris, MD; Jeremiah Haines, DO; Jawed Fareed, PhD; Tevgeny Brailovsky, DO, MSc; Amir Darki, MD, MSc

Background

- The six-minute walk test (6MWT) is a simple and well-validated test to assess functional status and predict morbidity and mortality in several chronic cardiopulmonary disease states.
- Neutrophil to lymphocyte ratio (NLR) reflects a pro-inflammatory state.
- Increased platelet to lymphocyte ratio (PLR) has been associated with increase in thrombus burden.
- Elevated D-dimer to fibrinogen ratio (D/f) reflects fibrinolysis activation.
- No study has investigated the correlation of these indices with gender differences in 6MWT in patients presenting with pulmonary embolism (PE).
- The objective of this study was to evaluate the gender differences in 6MWT and its impact on outcomes

Baseline Characteristics

<table>
<thead>
<tr>
<th>Baseline Characteristic</th>
<th>Males (n=230)</th>
<th>Females (n=251)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years), mean ± SD</td>
<td>59 ± 14</td>
<td>62 ± 16</td>
</tr>
<tr>
<td>BMI (kg/m²), mean ± SD</td>
<td>31 ± 8</td>
<td>34 ± 10</td>
</tr>
<tr>
<td>Race, n(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>142 (61.2)</td>
<td>140 (55.8)</td>
</tr>
<tr>
<td>Black</td>
<td>68 (28.8)</td>
<td>77 (30.7)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>16 (6.8)</td>
<td>17 (6.8)</td>
</tr>
<tr>
<td>Other</td>
<td>7 (3.0)</td>
<td>12 (4.8)</td>
</tr>
<tr>
<td>Past Medical History, n(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>130 (55)</td>
<td>121 (53)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>54 (23)</td>
<td>55 (22)</td>
</tr>
<tr>
<td>CVD</td>
<td>27 (11)</td>
<td>31 (12)</td>
</tr>
<tr>
<td>COPD</td>
<td>21 (9)</td>
<td>17 (7)</td>
</tr>
<tr>
<td>CAD</td>
<td>34 (14)</td>
<td>23 (9)</td>
</tr>
<tr>
<td>PVD</td>
<td>10 (4.2)</td>
<td>30 (4)</td>
</tr>
<tr>
<td>Prior PE</td>
<td>30 (13)</td>
<td>36 (14)</td>
</tr>
<tr>
<td>Severity of PE, n(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Massive</td>
<td>15 (6.4)</td>
<td>14 (5.6)</td>
</tr>
<tr>
<td>Submassive</td>
<td>140 (59.3)</td>
<td>151 (60.2)</td>
</tr>
<tr>
<td>6MWT Distance (95% CI)</td>
<td>764.4</td>
<td>518.9</td>
</tr>
</tbody>
</table>

Results

- We retrospectively evaluated all acute PE patients from our Pulmonary Embolism Response Team Registry who completed a 6MWT during their initial hospitalization.
- Differential complete blood count data along with d-dimer and fibrinogen were collected within 24 hours prior to PE diagnosis.

![Figure 1: 6MWT Distance Based on Gender](image)

Table 2. Correlation of Neutrophil to Lymphocyte Ratio and 6MWT

<table>
<thead>
<tr>
<th></th>
<th>Beta</th>
<th>SE</th>
<th>Std beta</th>
<th>t</th>
<th>P value</th>
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<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>NLR</td>
<td>17.9 ± 1.8</td>
<td>15.9 ± 3.1</td>
<td>-0.19</td>
<td>-1.7</td>
<td>0.09</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLR</td>
<td>14.3 ± 9.7</td>
<td>13.1 ± 8.9</td>
<td>-0.202</td>
<td>-1.93</td>
<td>0.05</td>
</tr>
</tbody>
</table>

![Figure 2: Correlation of Platelet to Lymphocyte Ratio and 6MWT](image)

- A total of 186 patients underwent baseline 6MWT and lab tests between March 2016 and January 2020.
- The mean walking distance for males (765 ft) was further than females (519 ft; figure 1).
- Multivariable regression analysis was calculated to investigate predictors of 6MWT in males vs females
- NLR, PLR, and D/f had a negative correlation with walking distance in females (r = -0.20, p <0.05; r = -0.3, p<0.01; and r = -0.15, p<0.05; figure 2)
- NLR, PLR, and D/f did not correlate with 6MWT in males.

Conclusions

- Female patients, in our study, had significantly shorter walking distance after acute presentation in PE.
- This may reflect higher inflammatory and prothrombotic state in females.
- Future studies will need to expand on these findings.
Introduction

- In the next decade, Alcohol-associated Liver Disease (ALD) is expected to contribute the largest burden to liver disease in the United States.\(^1\)
- Alcoholic hepatitis (AH) has a high morbidity and mortality, and treatment options are limited.\(^2,3\)
- Protein-calorie malnutrition (PCM) is present in nearly all patients with alcoholic hepatitis and improvement in PCM has been shown to improve survival.\(^4,5\)
- In 2006, the European Society for Clinical Nutrition and Metabolism (ESPEN) developed evidence-based guidelines for nutrition in patients with AH including recommendations on daily energy and protein intake.\(^6,7\)
- Adherence to the ESPEN guidelines remains unclear.

Objectives

- To assess adherence to the ESPEN guidelines during inpatient hospitalization of patients with alcoholic hepatitis.
- To explore the association of adherence to ESPEN Caloric and protein goals with clinical outcomes including in-hospital infection, recovery from steatohepatitis, and survival.
- If non-adherence is identified, to determine what barriers there are to adherence and to develop strategies to improve adherence in the future.

Methods

- A clinical research database (CRDB) search was performed that included patients 18 years or older who were hospitalized with severe alcoholic hepatitis between June 1st, 2012 and December 31st, 2020.
- A total of 347 patients met these criteria and were extracted. Each patient's chart was manually reviewed and 103 patients met NIAAA criteria for severe alcoholic hepatitis during our initial review. Variables were collected and entered into Redcap.

Preliminary Results

<table>
<thead>
<tr>
<th>% who met ESPEN nutritional goals</th>
<th>Did not meet ESPEN goals</th>
<th>Met ESPEN goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>% who met ESPEN nutritional goals</td>
<td>84.1%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Did not meet ESPEN goals</td>
<td>20 (36.2%)</td>
<td>33 (63.8%)</td>
</tr>
<tr>
<td>Met ESPEN goals</td>
<td>32 (59.3%)</td>
<td>22 (40.7%)</td>
</tr>
</tbody>
</table>

Table 1: Characteristics of patients with severe alcoholic hepatitis and among those who met ESPEN goals.

Preliminary Conclusions

- 86.4% of patients did not meet ESPEN nutritional goals during their inpatient hospitalization for alcoholic hepatitis.
- The identification of barriers to adherence may serve as actionable targets for future quality improvement efforts.
- Further data collection and analysis needs to be performed to further inform how nutrition impacts the natural history of severe alcoholic hepatitis.

References

INTRODUCTION

- FLIP (Functional Lumen Imaging Probe) is a diagnostic tool used to evaluate esophageal motility disorders (EMD).
- Following endoscopy, a catheter with an inflatable balloon is inserted into the esophagus and expanded.
- FLIP utilizes high-resolution impedance planimetry during volume-controlled balloon distension to measure cross sectional area (CSA) and esophageal distensibility.
- Rapid assessment of esophageal mechanical properties and opening dynamics of esophagogastric junction (EGJ) provide useful insight into the diagnosis of EMD.

AIMS

- Evaluate the utility of EndoFLIP in predicting endoscopic or surgical interventions performed in patients with EMD.

METHODS

- Retrospective cohort study of 149 patients undergoing FLIP at LUMC between 2018-2020.
- EMR utilized for patient demographics, FLIP metrics and post-FLIP esophageal interventions.
- Distensibility index (DI) and CSA were evaluated at 30mL, 40mL, 50mL, 60mL, 70mL.
- Abnormal FLIP was defined by retrograde, aberrant or absent esophageal body peristalsis and EGJ-DI <2.6mm/10mHg.
- Primary outcome: proportion of surgical and endoscopic esophageal intervention in patients with abnormal FLIP compared to those with normal FLIP.

RESULTS

- 149 FLIPs were performed at LUMC from 2018-2020.
- Mean patient age was 58 years old: 61% women and 38% men.
- Mean symptom duration prior to FLIP was 61 months.
- Dysphagia was most common indication for FLIP (68%).
- 119 patients had abnormal FLIP. 33 patients (27.7%) had an endoscopic or surgical intervention for EMD within 3 years.
- 30 patients had normal FLIP results. 7 patients (23.3%) had an endoscopic or surgical intervention for EMD within 3 years after FLIP.
- Comparison of intervention between patients with normal and abnormal FLIP showed no significant difference: X² (1, N=149) = 0.236, p=0.627.

CONCLUSION

- Patients with abnormal FLIP trended towards increased surgical or endoscopic therapies for EMD than those with normal FLIP, though this trend was not significant.
- 7 of 30 (23.3%) patients with normal FLIP underwent intervention, suggesting the implication of a normal FLIP remains to be fully understood.
- Impact of prior intervention, loss to follow up and referral of intervention in patients with abnormal FLIP was apparent and should be considered.
- Correlation of FLIP metrics with high resolution manometry, timed barium esophagram and endoscopy is an area of ongoing research and requires further study.
Optimization of Allergy History and Time of Antibiotic Delivery for Febrile Neutropenia

(1) Background & Problem Statement

- High risk patients with febrile neutropenia presenting to the ED require prompt therapeutic intervention. Systems to gather complete and accurate allergy history can provide a safety check and avoid delays in treatment, which could possibly affect overall patient outcomes.

- Adverse drug reactions (ADRs) are common in the inpatient setting:
  - Up to 20% of inpatients have an ADR, and 10-15% of hospitalized patients have antibiotic allergy.
  - Patients with antibiotic allergies have increased length of stay, higher cost of hospitalization and higher rates of hospital readmissions.
  - There are no standardized ways to collect allergy history.
  - Storage and presentation of allergy history in EHR can affect our actions.

- Febrile neutropenia (FN) is an oncology emergency with high mortality:
  - Defined as temperature >38.3 °C once or >38 °C for 1 hour and ANC < 500.
  - Standard treatment at our institution is empiric, however this is controversial in patients with severe pneumonia.
  - In-hospital mortality for FN estimated 8.9%.
  - In patients aged 66, mortality increased to 12.5%.
  - This is higher than mortality seen in STEAM, NSTEMI, stroke, pneumonias, all estimated <10% in various studies.
  - Time to antibiotics of 60 min is goal for treatment, like sepsis goals.
  - Unclear how this affects mortality, but many sites have protocols for treatment of FN to improve time to antibiotics.
  - Protocols need to be easily accessible to be useful.

(2) Fishbone Diagram

Ways to reduce time to antibiotics (TTA) from ED for febrile neutropenia:

- Study from O’Grady Clinic implemented measures in ED to reduce TTA, including reclassifying severity to IV/IVAD equivalent, making standardized order set for medications and giving antibiotics before CBC returned.
- Median TTA improved from 235 minutes to 81 minutes, with 87% receiving antibiotics in <90 minutes.
- One year after study period closed, even without further interventions, the TTA was maintained at <81 min for patients presenting to the ED with febrile neutropenia.

(3) Discussion – Adverse drug reactions

Standardizing how we collect adverse drug reaction (ADR) history with questionnaires:

- Project used questionnaires (Fig. 1) to assess ADR history in patients admitted to hospital with documented allergy. They analyzed for clinically significant changes in patient’s allergy list.
- 61% of the 202 patients had clinically significant changes, mostly commonly adding a description.
- Better exposure of allergy resolution would improve utility or iterations.

(4) Discussion – Febrile neutropenia protocols

(5) Next Steps

- Improve adverse drug reaction history collection and presentation of data in CPRS.
- Integrate allergy questionnaire into outpatient notes as part of nurse visit or reminder.
- Include allergy confirmation or acknowledgment in admission order set to prompt recognition and confirmation of allergy.
- ED and inpatient pharmacists already taking active role in "clearing" antibiotic allergies/ADR that are not clinically significant.

(6) References

Efficacy of Early Push Enteroscopy in LVAD Patients with Upper GI Bleeding

Andrew Choi MD 1, Thomas Konturek MD 2, Abdul Haseeb MD, MPH 2
1Department of Internal Medicine, Loyola University Medical Center, Maywood, IL
2Division of Gastroenterology and Nutrition, Loyola University Medical Center, Maywood, IL

Introduction
- Heart failure is a progressive and chronic disease affecting approximately 5.8 millions adults in the United States
- Continuous Flow (CF) LVADs have become the standard of care for patients when candidacy for transplantation is deferred, either as Bridge to Transplant (BTT) or as Destination Therapy (DT)
- CF-LVADs have been shown to improve survival when compared to Pulsatile Flow LVADs. However, CF-LVADs concomitantly increase the risk of GI bleeding thought secondary to a complex pathophysiological process
- Angiodysplasia is the most common cause of GI bleeding in LVAD patients, accounting for around 40% of all bleeding events. Typically, these angiodysplasias in LVAD patients are found in the upper and middle GI tract
- Prior single center studies suggest that an initial approach with push enteroscopy lead to higher diagnostic and therapeutic yields due to the typical location of angiodysplasias in this population

Aim
- We hypothesize that the use of push enteroscopy (PE) as the initial endoscopic procedure in CF-LVAD patients presenting with Upper GI Bleeding (UGIB) leads to a higher diagnostic and therapeutic yield as compared to EGD or EGD/Colonoscopy

Methods
- Single-center retrospective cohort study
- Study period: 7/6/2010 to 12/19/2020
- Inclusion Criteria: Age >18; CF-LVAD (HMII or HVAD), admission for Upper GI Bleeding
- Primary outcome: Diagnostic and Therapeutic Yield of Endoscopy
- Secondary outcomes: 30-day readmission rate for GI bleeding, hospital length-of-stay, total number of endoscopic procedures, total number of blood product requirements

<table>
<thead>
<tr>
<th>Table 1: Demographics</th>
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<tbody>
<tr>
<td>Total Number of Patients</td>
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<tr>
<td>Sex</td>
</tr>
<tr>
<td>- Male</td>
</tr>
<tr>
<td>- Female</td>
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<tr>
<td>Type of LVAD Therapy</td>
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<tr>
<td>- BTT</td>
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<tr>
<td>- DT</td>
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<tr>
<td>Total Admissions for GI Bleed</td>
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<tr>
<td>Type of GI Bleeding</td>
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<tr>
<td>- Upper</td>
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<tr>
<td>- Occult</td>
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<tr>
<td>- Lower</td>
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<table>
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<tr>
<th>Table 2: Type of First Endoscopy in Upper GI Bleed</th>
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<tbody>
<tr>
<td>EGD</td>
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<tr>
<td>Push Enteroscopy (PE)</td>
</tr>
<tr>
<td>EGD/Colonoscopy</td>
</tr>
<tr>
<td>EGD/VCE</td>
</tr>
<tr>
<td>Push/VCE</td>
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<tr>
<td>EGD/Colonoscopy/VCE</td>
</tr>
<tr>
<td>VCE</td>
</tr>
<tr>
<td>Balloon Assisted Enteroscopy</td>
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<td>Not Performed</td>
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Figure 1: Diagnostic and Therapeutic Yields of Endoscopy

<table>
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<th>Therapeutic Yield</th>
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<tr>
<td>EGD</td>
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<tr>
<td>Push Enteroscopy</td>
<td>0.444</td>
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<tr>
<td>EGD/Colonoscopy</td>
<td>0.62</td>
</tr>
<tr>
<td>EGD/VCE</td>
<td>0.59</td>
</tr>
<tr>
<td>Push/VCE</td>
<td>0.36</td>
</tr>
<tr>
<td>VCE</td>
<td>0.07</td>
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</tbody>
</table>

Conclusions
- The use of EGD as initial endoscopy in CF-LVAD patients with UGIB resulted in a higher diagnostic yield as compared to PE or combined EGD/Colonoscopy
- However, the use of PE had a higher therapeutic yield as compared to other modalities
- Additional studies will be necessary to further elucidate the role of early push enteroscopy in LVAD patients presenting with UGIB

References
Machine Learning Prediction of Pulmonary Embolism Mortality

Matthew Collins, Ahmad Marashi, Nicolas Kepostman, Josh Newman, Sorcha Allen, Muhanad Manshash, Oguz Albigic, Jawad Farez, Anir Darski

Introduction

- Acute pulmonary embolism (PE) is a common, life threatening complication of venous thromboembolism
- Incidence of VTE is 23 to 69 cases per 100,000 persons annually in the United States.
- Mortality varies significantly depending on severity of disease, with low-risk patients predicted to have a 30-day mortality rate of 2.3%, compared to 11.4% in high-risk patients.
- Current risk stratification tools lack lack positive predictive value.
- Machine learning (ML) is a methodology that incorporates developmental processes to recognize complex patterns for aiding in making rational decisions. In clinical practice, machine learning algorithms have been designed to routinely and accurately predict prognosis based on large volumes of patient information.
- The aim of this study was to create a machine learning instrument to predict 30-day all-cause mortality in patients diagnosed with acute PE.

Methods

- Utilizing ML algorithms, predictors of 30-day all-cause mortality were compared to conventional risk stratification models, PE severity index (PESI) and its simplified version (sPESI).
- (XGBoost), gradient boosting machine (GBM), random forest (RF), deep neural networks (DNN) and general linear models (GLM) ML algorithms were included.
- Finalized ML models were compared to each other, as well as reference models PESI and sPESI, using receiver operating characteristics (ROC) curves.
- 10 most important predictor variables in our dataset for 30-day mortality were identified based on decreases in accuracy by exclusion of each specific variable.
- Classification performance of the truncated XGBoost models were compared on ROC curves.

Results

- In the available literature, our XGBoost ML algorithm represents the first ML program to predict 30-day PE mortality.
- XGBoost can be used at point of contact without a need to access prior medical history or integrate the algorithm into one’s EMR, like the most commonly used algorithms PESI and sPESI, but with a superior AUC, sensitivity, specificity, and accuracy.
- XGBoost uses traditional, well understood markers of PE severity (lactate & respiratory rate) as well as new, less well understood ones (Red Cell Distribution Width & Neutrophil/Lymphocyte Ratio)
- Lactate $\rightarrow$ tissue hypoperfusion, shock, RV failure
- Respiratory Rate $\rightarrow$ acute, pulmonary mechanicrector stress and activation
- RVD $\rightarrow$ increased in situations of high inflammation, particularly in the setting of concomitant RAAS activation, RV failure, and worsened lung function
- NLR $\rightarrow$ inflammatory marker that is increased by adrenaline and glucocorticoid release seen in severe PE that may have an association with platelet activation, PE propagation, and worsening PE severity.

Discussion

- Conclusion: Compared to conventional risk stratification models, XGBoost and other ML models demonstrated a superior ability to predict short-term all-cause mortality in patients with acute PE.
- Limitation: Without external validation, our model remains unproven, and is our next step in its development.

References

Impact of Meropenem De-escalation on Outcomes of Febrile Neutropenia Patients
Hina Dalal, DO, Austin Fan, MD, Maressa Santorossa, PharmD, Fritzie Albarillo, MD, Stephanie Tsai, MD
Loyola University Medical Center, Edward Hines, Jr. V.A. Hospital

Background
Numerous studies have shown clinical benefits and lack of adverse effects when patients with febrile neutropenia are de-escalated from broad to narrow-spectrum antibiotics.
Ford et al. demonstrated longer lengths of stay, durations of severe neutropenia and 10% higher hospital cost in patients receiving empiric carbapenem over cefepime or piperacillin/tazobactam.
Aguilar-Guisado et al. illustrated that antibiotic de-escalation in febrile neutropenia with negative infectious work-up before absolute neutrophil count recovery was associated with a lower risk of recurrent fever and had no impact on adverse drug events, ICU transfer, and in-hospital mortality.
Per the pharmacy and therapeutics committee, the most common empiric antimicrobial used for febrile neutropenia at LUMC is meropenem and it is generally not appropriately de-escalated, even when recommended by the infectious diseases team.

Objective
The purpose is to conduct a retrospective review evaluating outcomes after appropriate de-escalation of meropenem among patients with neutropenic fever for non-inferiority, demonstrating that de-escalation is not associated with poorer outcomes.

Methods and Outcomes
- ICD-10 coded febrile neutropenia in Hematology/BMTU patients at LUMC from November 2019 to November 2020 with the following diagnoses:
  - Acute lymphoblastic leukemia
  - Acute myeloblastic leukemia
  - Aplastic anemia
  - Multiple myeloma
  - Myelodysplastic syndrome
  - Hodgkin or non-Hodgkin lymphoma
  - Autologous or allogeneic stem cell transplant
- Exclusion criteria:
  - <18 years of age
  - Clinically does not meet definition of febrile neutropenia
  - Did not receive meropenem for ≥ 48 hrs
  - Received treatment with vaspressors
  - No diagnosis of hematological malignancy

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Rate of appropriate Meropenem de-escalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary measure</td>
<td></td>
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<tr>
<td>Process measures</td>
<td>Meropenem days of therapy (DOT)</td>
</tr>
<tr>
<td></td>
<td>Frequency of ID consultation</td>
</tr>
<tr>
<td>Balancing measures</td>
<td>Rate of C. difficile infection</td>
</tr>
<tr>
<td></td>
<td>ICU transfer</td>
</tr>
<tr>
<td></td>
<td>Length of stay</td>
</tr>
<tr>
<td></td>
<td>Fever recurrence</td>
</tr>
<tr>
<td></td>
<td>Mortality</td>
</tr>
</tbody>
</table>

Initial Intervention
- In July 2019 LUMC P&T committee creates antibiotic de-escalation algorithm for febrile neutropenia, however it has poor uptake into clinical practice
- Barriers include:
  - Varying physician preference regarding timing the de-escalation of antibiotics
  - Lack of clinician awareness of implemented de-escalation algorithm
  - Clinician preference on consulting ID to assist in managing febrile neutropenia
  - Pharmacy has protocol for Meropenem approval, but de-escalation is dependent on the primary provider.

Gap Analysis
- PDSA cycle for initial algorithm demonstrated the need for attendings to agree with antibiotic de-escalation for practice to be adopted
- Redesign study from ‘pre vs post algorithm’ to ‘de-escalation vs continuation of meropenem’ to show non-inferior, and perhaps improved, outcomes in febrile neutropenia patients
- Thus, facilitate hematology implementing early de-escalation at LUMC followed by adoption of practice by medical trainees

References
Efficacy of Contact Precautions in Controlling the Spread of MRSA and VRE

Sovik De Sirkar, MD; Laura Miller, MPH; David Blade, MD, JD
Loyola University Medical Center

Background

Contact precautions (CP) are physical safeguards such as disposable gowns and gloves that limit any direct physical contact between patients and providers. The Centers for Disease Control and Prevention (CDC) recommends using contact precautions for vancomycin-resistant enterococci (VRE) and methicillin-resistant Staphylococcus aureus (MRSA) colonized or infected patients to limit the spread of these infections. The original studies that demonstrated the efficacy of contact precautions for limiting the spread of MRSA and VRE infections, however, were likely confounded by other factors such as improved hand hygiene, chlorhexidine bathing, and active surveillance cultures. Several pilot studies at other institutions have since found contact precautions do not decrease the spread of these infections.

Furthermore, contact precautions can be costly, increase the time it takes for medical teams to make their daily rounds, and decrease the overall time healthcare providers spend with their patients. Less interaction with providers has been linked to an increased incidence of falls and pressure ulcers.

In March 2020, Loyola University Medical Center (LUMC) suspended the mandate to use contact precautions to treat patients with MRSA and VRE as a measure to preserve personal protective equipment for the Covid-19 pandemic.

Objectives

To determine if the suspension of contact precautions led to a statistically significant increase in the rate of healthcare-acquired MRSA and VRE infections, or MRSA- and VRE- noses colonization, at LUMC.

To determine if the suspension of contact precautions led to a decrease in the percentage of LUMC patients with healthcare-acquired MRSA and VRE infections experiencing new falls or pressure ulcers.

Methods

This was a retrospective Quality Improvement (QI) study of patients admitted to LUMC between May 2019 to January 2020 and May 2020 to January 2021. The interim period was not evaluated as this was the start of the Covid-19 pandemic and the use of CP was in flux.

A Loyola clinical QA analyst utilized Microsoft SQL to connect to the electronic medical record and MedMined to extract all pertinent data. This included the number of monthly healthcare-associated infections, MRSA noses colonization, and documented falls and pressure ulcers.

MedMined is a local database that houses all of Loyola’s infectious disease data, which is populated monthly by the Infection Control team.

Healthcare-associated infections (HAI) are defined as infections that occur on or after the 3rd day of admission and meet certain site-specific infection criteria. HAI generally describe infections related to the use of central lines, indwelling urinary catheters, ventilators, or surgical sites.

Results

The monthly HAI rate per 1,000 patient days is displayed in Figure 1 below, with the dotted lines illustrating the rates with the use of contact precautions, and the dotted lines representing the same rate year over year after their suspension.

HAI (MRSA and VRE) without the use of contact precautions were the same or lower in a 2-month to month comparison in 6/9 months. For MRSA VRE, the same was true in 8/9 months over the same time interval.

Table 1: Cumulative HAI Incidence

<table>
<thead>
<tr>
<th></th>
<th>With CP</th>
<th>Without CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA Incidence</td>
<td>0.45</td>
<td>0.40</td>
</tr>
<tr>
<td>VRE Incidence</td>
<td>0.48</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Table 1 demonstrates that the overall number and rate of HAI MRSA and VRE infections decreased after the suspension of contact precautions. The populations for both infections were compared before and after the suspension of contact precautions using unpaired t-tests with equal variances. There was a statistically significant decrease in HAI VRE infections after suspending contact precautions. There was also a decrease in the MRSA colonization rate from 6.25% to 5.94%, and a greater than 5-fold decrease in the total number of MRSA screens.

Conclusion

This study demonstrated that not only was there an increase in the rates of HAI MRSA and VRE after the suspension of contact precautions, but there was also a statistically significant decrease in the rate of VRE infections. The MRSA nares colonization rate also fell in the latter period.

With the sole exception of pressure ulcers in MRSA, the proportion of adverse events also universally fell, keeping in line with the notion that these measures can be beneficial and reduce the amount of time healthcare workers spend with their patients, resulting in less attentive care and poorer conditioning.

These numbers suggest that contact precautions do not play an active role in curbing the spread of MRSA and VRE at LUMC. In fact, they may do more harm than good.

Of course, other factors may have influenced these findings. For example, the Covid pandemic may have led to an overall increase in the use of contact precautions and spurred public health initiatives like social distancing that limited infectious spread.

Nevertheless, the results of this study are quite encouraging. These outcomes suggest that it would be safe to continue to Discontinue from using contact precautions in patients with MRSA or VRE infections. Further prospective studies should be conducted to validate these findings.

References

Prognostic Value of Cardiac Magnetic Resonance Imaging Derived Myocardial Strain Analysis and Late Gadolinium Enhancement in Hypertrophic Cardiomyopathy
Sovik De Sirkar, MD; Matthew Thomas, DO; Susie Kim, MD; Menhel Kinno, MD

Background
- Segmental wall thickness and late gadolinium enhancement (LGE) have been shown to be positively correlated and linked to adverse clinical outcomes in patients with Hypertrophic Cardiomyopathy (HCM)1.
- The role of cardiac magnetic resonance (CMR)-derived myocardial strain analysis is poorly understood in the HCM population2,3.
- The primary objective of this study was to evaluate if myocardial strain is associated with LGE and segmental wall thickness, and thus can serve as a corollary prognostic indicator of clinical outcomes in HCM.

Methods
A retrospective analysis of 13 HCM patients at Loyola University Medical Center. CMR images were obtained and analyzed using Circle commercial software (cm4D, Circle Cardiovascular Inc., Calgary, Canada). LGE quantification was determined using a threshold of 6 standard deviations over remote myocardium. Strain was obtained by tissue feature-tracking and involved analysis of left ventricular 3-dimensional imaging for all 16 cardiac segments to assess for peak strain % and time to peak strain. These data were compared to segmental wall thickness and LGE using multivariate linear regression models.

Results
- Figure 1 demonstrates that the attenuation of longitudinal strain was related to greater LGE in the basal anteroseptal, mid inferoseptal, inferior, and inferolateral segments.
- Figure 2 shows the attenuation of circumferential strain also correlated with increased thickness in the apical septal, inferior, and anterior segments and basal anterolateral segments.
- Figure 3 demonstrates the direct correlation between the attenuation of radial strain and increased thickness in the apical septal, anterior, and lateral segments.

Conclusions
- There was a statistically significant correlation between the degree of attenuated myocardial deformation and the degree of hypertrophy and LGE in multiple segments.
- Strain parameters may be reproducibly correlated with thickness and LGE and, thus, serve as a surrogate clinical prognostic indicator for HCM outcomes.
- Future studies are needed to expand on these findings.

References
Introduction

- Pulmonary function tests (PFT) including spirometry are commonly used to assess and manage lung diseases among veterans seen at the Edward Hines Jr Veterans Affairs Hospital (Hines VA).
- PFT interpretation begins with a review of test quality. Suboptimal PFT’s should be interpreted with caution. Once quality has been assured, the next steps involve a series of comparisons relative to reference values and patient’s prior PFT’s (Figure 1). The final step is to answer the clinical question prompted by the test. Poor choices made during these preliminary steps increase the risk of misclassification.
- The current PFT reporting system at the Hines VA are based on the 2005 American Thoracic Society (ATS) and European Respiratory Society (ERS) International Joint Task Force: Standardisation of Lung Function Testing.[1-4]
- Since these publications, revisions reflecting the advancement of technological capabilities, new evidence, and new considerations[5-7] have been made in 2017[8-10] and 2019[11]

- Medical staff at the Hines VA have been trained in performing and interpreting PFTs at different time periods resulting in variability in its reporting and interpretation.

Objectives

- Standardize PFT reference values according to global lung initiative (completed).
- Decrease inter-operator variability in both interpreting PFT results and performing PFT’s (in process).
- Update the reporting system/software of PFTs at Hines VA (to be completed).
- Create a simplified report that would provide information to both pulmonary and non-pulmonary healthcare staff to make a diagnosis and to monitor risk-stratify, and make management decisions for patients (to be completed).

Figure 1. A simplified algorithm to assist with PFT interpretation in the clinical setting from ATS.[1-4] The algorithm presents classic PFT patterns for various respiratory disorders. The decision about how far to follow the diagram are clinical and vary depending on the question being answered and the patient (who may not present with classic patterns).

Table 1. Interpretation and reporting of PFTs by pulmonary fellows and medical residents prior to review and after this table is a representation of the actual template used at Hines VA for PFT review. Each column represents a patient. Interpolations are made on spirometry. Lung volumes, diffusion capacity for carbon monoxide, oxygen saturation on room air and exercise (new shown), and arterial blood gases (new shown) followed by a final report with overall impressions (not shown), (BD = bronchodilator).

Methods

Decrease Variability in Interpretation of PFTs

PFTs prior to 2010 were read independently by pulmonary fellows and medical residents (Table 1). These will then be compared to historical interpretations to assess for inter-operator variability. A review session led by the medical director of the pulmonary function laboratory (Si) will be held regarding the assessment, reporting, and interpretation of PFTs. PFTs from 2021 will be present to be read by the same group of pulmonary fellows and medical residents to compare and assess for inter-operator variability.

Quality Assurance of Technical Aspects of PFTs

Staff technicians involved with patient performance of PFTs will provide education at recurrent intervals to ensure the quality of the reported PFT values. These education sessions will also include review of PFT performance to ensure quality in the technical aspects of PFTs and to ensure that the software, if applicable, is in good working condition.

Updates to the PFT Report Format

The current template used for reporting and interpreting PFTs will be reviewed by this group which will include the medical director of the pulmonary function laboratory (Si) and the division chief of pulmonary and critical care medicine (AJ). Revisions will include but is not limited to updates in terminology, updates in testing parameters, addition of grading systems and differential diagnoses.

References

External Validation of Loyola University Medical Center’s Cardiac Evaluation Prior to Renal Transplantation Protocol

Introduction

A variety of approaches are undertaken for cardiovascular screening prior to approval for kidney transplantation. We sought to evaluate the effect of a revised pre-transplant cardiac assessment protocol at our institution, which included a more frequent use of coronary angiography in patients felt at increased cardiac risk.

Methods

Examined all patients (n=419) who underwent kidney transplantation three years before (2013-2015, n=164) and after (2016-2018, n=235) initiation of a new cardiac evaluation protocol at Loyola Medical Center. Subsequently, as a validation cohort, identified patients via the United States Renal Data System (USRDS) (n=25,276) who had undergone a renal transplant between 01/2010 and 01/2015. Explored the area under receiver operating characteristic curve when the Loyola screening protocol is applied to the larger national sample. Primary endpoint was a combined rate cardiovascular mortality, non-fatal myocardial infarction, need for emergent revascularization, and hospitalization for unstable angina.

Screening Protocol

- Diabetes Mellitus
- Peripartum Arterial Disease
- Male age > 45
- Female age > 55
- History of MI
- Need for Revascularization
- UFE or CM or > 40%

Pre-Operative Screening:

- Low Risk: No screening required
- Intermediate: Yearly non-invasive testing
- High or Very High Risk: Angiography

Results

Figure 1: Kaplan-Meyer survival curve of composite cardiovascular events before and after the new Loyola protocol was implemented

- At 12 months: 11 (6.0%) of the pre- and 1 (0.4%) of the post-protocol groups - adjusted HR 0.08 (95% CI: 0.01-0.620, p=0.016)
- At 36 months: 17 (9.2%) and 1 (0.4%) patients, before and after the revision resulting in an adjusted HR 0.06 (95% CI: 0.01-0.45, p = 0.006)
  - Number needed to treat (NNT) – 11
  - Non-fatal Type II NSTEMI:
    - 32 (17.4%) in the pre and 26 (11.1%) post- groups, (p=0.06)

Major Adverse Cardiovascular Events:

- Low Risk
- Intermediate Risk
- High Risk
- Very High Risk

ROC Curve

Figure 3: Receiver operating characteristic curve of the new protocol utilizing the USRDS database cohort.

- AUC 0.76 (95% CI: 0.74-0.78, p<0.001)
- Sensitivity: 0.79 (95% CI: 0.75-0.82)
- Specificity: 0.60 (95% CI: 0.59-0.60)
- Positive LR: 1.96 (95% CI: 1.7-2.05)
- NPV: 0.99 (95% CI: 0.99-0.99)

Discussion

- Death due to cardiovascular disease is the leading cause of functioning graft loss accounting for approximately half of all cases [1].
- The new approach at Loyola resulted in increased rates of angiography in patients deemed high or very high risk (64.1% pre- vs 95.7% post, p<0.001), without a significant change in those considered intermediate or low risk (18.3% pre- vs 12.8% post, p<0.210).
- For comparison, the Revised Cardiac Risk Index (RCRI), a commonly used preoperative cardiovascular risk stratification tool, has a moderate discrimination ability between patients at low versus high risk for cardiac events after noncardiac surgery with [2]:
  - AUC 0.75 [95% CI, 0.72 to 0.79]
  - Sensitivity, 0.65 [CI, 0.46 to 0.81]
  - Specificity, 0.76 [CI, 0.58 to 0.88]
  - Positive LR, 2.78 [CI, 1.74 to 4.45]

Conclusion

In patients undergoing evaluation for kidney transplant, our revision of the cardiac screening protocol resulted in a higher rate of coronary angiography, however it was associated with a reduction in major cardiovascular events and overall mortality after transplant with a similar predictive ability to other commonly utilized pre-operative assessment tools such as the RCRI.

References


Disclosure: None of the authors have any disclosures to report.
Phenobarbital for alcohol withdrawal in the ICU setting
Yiran Gong MD, Ejaz Kalmulla MD
Loyola University Medical Center

Introduction
- LLUMC utilizes CMA-Ar for assessment of alcohol withdrawal
- Ten items each evaluated independently which together yield a score which correlates with the severity of alcohol withdrawal
- Current CMA-Ar protocol at LLUMC utilizes scoring doses of lorazepam consisting with severity of symptoms
- Lorazepam has the advantage of short half-life which is associated with low risk of overdose

Why phenobarbital?
- Previous studies showing benefits of phenobarbital as anxiolytics and mood-stabilizer in ICU settings
- Phenobarbital, whether in combination with lorazepam or as monotherapy, has been shown to decrease ICU LOS, time on mechanical ventilation, and readmission to an ICU for severe withdrawal
- Currently LLUMC does not have a protocol in place for phenobarbital either as mon or an adjuvant therapy for alcohol withdrawal

Objectives
- Determine using data gathering and analysis if phenobarbital based approaches to alcohol withdrawal at LLUMC has resulted in improvements in ICU LOS and decreased probability of ventilation over lorazepam based approaches
- Data can be further expanded to include readmissions to the ICU for patients who transition to a floor setting while undergoing phenobarbital therapy for alcohol withdrawal

Methods
- Single center retrospective study
- Data provided by LLUMC pharmacy

Results

<table>
<thead>
<tr>
<th>Group</th>
<th>Gender</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>lorazepam</td>
<td>F</td>
<td>3.6666667</td>
</tr>
<tr>
<td>M</td>
<td>4.867143</td>
<td>61.142857</td>
</tr>
<tr>
<td>phenobarbital</td>
<td>F</td>
<td>11.250000</td>
</tr>
<tr>
<td>M</td>
<td>5.541667</td>
<td>48.083333</td>
</tr>
</tbody>
</table>

Table 1. Mean LOS and age separated by gender and treatment group

Future considerations
- Analyzing data for the year of 2018-2021
- Analysis of other intensive care unit services, such as NICU and Neuro ICU
- Stratification of data based on severity of alcohol withdrawal
- Prospective data gathering using phenobarbital
  - Patients meeting inclusion criteria will receive phenobarbital according to the protocol at time of symptom control is achieved
  - Included study population stratified by alcohol withdrawal as primary diagnosis vs. secondary diagnosis
  - Data for patients receiving phenobarbital in an ICU setting will be collected in a 12-month time window and compared to historical data for ICU patients on lorazepam for alcohol withdrawal from the prior year
  - Collected data will focus on ICU LOS, number of patients requiring mechanical ventilation, and readmission to an ICU setting for alcohol withdrawal

Conclusion
- No significant differences in ICU LOS were found between phenobarbital and lorazepam monotherapy
- No significant differences were found in age between the two treatment groups
- There were more females than males in the phenobarbital group compared to the lorazepam group; however, there was no significant gender difference in ICU LOS in either treatment group
- No significant differences were observed in frequency of admissions between the phenobarbital and lorazepam groups
- Phenobarbital seems to be the preferred way to treat alcohol withdrawal in the ICU despite the lack of a formalized order set

Limitations
- Many admissions to an ICU setting for alcohol withdrawal had additional active problems, confounding the LOS and readmission status
- Analysis not adjusted for severity of alcohol withdrawal, possible bias into determination of receiving phenobarbital vs. lorazepam
- Small sample size due to only pulling from one year of prescriber data, limited in geography to only medical ICU services

References
1. Background and Fishbone

- The current criteria for restraint use are "used only when clinically justified or when warranted by patient behavior that threatens the physical safety of the patient, staff, or others" - Loyola University Medical Center's restraint policy (6).
- However, restraints are not shown to prevent adverse events such as falls or self-harm and paradoxically, they are associated with increased unplanned extubations, loss of lines/devices, worsening delirium and longer hospitalizations (1, 3, 9).
- Currently there is no formalized process to reduce restraint use. Bedside decisions about restraint use are primarily made by RNs.
- Unplanned extubations are submitted as VOICE reports.

2. AIMS Statement

To reduce the use of physical restraints in the Medical Intensive Care Unit at Loyola University Medical Center, and demonstrate that restraint reduction is not associated with compromises in patient safety.

3. Intervention and Results

Intervention: MICU team asks on daily rounds "Can we de-escalate restraints today?"

Files were distributed and QI team members discussed with RNs and Medical Teams. Asked Interns to document if patient was in restraint as part of daily progress notes.

4. Discussion

Asking the nurse "can we de-escalate restraints today" led to a decrease in the number of patients in restraints without an increase in the number of unplanned extubations.

Limitations:
- Resident teams change every 2 weeks making disseminating information/education difficult.
- MICU teams not always assessing with bedside RN.
- We found that the restraint order expires at midnight which falls on the overnight cross covering intern to renew, who is not as familiar with the patients. The current culture is for the intern to renew all restraints in the unit overnight.

Next steps:
- Resident teams change every 2 weeks but RNs are constant. Ask RN to be present for bedside rounds to help address restraints similar to how Foley's and lines such as CVC are assessed on a daily basis.
- RNs to ask for renewal of restraints at noon instead of at midnight. Therefore the medical team who know the patients best can reassess, collaborate with the bedside RN, and reorder restraints if needed.

References

Acknowledgements

Special thanks to Katie Cream, 3MICU Staff, Dr. Patel
Improving Patient Safety During Intra-Hospital Transport of ICU Patients

Arushi Hulku MD, Martin Kangar MD, Britta White MD, Kevin Simpson MD | Loyola University Medical Center

Background

Intra-hospital transport of critically ill patients is associated with potentially severe adverse events. Because physicians do not usually accompany their patients during transport, they may not be aware of the technical or medical issues that arise during this process.

Previous studies have identified common complications of transport and have developed intra-hospital transport guidelines to respond. The purpose of this study is to investigate current intra-hospital transport of medical ICU patients at Loyola University Medical Center, and utilize this data to develop a “Transport Tool.”

The “Transport Tool” will include an algorithm to risk stratify critically ill patients for possible near misses or adverse events during or shortly after intra-hospital transport, as well as a checklist for nursing staff to abide by during transport.

Our goal is to reduce transport-related near misses or adverse events with implementation of the tool, by streamlining the transport process and minimizing communication regarding intra-hospital transport of these patients.

Baseline Data

Transport events in which adverse events were reported: 26/62, or 42.2%

- Pain, Aspiration, Increased pressure, Monitor battery died, No IV, No extra Q3 task, Equipment fail, Given at imaging site, Unnecessary transport, In not fitting in ambulance, Increased suctioning needs, Increased vent support/destructions

Current and ideal state process map

Overview

1. Transportation needed for imaging procedure, etc.
2. Evaluation
3. Communication
4. Transport

Proposed AIM Statement

NOW

40.3% of transport encounters have reported near misses/adverse events

FUTURE

Goal is to ultimately reduce transport-related near misses/adverse events by 50% by December 2021

Analysis and Discussion

Communication/Safety:

- Risk assessment: MD staff possibly suboptimal and may increase likelihood of reported near misses/adverse events
- Communication between medical and nursing staff may be a contributing factor to transport-related events
- Survey data reports a lack of communication on adverse events and lack of confidence in communicating transport events as well as assessing patient risk

Timing of Transport:

- Overnight transport may be associated with increased risk of near misses/adverse events, possibly due to lower staffing levels

Q2 requirements:

- Risk of near misses/adverse events may be increased in RRT/ICU patients or any patients with extra medical equipment such as Q2 tasks

Hemodynamics, Sedation, and Agitation:

- Patients on vasopressors/vasoconstrictors and/or sedation were higher risk for experiencing a near miss or adverse event
- Patients who were hypoventilated before transport (pH <7.30) were higher risk for experiencing an adverse event, particularly in requiring greater increase in airway pressure

Limitations:

- Small sample size
- Staff may have retrospectively submitted transport data for patients with adverse transport events
- Perception of lack of support staff may increase rates of reported adverse events
- Very high risk groups not included, likely because they were not sent for transport

Future Steps

Based on this preliminary data, we plan to develop a three-part tool available for medical and nursing staff to address the issue of intra-hospital transport of critically ill patients:

Part 1: Risk stratification tool

- Identify high-risk patients in whom the risk of transport may outweigh any theoretical benefits of diagnostic testing/procedures and may benefit from delay or cancellation of transport
- Help guide physician-decisions regarding the transport of critically ill patients in an objective assessment of risk based on data collected from previous transport encounters and input from nursing staff

Part 2: Transport encounter checklist

- A decision tool to transport using risk stratification tool above, provide to use checklist of housekeeping items to address and correct possible sources of adverse events

Part 3: Data collection and analysis

- Take place with parts 1 and 2, will track frequency and type of adverse events to determine impact
- A component of the checklist will be dedicated to recording adverse events and documenting the nature of the event, similar to the initial data collection phase
Socioeconomics of Coronary Artery Calcium: Is it Scored or Ignored?
Mashaal Ikram MD1, Kim Allan Williams Sr. MD2
1. Loyola University Medical Center, Maywood, IL
2. Rush University Medical Center, Chicago, IL

Background
Chicago is one of the most racially segregated cities in the US, with up to a 30-year mortality gap between some neighborhoods.

Computed tomographic coronary artery calcium scoring (CACS) is an excellent risk stratification tool, but costs about $200 out-of-pocket, making it inaccessible to some.

Objective
To determine whether ACC/AHA guideline-recommended screening tool is accessible to all populations and neighborhoods, we evaluated the price and availability of CACS in Chicago area hospitals.

Methods

ILLINOIS HOSPITALS
N= 40

CACS
N= 30
No CACS
N= 10

Hospital service area (by zip code):
1) Compared demographic, socioeconomic, and ethnic population data using US census bureau;
2) Compared pricing of CACS between hospitals; and
3) Analysis of data using un-paired t-testing for comparison of means.

Results

FIGURE 1: NEIGHBORHOODS WITH AND WITHOUT CACS

FIGURE 2: ETHNIC POPULATION OF NEIGHBORHOODS WITH AND WITHOUT CACS

FIGURE 3: HOSPITALS WITH CACS BY QUINTELS OF INCOME

FIGURE 4: AVERAGE HOSPITAL BED CAPACITY

Conclusion
Screening for cardiovascular disease should be accessible to and affordable for everyone, along with other risk reduction initiatives such as community blood pressure surveillance, nutrition interventions, diabetes detection, CPR and improving health literacy.

We Propose:
1) a national policy change to include CACS as a first-dollar covered preventive service, as it currently is in the state of Texas, and
2) that hospital systems advertise and routinely perform this inexpensive test for no cost in socioeconomically depressed areas, as a means to enhance risk factor and disease modification and management.
Marketing Cardiovascular Mortality?
Healthy vs. Unhealthy Food in Television Advertising

Mashaal Ikram MD¹, Khari Hill², Kim Allan Williams Sr. MD²
1. Loyola University Medical Center, Maywood, IL 2. Rush University Medical Center, Chicago, IL

Background
Cardiovascular disease has been the leading killer of Americans since the Spanish flu pandemic of 1918.

During the SARS-CoV-2 pandemic, social distancing and stay-at-home mandates have increased television (TV) engagement and media marketing has become more impactful.

Objective
We evaluated the healthfulness of food marketing, based on commercials most frequently aired on American primetime networks during SARS-CoV-2 pandemic.

Methods

- N=104 Food TV commercials
- N=60 Fast Food
- N=6 Home Delivery
- N=28 Grocery Chains
- N=28 Individual Items
- Total Nutrition Scoring (by ingredients and serving size)

- Data analyzed using comparison of means with unpaired t-test

Results

<table>
<thead>
<tr>
<th>Type of Commercial</th>
<th>Example</th>
<th>Contents</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Food</td>
<td>Chicken wings, beef burger, soft drink</td>
<td>Sugar sweetened beverage, fried potatoes, vegetables, animal fat, dairy, chicken, beef, ranch dressing</td>
<td>Healthful (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total: 6</td>
</tr>
<tr>
<td>Home Delivery</td>
<td>Fully cooked vegan pizza with whole grain rice and vegetable sides</td>
<td>Vegetables, whole grains, sauce (sodium 700mg)</td>
<td>Healthful (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total: 1</td>
</tr>
<tr>
<td>Grocery Chains</td>
<td>Produce items: cheese, fruits, vegetables, milk and eggs</td>
<td>Vegetables (x2), fruits (x2), dairy, eggs</td>
<td>Healthful (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total: 2</td>
</tr>
<tr>
<td>Individual Items</td>
<td>Yogurt</td>
<td>Dairy</td>
<td>Healthful (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total: 1</td>
</tr>
</tbody>
</table>

Conclusion

- Clinical Perspective: Commercial TV in the US routinely promotes the consumption of foods that are documented in the published medical literature and nutritional guidelines to be unhealthy, particularly those underpinning cardiovascular disease and risk factors.

- We suggest regulation and implementation of legislation, similar to the advertising ban on cigarettes, in order to reduce the frequency and/or alter the content of these food commercials, and consider a ban on such advertising to children, similar to those employed in Canada and the European Union.

*All authors have nothing to disclose.*
Improving Utilization and Awareness of Targeted Temperature Management (TTM) for Patients Achieving Return of Spontaneous Circulation after Cardiac Arrest (ROSC) at Hines VA Hospital

Daniel Kim, MD PGY3, Pandu Arora, MD PGY2, Richi Narla, MD
Loyola University Medical Center Department of Internal Medicine, Hines, IL, VA Hospital

Background

- Over the last several decades, TTM to induce mild hypothermia has been the standard for patients who remain comatose after surviving a cardiac arrest.
- Studies have shown that TTM provides improved neurological outcomes in these patients.
- A recent RCT comparing 33°C with 36°C for OHCA patients showed that both targets had similar mortality and neurological outcomes at 180 days.
- The current AHA guidelines recommend as part of their ACLS algorithm that patients who achieve ROSC but not following common practice optimization of respiratory function/hypotension be initiated on targeted temperature management.
- Various institutions have differing protocols for qualifications for TTM as well as methods for carrying it out.

Objective

- Analyze frequency of use of TTM at Hines VA Hospital from 2017-2020.
- Increase consideration and knowledge of appropriate utilization of TTM in post cardiac arrest patients achieving ROSC.
- Assess pre and post intervention level of knowledge and familiarity of housestaff on applying hypothermia protocol at Hines VA Hospital.

Proposed Interventions

- Development of Hines VA Hospital Specific TTM Handbook for housestaff.
- Establish clear guidelines on who initiates and who maintains in what setting and location of patient.
- Publish handbook on Internal Medicine Residency Website.
- Provide laminated protocol cards for all ICUs as well as ED.
- Implement an easily accessible hypothermia protocol order set within the EMR (CPRs).
- Order set to include labs, rules, diagnostic testing necessary for monitoring while on targeted temperature management.
- Include relevant paper numbers for troubleshooting (e.g. Neurology/Cardiology IMCU).
- Pre/Post intervention for Housestaff prior to starting Hines CMICU to assess overall knowledge on how to initiate TTM at Hines.
- Include section in CODE BLUE note template asking if TTM considered after ROSC achieved.

2017-2020 CODE BLUE DATA

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Blue n</td>
<td>49</td>
<td>48</td>
<td>75</td>
<td>35</td>
</tr>
<tr>
<td>ROSC (%)</td>
<td>29(59)</td>
<td>22(58)</td>
<td>93(58)</td>
<td>4(15)</td>
</tr>
<tr>
<td>24hr Survival (%)</td>
<td>33(67)</td>
<td>10(33)</td>
<td>4(15)</td>
<td>1(3)</td>
</tr>
<tr>
<td>Survival to Discharge (%)</td>
<td>16(33)</td>
<td>4(8)</td>
<td>1(3)</td>
<td>1(3)</td>
</tr>
</tbody>
</table>

Initial Rhythm (ROSC Patients)

- P 
- A 
- V 
- V T 
- VF

Time to ROSC (minutes)

- 6-10: 15
- 11-12: 8
- 13-14: 3
- 15-16: 1

Post ROSC Neuro Exam Documentation

- Yes: 23
- No: 0

TTM Considered/ (Per Documentation)

- Yes: 27
- No: 19

TTM Started

- Yes: 30
- No: 26

Next Steps

- Finalize draft of Handbook and laminated TTM outline cards for ICU.
- Update on resident residency website.
- Work with IT to add TTM order set and protocol to main order menu for under MEDICINE INP Add New Orders.
- Send out Pre Intervention Survey to all housestaff working in ICU.
- Will also use this to assess barriers faced by housestaff in considering TTM or initiating it.
- Develop new CODE BLUE note template to include section regarding TTM.
- Reassess with post intervention survey in 3 months.
- Review chart data on TTM usage for year 2021-2022.

References