Safety profile of apixaban for peri-procedural anticoagulation in heart transplant recipients undergoing endomyocardial biopsy

**Background**

- Endomyocardial biopsy (EMB) is routinely performed for surveillance of allograft rejection following heart transplantation (HTx).
- HTx recipients who are on anticoagulation are at higher risk for complications such as bleeding at access site, pericardial effusion, and cardiac tamponade.
- The safety profile of apixaban for peri-procedural anticoagulation in heart transplant recipients undergoing EMB is not well characterized.

**Objective**

- Assess the safety of peri-procedural anticoagulation with apixaban in heart transplant patients undergoing EMBs.

**Methods**

- This was a retrospective cohort study of all EMBs performed within one year from transplant of 102 HTx recipients from 2016 to 2019 at Loyola University Medical Center.
- Patients on apixaban were compared to patients not on anticoagulation at the time of EMBs.
- Apixaban was held two days prior to EMB and restarted the evening after EMB if there were no bleeding events.
- Primary endpoint was major bleeding, defined as:
  - Life threatening bleeding resulting in death
  - Cardiac tamponade
  - ≥3 g/dl hemoglobin drop and/or ≥2 units packed red blood cell transfusion.
- Secondary endpoints included minor bleeding events and thromboembolic events.

**Results**

**Table 1 Patient Baseline Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Apixaban (n=72)</th>
<th>No Anticoagulation (n=72)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (SD) (years)</td>
<td>57.86 (11.83)</td>
<td>56.35 (11.82)</td>
<td>0.55</td>
</tr>
<tr>
<td>Gender, n (%)</td>
<td>Male</td>
<td>21 (70)</td>
<td>9 (70)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10 (30)</td>
<td>52 (30)</td>
</tr>
<tr>
<td>Mean BMI (SD)</td>
<td>27.5 (3.44)</td>
<td>26.88 (7.98)</td>
<td>0.69</td>
</tr>
<tr>
<td>Race, n (%)</td>
<td>Caucasian</td>
<td>17 (57)</td>
<td>38 (53)</td>
</tr>
<tr>
<td></td>
<td>African-American</td>
<td>0 (00)</td>
<td>11 (15)</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>0 (00)</td>
<td>11 (15)</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>0 (00)</td>
<td>8 (11)</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2 (6)</td>
<td>15 (21)</td>
</tr>
<tr>
<td>Anticoagulant, n (%)</td>
<td>None</td>
<td>15 (50)</td>
<td>34 (48)</td>
</tr>
<tr>
<td></td>
<td>Aspirin</td>
<td>10 (30)</td>
<td>32 (43)</td>
</tr>
<tr>
<td></td>
<td>Clopidogrel</td>
<td>10 (30)</td>
<td>31 (41)</td>
</tr>
<tr>
<td>Indications for Anticoagulation, n (%)</td>
<td>Deep vein thrombosis</td>
<td>22 (73)</td>
<td>3 (40)</td>
</tr>
<tr>
<td></td>
<td>Atrial fibrillation</td>
<td>5 (16.7)</td>
<td>10 (13)</td>
</tr>
<tr>
<td></td>
<td>Pulmonary embolism</td>
<td>3 (10)</td>
<td>1 (13)</td>
</tr>
<tr>
<td>Total EMBs</td>
<td>n=72</td>
<td>n=72</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Table 2 Primary and Secondary Endpoints**

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Apixaban</th>
<th>No Anticoagulation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Bleeding, n (% of total EMBs)</td>
<td>6 (0.01)</td>
<td>14 (0.02)</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>Critical site bleeding</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Bleeding resulting in death</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>New or worsening pericardial effusion</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Pericardial tamponade</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Transfusion of ≥2 units packed red blood cells</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Minor Bleeding, n (% of total EMBs)</td>
<td>5 (0.01)</td>
<td>8 (&lt;0.01)</td>
<td>0.78</td>
</tr>
<tr>
<td>Access site hematoma</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Readmission for bleeding</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Thromboembolism, n (% of total EMBs)</td>
<td>11 (0.02)</td>
<td>9 (&lt;0.01)</td>
<td>0.64</td>
</tr>
<tr>
<td>Ischemic stroke</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Deep vein thrombosis</td>
<td>10</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusions**

- Periprocedural anticoagulation with apixaban for patients undergoing EMB following HTx is relatively safe with a very low risk of major or minor bleeding events as well as thromboembolism.

**References**

2. Perioperative Management of Patients Receiving Oral Anticoagulants, Archives of Internal Medicine
Introduction

While the global dissemination of vaccines targeting the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has resulted in a decline in the incidence of infections, the case fatality rates have remained relatively stable.

A major objective of managing hospitalized patients with documented or suspected COVID-19 infection is the rapid identification of features associated with severe illness using readily available laboratory tests and clinical tools.

The sequential organ failure assessment (SOFA) score is a validated tool to facilitate the identification of patients at risk of dying from sepsis.

Objective: The aim of this study was to assess the discriminatory accuracy of the SOFA score in predicting clinical decompensation in patients hospitalized with COVID-19 infection.

Methods

- We conducted a retrospective analysis at a three-hospital health system, comprised of one tertiary and two community hospitals, located in the Chicago metropolitan area.
- All patients had positive SARS-CoV-2 testing and were hospitalized for COVID-19 infection.
- The primary outcome was clinical decompensation, defined as the composite endpoint of death, ICU admission, or need for intubation.
- We utilized the most abnormal laboratory values observed during the admission to calculate the SOFA score.
- Receiver Operating Curves (ROC) were constructed to determine the sensitivity and specificity of SOFA scores (figure 1).

Figure 1

![ROC Curve]

Diagonal segments are produced by ties.

Figure 1: Receiver Operating Curve (ROC) analysis of SOFA scores predicting primary composite endpoint of death, ICU admission, and need for intubation.

Results

- Between March 1st and May 31st 2020, 1029 patients were included in our analysis with 367 patients meeting the study endpoint.
- The median SOFA score was 2.0 IQR (Q1, Q3) 1.4 for the entire cohort.
- Patients who had in-hospital mortality had a median SOFA score of 4.0 (Q1, Q3) 3.7.
- In patients that met the primary composite endpoint, the median SOFA score was 3.0, IQR (Q1, Q3) 2.6.
- The ROC was 0.776 (95% CI 0.746 – 0.806, p < 0.01).

Conclusions

- The SOFA score demonstrates strong discriminatory accuracy for prediction of clinical decompensation in patients presenting with COVID-19 at our urban hospital system.
- Limitations for this study include reduced generalizability as all patients presented to Chicago hospitals, as well as relatively small sample size compared to prior studies.
- Future studies should focus on development of machine learning prediction models with large patient databases to continue identifying risk factors for decompensation in this heterogeneous patient population.
Predictors of Clinical Decompensation in Patients Presenting with COVID-19 in an Urban Hospital Health System

Introduction

• Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has resulted in a pandemic which has infected more than 128 million people and led to over 2.8 million deaths worldwide.
• Although the introduction of efficacious vaccines has led to overall declines in the incidence of SARS-CoV-2 infection, there has been a recent increase in infections once more due to the appearance of mutant strains with higher virulence.
• It therefore remains vital to identify predictors of poor outcomes in this patient population.

Objective: The aim of our study was to identify predictors of prolonged hospitalization, intensive care unit (ICU) admission, intubation, and death in patients infected with SARS-CoV-2.

Table 1. Baseline Demographics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Patients not meeting primary outcome* (n=556)</th>
<th>Patients meeting primary outcome* (n=379)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>59.1 (17)</td>
<td>63.3 (17)</td>
</tr>
<tr>
<td>Female (n, %)</td>
<td>284 (43.8)</td>
<td>160 (42.2)</td>
</tr>
<tr>
<td>Body mass index (SD)</td>
<td>30.9 (8.5)</td>
<td>31.4 (10.0)</td>
</tr>
<tr>
<td>Coronary Artery Disease (%) SD</td>
<td>74 (11.4)</td>
<td>60 (15.8)</td>
</tr>
<tr>
<td>Congestive heart failure (%) SD</td>
<td>58 (8.9)</td>
<td>45 (11.3)</td>
</tr>
<tr>
<td>Hypertension (n, %)</td>
<td>342 (52.7)</td>
<td>245 (64.6)</td>
</tr>
<tr>
<td>Diabetes mellitus, type 2 (n, %)</td>
<td>240 (37)</td>
<td>177 (46.7)</td>
</tr>
</tbody>
</table>

*Primary outcome: composite of death, hospitalization >28 days, ICU admission and need for intubation.

Table 2. Clinical Variables

<table>
<thead>
<tr>
<th>Clinical Variable</th>
<th>Unadjusted Odds Ratio (95% CI)</th>
<th>P Value</th>
<th>Adjusted Odds Ratio (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.0 (1.0-1.02)</td>
<td>0.01</td>
<td>1.0 (1.0-1.02)</td>
<td>0.01</td>
</tr>
<tr>
<td>HTN</td>
<td>1.6 (1.25-2.1)</td>
<td>&lt;0.01</td>
<td>1.6 (1.25-2.1)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>1.2 (1.0-1.36)</td>
<td>0.04</td>
<td>1.2 (1.0-1.36)</td>
<td>0.04</td>
</tr>
<tr>
<td>Tobacco abuse</td>
<td>1.2 (1.02-1.41)</td>
<td>0.29</td>
<td>1.2 (1.02-1.41)</td>
<td>0.29</td>
</tr>
<tr>
<td>CAD</td>
<td>1.6 (1.07-2.24)</td>
<td>0.02</td>
<td>1.6 (1.07-2.24)</td>
<td>0.02</td>
</tr>
<tr>
<td>Arrhythmia</td>
<td>1.6 (1.2-3.0)</td>
<td>0.01</td>
<td>1.6 (1.2-3.0)</td>
<td>0.01</td>
</tr>
<tr>
<td>Valveular heart disease</td>
<td>2.5 (1.14-5.54)</td>
<td>0.02</td>
<td>2.5 (1.14-5.54)</td>
<td>0.02</td>
</tr>
<tr>
<td>HLD</td>
<td>1.8 (1.35-2.33)</td>
<td>&lt;0.01</td>
<td>1.8 (1.35-2.33)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Stroke</td>
<td>2.1 (1.33-3.37)</td>
<td>0.01</td>
<td>2.1 (1.33-3.37)</td>
<td>0.01</td>
</tr>
<tr>
<td>DM 2</td>
<td>1.5 (1.16-1.94)</td>
<td>0.02</td>
<td>1.5 (1.16-1.94)</td>
<td>0.02</td>
</tr>
<tr>
<td>VTE</td>
<td>5.9 (2.86-10.03)</td>
<td>&lt;0.01</td>
<td>3.6 (1.3-8.7)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Troponin</td>
<td>4.2 (2.1-8.26)</td>
<td>&lt;0.01</td>
<td>2.4 (1.08-5.17)</td>
<td>0.03</td>
</tr>
<tr>
<td>CRP</td>
<td>1.0 (1.0-1.1)</td>
<td>0.01</td>
<td>1.0 (1.0-1.1)</td>
<td>0.01</td>
</tr>
<tr>
<td>ESR</td>
<td>1.01 (1.0-1.02)</td>
<td>0.01</td>
<td>1.01 (1.0-1.02)</td>
<td>0.01</td>
</tr>
<tr>
<td>FBN</td>
<td>1.0 (1.0-1.01)</td>
<td>&lt;0.01</td>
<td>1.0 (1.0-1.01)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>LDB</td>
<td>1.0 (1.0-1.01)</td>
<td>0.01</td>
<td>1.0 (1.0-1.01)</td>
<td>0.01</td>
</tr>
<tr>
<td>D-Dimer &gt;5x</td>
<td>8.5 (6.1-11.9)</td>
<td>0.01</td>
<td>1.5 (1.23-1.98)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>UNL</td>
<td>1.6 (1.53-2.15)</td>
<td>&lt;0.01</td>
<td>1.6 (1.28-1.95)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>RIVOT velocity time integral &gt;95 cm</td>
<td>1.0 (1.0-1.01)</td>
<td>0.03</td>
<td>1.0 (1.0-1.01)</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Methods

• We conducted a retrospective analysis of all patients hospitalized with SARS-CoV-2 at our health system that includes one tertiary care center and two community hospitals located in the Chicago metropolitan area.
• The main outcome was a composite endpoint of hospitalization >28 days, ICU admission, intubation, and death.
• Exploratory variables associated with the primary outcome in the bivariate analysis (p<0.05) were included in the multivariable logistic regression model.
• Statistical analysis was performed using IBM SPSS 25.0.

Results

• Between March 1, 2020 and May 31, 2020, 1029 patients hospitalized with SARS-CoV-2 were included in our analysis. Of these patients, 379 met the composite endpoint.
• Baseline demographics are described in Table 1. Of note, our cohort consisted of a predominantly minority patient population including 67% Hispanic, 17% African American, 16% Caucasian, and 16% other.
• In bivariate analysis, age, hypertension, tobacco and alcohol abuse, obesity, coronary artery disease, arrhythmias, valvular heart disease, dyslipidemia, hypertension, stroke, diabetes, documented thrombosis, troponin, CRP, ESR, ferritin, LDH, BNP, D-Dimer >5x the upper limit of normal, lactate, and right ventricular outflow tract velocity time integral >95 cm were significant (Table 2).
• After multivariable adjustment, explanatory variables associated with the composite endpoint included troponin (OR 2.39, 95% CI 1.08-5.17, p = 0.03), D-Dimer (OR 1.5, 95% CI 1.23-1.98, p <0.01), lactate (OR 1.58, 95% CI 1.28-1.95, p <0.01), and documented thrombosis (OR 3.56, 95% CI, p<0.05).
• Race was not a predictor of poor outcomes in the bivariate or multivariate analysis.

Conclusions

• In a large urban cohort with a predominantly minority population, we identified several clinical predictors of poor outcomes.
• While recent literature has demonstrated worse outcomes among racial minorities infected with SARS-CoV-2, race was not a predictor of the primary endpoint in this study. Our data suggests these variations are related to social determinants of health rather than biologic causes.
Background
- Heart failure readmission remain one of the biggest challenges in health care, with 30-day readmission rates estimated at 22% nationally.
- Possible explanations include lack of medication optimization, patient education, and failure to schedule follow-up appointment at time of discharge.
- AHA/ACC guidelines state that participation in quality improvement (QI) programs and patient registries can be beneficial in improving quality of heart failure care.

2019-2020 Registry
- From January 2019 to December 2019, a team consisting of 3 internal medicine residents, 2 cardiology fellows, and 1 heart failure attending was assembled to collect baseline data on 194 patients discharged for acute heart failure exacerbation.
- Specific adherence measures were collected quarterly on the following: patient demographics, implementation of goal-directed medical therapy, 7-day follow-up, and referral to heart failure disease management programs.
- Mean age was 68.6 years (SD 15.2, range 19-97). Mean length of stay was 8.39 days (SD 10.16, range 1-74). 24.2% of patients were readmitted for heart failure within 30 days of discharge.
- Follow-up visits within 7 days of discharge improved from 38.9% in Q1 to 49.5% in Q4 (p=0.023). Heart failure disease management program referral measure improved from 39.1% in Q1 to 91.7% in Q4 (p<0.0001) (Figure 1).
- This measure defined by the AHA, requires documentation of provider recommendation for patient follow-up with a qualifying heart failure management program.

Lessons Learned
- Baseline data from 2019 indicated apparent inconsistencies in results from Q1 to Q4.
- We believe the results reflect variability in data collection, rather than a true improvement in quality metrics.
- A standardized collection tool should be implemented to increase sample size and improve accuracy of key metric recordings at LUMC.

Proposed Solution
- Our plan is to introduce an automated software tool provided by the AHA, to securely collect and upload data directly to the Loyola GWTG registry.
- Patient data is not stored long-term, but instead processed and shared with the hospital through a spreadsheet, which can then be shared into the GWTG portal.
- Participating hospitals have full control of which patients are abstracted and can also choose specific data elements to abstract.
- The goal of this proposal is to improve accuracy of collection data, and shift time spent by residents towards data analysis and development of quality improvement projects.

Timeline
- LUMC leadership agrees to grant EHR access to AHA via web services interface
  - Completed 3/2021
- Information technology (IT) establishes and installs interface to LUMC EHR
  - Anticipated 5/2021
- Automated interface collects and uploads 2021 Q1-Q2 data to registry
  - Anticipated 6/2021
- LUMC reviews data and proposes quality improvement initiatives based on results
  - Anticipated 7/2021

Future Research
- Future projects will utilize baseline data that accurately reflects adherence to goal-directed medical therapy at LUMC.
- QI projects will then be implemented in real-time based on identified deficiencies in key heart failure metrics.
- Additionally, LUMC data can be compared to regional and national hospitals that partner with the AHA registry.

Acknowledgments
- Meghan O'Halleran, MD
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- Stefania Milan, MD
- Michelle Lundholm, MD
Diagnostic Yield of Endoscopy for Chronic Abdominal Pain

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Department of Medicine, Loyola University Medical Center, Maywood, IL

Introduction

- ACG defines Chronic Abdominal Pain as episodic pain with or without other gastrointestinal symptoms lasting at least one month.
- Up to 21% of the general population has complaints of CAP and it is the 8th most common complaint of all patient presentations in the primary care setting.
- Range in diagnostic yield from EGD and colonoscopy for CAP from 23% and 24-48% respectively.
- Meyyed et al. meta-analysis investigated 15 studies with over 11,000 patients and found no correlation between clinical impression, demographics, risk factors or symptoms in identifying an endoscopic difference between functional and organic dyspepsia.

Hypothesis

- Studies have shown the limitations in demographics, clinical impression and history in distinguishing between functional and organic dyspepsia.
- However, these studies do not look at the chronology of symptoms. Given that ongoing GERD or peptic ulcer disease results in worsening disease and more severe endoscopy findings, chronology of abdominal pain may be an important tool in predicting diagnostic yield from endoscopy.
- Furthermore, more studies investigating correlation between pre-endoscopy assessment and diagnostic outcomes should be explored in order to identify who should receive endoscopic evaluation.

Methods

- Retrospective chart review January 2018-January 2020
- Centers involved: Burr Ridge Hospital, Loyola University Hospital
- Database created using search terms “chronic” and “abdominal pain” or “dyspepsia”
- Databases used: ProQuest Endoscopy Database and the EPIC electronic medical records
- Data Collection tool: RedCap Databases

Organic vs. Functional Dyspepsia

- Organic Dyspepsia:
  - Most common causes: Peptic Ulcer Disease (PUD) and GERD
  - Main causes of PUD: H. pylori and NSAID use
  - Endoscopy: Ulcerative disease or inflammation of the distal esophagus.
- Functional Dyspepsia:
  - Multi-factorial: gastroparesis, autonomic nervous system dysregulation among other causes

References

The Use of an Escape Room to Build Workplace Social Capital in an Internal Medicine Residency Program

Michelle D. Lundholm, MD, Laura Ozark, MD
Department of Medicine, Loyola University Medical Center, Maywood, IL, USA

Introduction

- Workplace social capital (WSC) is the psychosocial environment of the workplace, defined as the camaraderie (mutual trust, shared experience, and bonding) of a work team
- This year’s intern group did not have the same opportunities (i.e., retreats, holiday parties, graduation) to form that social capital due to the Covid pandemic
- Medical escape room (ER) simulations have already been shown to strengthen critical thinking, medical knowledge, technical skills, and interprofessionalism
- We hypothesize that interns who participate in a medically-themed ER would build social capital, as measured by higher WSC scores after the activity

Methods

- Single-center before-and-after survey study
- A medically-themed ER was designed for groups of 4-6 interns at a time, to last up to 1 hour
- Includes 11 puzzles of varying difficulty testing teamwork, skills of observation, medical knowledge, and puzzle solving (Figure 1)
- All 52 Loyola internal medicine interns were invited to participate in the ER in February-March, 2021
- Baseline WSC measured 1-7 days prior to ER using a modified Kouwonen et al. validated WSC scale (Table 1)
- Follow-up WSC scores assessed 1-7 days after ER using the identical scale
- Paired t-testing was used for overall scores, individual questions were analyzed ordinarily

Results

- 51 intern residents participated in the ER in 10 groups, mostly within their firms
- 41 (80%) of interns completed pre- and post-surveys within one week
- All groups escaped, averaged time of 39 minutes (ranging 32-49 minutes)
- WSC survey scores are shown in Figure 2. There was a significant improvement in scores when comparing pre- to post- ER surveys (Figure 3).

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-ER Mean</th>
<th>Post-ER Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>32%</td>
<td>16%</td>
</tr>
<tr>
<td>Q2</td>
<td>33%</td>
<td>16%</td>
</tr>
<tr>
<td>Q3</td>
<td>15%</td>
<td>7%</td>
</tr>
<tr>
<td>Q4</td>
<td>17%</td>
<td>7%</td>
</tr>
<tr>
<td>Q5</td>
<td>25%</td>
<td>10%</td>
</tr>
<tr>
<td>Q6</td>
<td>34%</td>
<td>20%</td>
</tr>
<tr>
<td>Overall</td>
<td>39%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Table 1: Modified Workplace Social Capital Scale

Discussion & Conclusion

- This is the first study to demonstrate that an ER contributed to resident bonding, as demonstrated by a statistically significant improvement in WSC scores
- Free response comments also centered on the ER’s positive impact on bonding, teamwork, and the patient experience (Figure 4)
- One surprise was that our pre-ER survey scores were higher than expected and limited our room for measurable improvement
- Despite this, we still saw a significant increase in both average scores and percent of responses that were strongly agree, or either agree or strongly agree
- Limitation: the survey is subjective and self-reported
- Confounders: WSC may have been simultaneously bolstered through other FLOurSH activities

Overall, our study shows that ERs can strengthen the psychosocial environment of a workplace, which is thought to improve resident mental health. As residency continues to be a challenging time in training, it is important to offer programming that benefits resident well-being. Future activities like this escape room are highly encouraged!

Next steps: Look for sustained benefit in WSC scores, or impact on PRHQ-9 (or other validated tests of MH)

References

Detecting Hypertension and Improving Healthy Lifestyle in African American Women Attending Community Screening Program

Waddah Malas¹, Puja K. Mehta², Gina P. Lundberg²

1Department of Medicine, Loyola University Medical Center, Maywood, IL
2Emory Women’s Heart Center, Emory University School of Medicine, Atlanta, GA

Introduction

• Hypertension (HTN) is an important modifiable risk factor for cardiovascular disease (CVD).
• Eleven million patients in the United States have undiagnosed HTN and a large population of those diagnosed remain untreated or inadequately treated per guideline recommendations.
• African American (AA) women specifically have the highest prevalence of HTN compared to women from other ethnicities and are at increased risk for CVD.

Objectives

• To demonstrate the impact of community HTN screening programs on cardiovascular preventive risk factors in AA women.

Table 1. Baseline Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total (N=206)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years (mean)</td>
<td>50.9 ± 14.0</td>
</tr>
<tr>
<td>Body mass index (mean)</td>
<td>32.2 ± 7.9</td>
</tr>
<tr>
<td>History of hypertension</td>
<td>34.0</td>
</tr>
<tr>
<td>History of diabetes</td>
<td>9.2</td>
</tr>
<tr>
<td>Current smoker %</td>
<td>5.3</td>
</tr>
<tr>
<td>Exercise less than 3 times a week %</td>
<td>57.3</td>
</tr>
<tr>
<td>Eating fast food &gt; 3 times a week %</td>
<td>22.3</td>
</tr>
</tbody>
</table>

Figure 1. Six Months Follow Up

Results

• N= 136 had no prior history of diagnosed HTN. 66.2% of these participants had blood pressure of >130/80.
• 15.5% of those with elevated blood pressure were started on at least 1 blood pressure medication within 6 months after following up with a physician.

Conclusion

• Information from community health CVD screening event prompted previously undiagnosed AA participants to seek care for treatment of HTN within 6 months.
• Community-based screening programs are effective at screening and educating large populations of patients leading to early diagnosis and treatment of HTN.
• Education of healthy lifestyle recommendations may be beneficial to reduce CVD risk in high risk communities.

Limitations

• These were data collected in a metro-Atlanta area and thus may not be applicable to rural populations.
• Susceptible to errors due to using self-report surveys.

References

Background & Problem Statement

- Cardiac arrests can occur anywhere.
- Cardiopulmonary resuscitation (CPR), the manual application of chest compressions and ventilations to patients in cardiac arrest, can be life-saving.
- In-hospital cardiac arrests (IHCA) have better outcomes when compared to out-of-hospital cardiac arrests.¹²
- Good outcomes for in-hospital cardiac arrests depend on:
  - A skilled resuscitation team
  - Prompt initiation of high-quality CPR and defibrillation
  - Organizational structures to support IHCA response.³
- Delays in cardiopulmonary resuscitation, defibrillation, and epinephrine administration all increase survival in in-hospital cardiac arrests.⁴
- Time to initiation of CPR > 2 minutes was associated with a survival of 14.7% (91 of 618) as compared with 17.1% (9,111 of 56,604) if CPR was begun in 2 min or less (P < 0.002)²

Problem Statement: Potential delays in CPR initiation in hospital cardiac arrests in low patient volume areas may occur in part due to lack of familiarity with emergency response protocols and delay in equipment mobilization.

Fishbone Diagram: Potential Delay

- Team Members' Communication
- Unearlier roles in activating emergency response protocol
- Unearlier roles of resuscitation team members
- Lack of practical application of ALS simulation (beyond BLS scenario) that occurs within social work environment

Potential Delay in CPR initiation after in-hospital cardiac arrest

Location and Accessibility of Crash Cart including insertion supplies

Potential of Equipment

Future Considerations

- Increase frequency of simulated application of Basic Life Support (BLS) in hospital areas where codes are a rare event. In order to:
  - Establish familiarity with and confidence in performing skills required in protocols.
- Mobilize equipment needed to support such protocols
- Consider consolidation of emergency equipment:
  - Evaluate the cost vs benefit of additional features on emergency equipment in order to augment technological support during CPR.

Discussion

- Potential delays in CPR initiation can be attributed to:
  - Delayed mobilization of equipment
  - Lack of familiarity of high-quality CPR and defibrillation
  - Unclear roles of resuscitation team members
  - Get With the Guidelines Resuscitation
    - Large perspective, hospital based, multi-center clinical registry that collects resuscitation data from over 300 hospitals nationwide and creates evidence-based guidelines for inpatient IHCA's
    - Guertin et al conducted a prospective qualitative study at nine hospitals in the Get With the Guidelines Resuscitation registry and found that IHCA's in higher performing hospitals had:
      - Enhanced training and competency in CPR
      - Provided organizational flexibility and responsiveness in nursing role
      - Empowered nurses to operate at higher scope of clinical practice
      - Nalimouchi et al found that resuscitation teams at top-performing hospitals had:
        - Dedicated or designated resuscitation teams
        - Participation of diverse disciplines as team members during IHCA
        - Clear roles and responsibilities of team members
        - Better communication and leadership during IHCA
      - In-depth mock code trainings²

Next Steps

Hines Hospital "First Three Minutes" and Mock Code trainings

- Organized by Hines Nursing Professional Development Practitioner
- Performed throughout the hospital, including areas of the hospital where codes are a rare event
- Goal of Three-Minute training: give first-responders the tools, skills, and education needed to provide efficient and proficient patient care in the first few minutes of a cardiac arrest before the code team arrives
- Reviewed following items:
  - Equipment education including AED function on defibrillator
  - Proper technique of compression and defibrillation
  - Prompt mobilization of equipment including crash cart
  - Include built-in feedback and debriefing after training sessions
  - Implemented environmental and technological changes

Hines Code Review Committee

- Multi-disciplinary team performs dedicated reviews in hospital cardiac arrests and helps identify areas for improvement

References


Acknowledgments: Dr. Megan O’Halleran, Site Director CQI Program; Dr. Poonamna Oguire, Director of Nursing; Dr. Rich Mehta, Director, Hines Medical Interdisciplinary Care; Mary McCauley, DNP, CMS, RN, Quality System Improvement; and Malgorzata Ryczek, MSN, RN Nurse Professional Development Practitioner.
PREDICTORS OF ANTICOAGULATION COMPLIANCE IN PATIENTS WITH PULMONARY EMBOLISM AFTER HOSPITAL ADMISSION

Introduction

- Approximately 900,000 people in the U.S. are affected by deep vein thrombosis (DVT)/pulmonary embolism (PE) each year and upwards of 100,000 will die annually from related complications. 10-30% of people will die within one month of diagnosis and one third will have recurrence within 10 years.
- CHEST guidelines recommend treatment with anticoagulant (AC) therapy for provoked and unprovoked PE. The standard duration is 3 months with longer treatment courses reserved for recurrent or persistent PE.
- Prior cohort studies show a significant increase in mortality, recurrent venous thromboembolism (VTE), and major bleeding with non-compliance. Non-compliance has also been associated with increased healthcare costs both in the inpatient and outpatient setting.
- AC compliance after acute PE is of utmost importance to prevent mortality and recurrent events. This study analyzed factors affecting compliance of AC after acute PE.

Methods

- Single-center retrospective study at Loyola University Medical Center, 6/2016-5/2020.
- Inclusion criteria: Age ≥ 18, inpatient admission, formal Pulmonary Embolism Response Team (PERT) consults for PE, PE confirmed on CEP, patient discharged on AC. Exclusion criteria: patient with PE was caused by cancer, death prior to discharge, and discharge to long-term care facilities where the patient and primary pharmacy would not be responsible for filling AC.
- Compliance data including AC fill dates from pharmacies, and demographics from chart review (Table 1) were analyzed as covariates in linear regression analysis.
- The primary outcome: Proportion of Days Covered (PDCs), calculates compliance as number of days of medication on hand / number of days in dose interval.

<table>
<thead>
<tr>
<th>Table 1. Demographics</th>
<th>Mean ± SD</th>
<th>Range</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>128</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>62 ± 17</td>
<td>23-100</td>
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<tr>
<td>APACHE II score</td>
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<td>Diagnosis</td>
<td>DVT</td>
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<td>PE</td>
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<td>VTE history</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>No</td>
<td>109</td>
<td></td>
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<tr>
<td>Hypertension</td>
<td>Yes</td>
<td>100</td>
<td>0.001</td>
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<tr>
<td></td>
<td>No</td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

- 118 patients of 144 had sufficient data to measure compliance, and were included in analysis. 85 (49.2%) of the 118 had a PDC of 1, indicating 100% compliance. Remaining patients had a PDC range of 0.98 to 0.99. Mean PDC for all 118 patients was 0.88 ± 0.09 (SD). Median PDC was 0.89, and Mode was 1.
- Age, Black race, Medicaid, follow up, and type of AC (Apirsvn) had significant association with PDC in univariate regression.
- Only Black cohorts had 43% reduced compliance (PDC= 0.14, p= 0.006) compared to White population in multivariate regression. This finding is consistent with prior studies exploring the impact of race on medication compliance across different types of medications and diseases, like hypertension, dyslipidemia, and diabetes mellitus.
- Possible underlying driver(s) that a surface reading of race and compliance may be masking include socioeconomic status, health literacy, physical and financial access to healthcare, mental health, and social support. Concern for harmful medication side effects, dependency, adding medication to existing regimens, and mistrust and skepticism of the medical system are other possible drivers.
- Prior studies have demonstrated that Black patients have a higher mortality after pulmonary embolism compared to White patients. Improving anticoagulant compliance in this specific patient population is crucial. Further study is needed to assess if any of these factors play a role.

In-hospital education may mitigate some factors. Analysis in this study showed no significant differences in compliance after in-hospital education. However, other studies have shown increased compliance. Different outcomes may be due to sample size or type of education tool.

The major strength of this study is that it includes a broad range of AC types, insurance types, and patients (age, race, gender) whereas other studies focus on specific segments of patient populations. Thus, the results of this study encompass many factors affecting patient compliance.

Selected limitations include:
- Data was limited to information recorded in medical charts. 35 (29.7%) of the 118 patients did not have a race recorded. If they had, it may have changed the statistical significance of these outcomes.
- The small sample size of 144 patients, with low power, may limit applicability to the general population.
- Other critiques include human error in gathering data from chart review and pharmacy records, difficulty in calculating PDC for warfarin due to frequent dosing changes. Based on PDR, and adjusted time intervals to calculate PDC (i.e., some patients had data for a few months whereas others had data over multiple years).

Conclusion

A racial disparity appears to exist in AC compliance in PE patients. Black patients have lower compliance compared to White patients. Further studies are needed to address underlying contributors and improve compliance in this population.

References
Transfer Troubles

"Transport of critically ill patients repeatedly illustrates Murphy's Law" (1)

Christopher O'Hare, MD
Hines VA Medical Center, Loyola University Medical Center

Background & Problem Statement

- Accepting Interhospital Transfers is a common occurrence at both Hines VA and Loyola University Medical Center.
- Upon arrival of a patient with a critical illness, the need for transportation occurs on up to 10% of transports, redeeming on up to 15% of transports.
- Decreased availability of ambulances with critical care capabilities, increased availability in 2018 Q4.
- Critical Care Unit (CCU) shift change from 7am - 7pm.
- Increased demand in CCU 10am - 7pm.
- Decrease in CCU 6am - 10am.

Discussion

- Interventions to improve the process have yet to be extensively studied.
- A study by Thefeldt et al., published in 2017 examined a simple intervention: introduction of a standardized hand-off tool (1).
  - Developed a tool, standardized hand-off tool.
  - Identified key components for hand-off tool.
  - Engineered to improve communication, awareness, and follow-up.

Conference Follow Up

- Focused intervention: Standardized Transfer Document
  - Standardized hand-off tool designed.
  - Will be used to present patient information.
  - Will be used to provide patient information to the receiving facility.
- Required Personnel/Committees
  - Critical Care Department
  - Transfer Office
  - MOC/CC
  - LUMC, NICU

Fishbone Diagram

- Standardization of Transfer/Handoff Checklist
  - Variability exists between day and night transfers, overnight transfers have less standardization.
  - Hand-off tool introduces structure and consistency.
  - Hand-off tool improves documentation, communication, and build accountability.

Next Steps

- Routine Clinical Updates
  - Updates are provided, but rarely (never) provided in practice.
  - Many hospitals require updates, but 1% require routine updates, per Weingart et al (1).
  - 1% of CCU patients received updates, 2.4% every 24 hours, 39% every 24 hours, 39% required updates, but did not specify timing.
- Training on Accepting OH Transfer
  - Accepting OH transfer is performed by attendings at Loyola.
  - Addendum to standardized hand-off tool.
  - Follow-up to ensure knowledge and understanding.

References

Quality Improvement Project to Assess Interfacility Transfers of Patients with STEMI
Maya Patel, MD
Loyola University Medical Center
Edward Hines Jr VA Medical Center

Background

- Door-to-balloon time (D2B) - time between arrival of STEMI patient to a hospital and first balloon inflation
- ACC/AHA guidelines recommend D2B time of 90 minutes or less
- McNamara et al (1) shows the mortality rate almost doubles in those with D2B times of 121-156 minutes as compared to those with D2B time of 90 minutes or less
- Despite data showing that rapid PCI improves mortality, D2B times for patients, particularly those requiring inter-facility transfer, are still suboptimal.

Problem Statements

- Lack of regular post-event feedback to staff can decrease an individual’s understanding of the whole treatment process and their understanding of their individual role. This can result in a less cohesive and less efficient team.
- The lack of an emergent diagnosis-specific protocol for inter-facility transfer can lead to confusion and unnecessary delays in transferring the patient for the intended procedure such as reperfusion in the setting of a STEMI.

Implement a simplified streamlined protocol for interfacility transfer in the setting of a STEMI

- Reimer et al (2) is a retrospective cohort study that showed that the implementation of a streamlined protocol for interfacility transfers of STEMI patients, improved door-to-balloon times when compared to using the traditional protocol
- A single phone call would allow for the dispatch of emergency transportation, and activation of transport coordinator and the accepting facility’s cath lab to occur simultaneously.
- The aim would be to:
  - Use the streamlined protocol during cath lab off-hours
  - Decrease physician’s responsibility for administrative tasks so they can focus on patient care.
  - Minimize confusion on how to initiate emergency inter-facility transfers, particularly when physicians are new to the facility.
  - Incorporate a contingency plan in the case there is a delay in one pathway, such as transportation.

Incorporate Formalized and Interactive Feedback to Staff

- Scholz et al (3) is one of several papers derived from the FITT-STEMI trials that showed that systematic and formalized data assessment and interactive feedback to staff involved with interfacility transfers of STEMI patients, significantly improves D2B times.
- The feedback sessions would be conducted at both the dispatching and accepting hospitals.
- Discussions would include:
  - Data on the hospital’s average D2B times
  - Open discussion of concerns, barriers and suggestions on how to improve the inter-facility transfer protocols
- The aim would be to:
  - Increase awareness of individual responsibilities and understanding of the whole treatment process thereby improving the efficacy of the team.
  - Allow for regular evaluation of the emergency interfacility transfer process and provide opportunity to make constructive changes.

Next Steps

- These strategies were implemented at facilities that function differently from Hines VA, but they could be adapted to improve on the current inter-facility transfer process.
- These strategies could be incorporated at the VA by:
  - Scheduling inter-facility feedback sessions during already established interdisciplinary meetings
  - Developing a customized streamlined protocol using the resources available to Hines VA.
- Additional information required:
  - Number of STEMI patients requiring inter-facility transfer from Hines VA.
  - Average D2B times when inter-facility transfer is required
  - Understanding of current resources, such as transportation contracts, to better understand how to incorporate them into a streamlined protocol.

- Potential barriers:
  - Fewer resources to meticulously track and analyze data
  - Coordinating feedback sessions at dispatching and accepting facilities.
  - Requires extensive planning to develop and implement a streamlined protocol.

References

Discordance Among Commercially Available Next-Generation Sequencing Assays to Identify Germline Drivers of Inherited Bone Marrow Failure Syndromes

Gregory W. Roloff, MD1; Lucy A. Godisy, MD, PhD2,3; and Michael W. Drazier, MD3

1Department of Medicine, Loyola University Medical Center, Maywood, IL, USA; 2Department of Medicine, Section of Hematology/Oncology, The University of Chicago Comprehensive Cancer Center; 3Department of Human Genetics, The University of Chicago, Chicago, IL, USA

Introduction & context

- Hereditary hematopoietic malignancies (HHMs) are syndromes driven by germline variants that substantially increase an individual’s lifetime risk of developing hematologic cancers
- Also included in the HHM spectrum are inherited bone marrow failure syndromes (IBMFs), characterized by development of clinically significant cytopenias, bleeding, and infections that are driven by germline mutations and unrelated to viral, drug, or toxic exposures
- Several IBMFs also harbor risk for clonal evolution and progression to acute myeloid leukemia
- We have previously described the diagnostic heterogeneity that exists among commercially available tests marketed to detect germline risk variants for familial leukemias (PMID: 32807974)
- Here we expand our analysis, providing a systematic assessment of the assay characteristics, methodologies, and performance attributes of commercial assays intended to detect IBMFs variants

Performance attributes of commercial NGS assays for IBMFs vary dramatically

<table>
<thead>
<tr>
<th>Company</th>
<th>Institution</th>
<th>Platform</th>
<th>Assay</th>
<th>List Price</th>
<th>Turnaround (days)</th>
<th>Clonality detection</th>
<th>CNV detection</th>
<th>Confirmation</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory I</td>
<td>WBB*</td>
<td>39</td>
<td>250**</td>
<td>10-21</td>
<td>Single exon resolution</td>
<td>MLPA</td>
<td>Long-read sequencing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory J</td>
<td>WBB, purified DNA, saliva</td>
<td>135</td>
<td>1700</td>
<td>28</td>
<td>May not reliably detect partial CNVs or indels &gt; 50 bp</td>
<td>ddPCR</td>
<td>Upper Review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory K</td>
<td>SF</td>
<td>53</td>
<td>3000</td>
<td>42</td>
<td>400 bp</td>
<td>Sanger</td>
<td>Upper Review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory L</td>
<td>WB, SF, purified DNA</td>
<td>86</td>
<td>3250</td>
<td>28-42</td>
<td>Single exon resolution</td>
<td>MLPA, qPCR</td>
<td>Upper Review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory M</td>
<td>SF, WBB, saliva</td>
<td>116</td>
<td>Not Detected</td>
<td>42</td>
<td>Not Detected</td>
<td>Not Detected</td>
<td>Sanger</td>
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<td></td>
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<tr>
<td>Laboratory N</td>
<td>SF</td>
<td>133</td>
<td>1450</td>
<td>18</td>
<td>80% sensitivity for CNVs ≥ 2 exons</td>
<td>aCGH, MLPA</td>
<td>Upper Review</td>
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<tr>
<td>Laboratory O</td>
<td>WBB</td>
<td>90</td>
<td>3000</td>
<td>42</td>
<td>Resolves</td>
<td>MLPA, qPCR</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Laboratory P</td>
<td>WBB, saliva, MBB</td>
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<td>Not Detected</td>
<td>21-35</td>
<td>Not Detected</td>
<td>MLPA, qPCR</td>
<td></td>
<td></td>
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</tbody>
</table>

Table 3. Practical and Technical Attributes of Commercial IBMF Assays. Eight assays marketed for germline testing related to IBMFs were identified. Data were collected from laboratory websites, test requisition forms, and test information sheets. Laboratories are anonymized in the table above to prevent confliction and span anonymized test codes. A given test may have been utilized by a clinical laboratory. All tests submitted to NGS analysis. Genes included those on IBMF panels for each laboratory and excluded “old” exons. Price reflects the list price before the application of health insurance cost reductions or maximum out-of-pocket expenses. *Genes adopted by commercial laboratories. **Genes adopted by clinical laboratories. ***Genes adopted by commercial laboratories. ****Genes adopted by clinical laboratories.

Description of methods

We analyzed commercially available next-generation sequencing (NGS) assays marketed for evaluation of IBMFs. Excluded from our analysis were somatic mutation panels for hematologic malignancies or solid tumors mutational profiling. Using company websites and the NCSG Genetic Testing Registry (https://www.ncbi.nlm.nih.gov/gtr/), we compiled data on the number of genes included in each assay, testing cost, turn around time, specimen types accepted, and sequencing specific metrics on commercially available assays intended for use in suspected IBMFs (n=6). Hereditary leukemia/myelodysplasia panels were previously studied and therefore excluded. Companies were contacted, provided a draft manuscript of the data and given the opportunity to review, clarify, or contest any of the information presented herein.

Inconsistent inclusion of IBMF-associated genes across commercial testing panels

Conclusions

- Many of the commercially available assays marketed for the detection of IBMFs fail to detect the majority of genes implicated in IBMFs
- Significant variation between labs was noted. Multiple issue types accepted for sequencing, with many labs accepting peripheral blood as appropriate tissue for circulating DNA blood representing the involved tissue that harbors additional somatic variants
- Given the gaps in commercial test characteristics, individuals/families harboring germline variants are likely being erroneously reassured by false-negative results.

Future directions

- Ongoing work seeks to identify the prevalence and phenotypic significance of germline mutations traditionally associated with hematologic malignancies across the spectrum of solid tumors. An ongoing analysis of 45 known cancer predisposition genes in germline samples of 203 patients with 203 hematologic malignancies or more than one other independent solid tumors revealed that 13% (26/203) harbored pathogenic germline variants related to IBMF with the gery-line-gene distribution of verified cases shown in the pie chart above.
- Patients identified with germline BRCA1, BRCA2, and TP53 mutations did not satisfy currently recommended clinical criteria to warrant germline testing, thereby underscoring the consideration of germline evaluation in patients with multiple cancers regardless of phenotype.
Predicting Lung Cancer Among Pulmonary Nodules

Safeer Shah MD, Michel Reid MD, Afshar Majid MD
Loyola University Medical Center

Abstract

It is estimated that the prevalence of pulmonary nodules in the US ranges from 150,000 to 1 million annually. Most nodules are benign. In fact, 96% of nodules biopsied in the National Lung Screening Trial were false positives. Lung cancer remains the third most common cancer and the leading cause of cancer death in the US. The 5 year survival for all lung cancer is 18%, however for Stage 1 is 73-90% stressing the importance of diagnosing cancer early. The USPSTF recommends screening for lung cancer among patients with 30 pack year history or quit within the past 15 years with a low dose CT scan.

Current validated risk prediction models for Pulmonary Nodules use radiographic features and clinical characteristics such as Age, Sex, Family History, Pack year history and Upper lobe prominence. A limitation to these models is that they are specific to the population they were developed in and are poorly externally validated. Additionally, models are not helpful in assessing nodules less than 8 mm or apply to sub-solid nodules. Inadequate risk prediction can lead to unnecessary invasive procedures such as biopsy and wedge resection in addition to anxiety for patients due to concern about potential malignancy.

Currently, the McWilliams model remains the most validated risk prediction model however most clinicians continue to estimate risk intuitively.

Introduction

We would like to build a better risk prediction model for Pulmonary Nodules by improving image analysis techniques. Radiomics is the concept where images are converted into mineable data for machine learning algorithms to find physical features by a process called segmentation. There are many examples of Radiomics in medicine, one being in a study by Aerts et al. who found common features among head and neck cancers and lung cancers that predicted mortality. Additionally, Nasief et al. found that in pancreatic cancer changes of radiomic features overtime can predict response to chemotherapy treatment. We plan to adapt an existing risk prediction model for pulmonary nodules for the Loyola population.

A potential risk prediction model could be used by clinicians to risk stratify pulmonary nodules and possibly guide management about obtaining a biopsy. An improved sensitivity and specificity for this model may lead to less false negatives and improving mortality with earlier identification of malignancy.

Methodology

This will be a retrospective study on patients who are enrolled into the Loyola Lung Cancer Screening Clinic. The inclusion criteria are patients who have a 30 pack year history or quit within the past 15 years based on current USPSTF guidelines.

A RedCap database has been designed to include information regarding patient demographics, medical history and biopsy results. Additionally, information regarding the location, size and characteristics of pulmonary nodules greater than 4 mm up to 5 nodules will be recorded with their corresponding CT scans. Using the CT Images, Convolutional Neural Networks (CNN) can be arranged to create models for feature extraction to create the basic model to identify malignancy among pulmonary nodules.

Results

1,548 patients were identified in the Loyola Lung Cancer Screening clinic program. Of these patients, 56 have biopsy confirmed malignancy with the majority (29 of 56) being Adenocarcinoma. Those with confirmed malignancy had an average of 47.2 pack years while those who have not been biopsied have an average 47.9 pack year history.

The data acquisition phase is still in process with 106 CT Scans and corresponding pulmonal nodule information being entered for the purpose of building a CNN.

Conclusion

Based on preliminary data, the average pack year history does not correlate with an increased risk of malignancy which is commonly used in most prediction models. Further collection is needed to determine the strength of current risk prediction models among our patient population.

Additionally, we have yet to find the number of false positives in our patient sample.

We suspect that improved image analysis techniques using machine learning algorithms may improve current risk prediction models. This may lead to an additional tool for clinicians to use when deciding to pursue invasive diagnostic procedures.

Acknowledgements

References


Exposure to Disseminated Zoster
Tyanvi Swartz MD, Edward Hines, Jr. VA Hospital, Hines IL

Background & Problem Statement
Herpes Zoster is a communicable disease that requires healthcare systems’ attention and recognition to prevent transmission within the hospital. Specific attention and different recommendations apply for particular vulnerable populations including immunocompromised patients.

Zoster
- 1-4% shingles patients require hospitalization (annually)
- 100-150 deaths per year in the US
- Dissemination occurs in 2% of zoster cases

Isolation Precaution Guideline for Zoster
- Immunocompetent patient
  - Localized: complete cover of all lesions till dry
  - Disseminated: airborne+ contact+ cover all lesions
- Immunocompromised patient
  - Localized: airborne+ contact+ cover till dissemination is ruled out
  - Disseminated: airborne+ contact+ cover all lesions

Current Process
Training module
- Isolation training modules required for all Loyola trainees during orientation
- Part of medical education covers isolation for different diseases
- Isolation training included for all nursing staff

Isolation procedures
- Loyola
  - MD places order for isolation precautions
  - Sign placed by RN
  - At back of each isolation signs, specific disease is identified
  - Isolation discontinued by MD only
  - Before anyone enters the room, the team looks the back of the sign to confirm the disease
- Hines
  - RN chart reviews and places isolation signs first
  - Primary teampaged to place the specific isolation order (delay)
  - No specific diseases are written on the back of the sign

Next Steps
- Cost analysis for print new signs for the hospital
- Approval from Infectious control
- Analysis of past appropriate of isolation precaution sign usage rate
- Compare appropriate of isolation precaution sign usage after 6 months of new signs are printed

Proposed Action Items: Precaution signs
- First 2 pictures are current isolation precautions (front and back) at Hines VA hospital
- Propose an easy to understand picture as picture 3 (sample from PCICnet hospitals in NY)
- Propose to print CDC isolation guidelines at the back of isolation precaution signs for staff to reference (as picture in next steps)

References


Atrial fibrillation (AF) is a common cardiac arrhythmia characterized by a disordered electrical activity that leads to an irregular heart rate. AF treatment can be challenging due to its complex nature and potential long-term implications for heart function. This study investigates the intermediate-term outcomes of AF patients using different therapeutic approaches to understand the effectiveness and potential long-term benefits of each method.

**Introduction**

AF is a chronic disease that affects millions of people worldwide, leading to increased risk of stroke, heart failure, and other cardiovascular events. Effective management of AF is crucial for improving patient outcomes.

**Methods**

The study was conducted on a cohort of 100 AF patients, divided into three groups based on their treatment strategies: Group A received antiarrhythmic drugs (AADs), Group B underwent catheter ablation, and Group C received both AADs and catheter ablation. Follow-up visits were scheduled at 6, 12, and 24 months post-treatment to assess outcomes.

**Objective**

The primary objective was to evaluate the intermediate-term outcomes of AF patients treated with AADs, catheter ablation, or both, focusing on recurrence rates, procedural success, and long-term complications.

**Results**

- **Group A (AADs):** 20% recurrence rate at 24 months.
- **Group B (Catheter Ablation):** 10% recurrence rate at 24 months.
- **Group C (AADs + Catheter Ablation):** 5% recurrence rate at 24 months.

**Discussion**

The results suggest that combining AADs with catheter ablation is more effective in reducing AF recurrence compared to individual treatments. Further studies are needed to confirm these findings and explore the long-term impacts of each approach.

**References**

Patient Safety Case: A Potential Delay in Sepsis Recognition Causing Harm Event

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Introduction

- Sepsis is a life-threatening organ dysfunction caused by dysregulated host response to infection
- Major health concern, accounting for more than $20 billion (2.2%) of total US hospital costs in 2011

Diagnosing sepsis is extremely subjective and variable
- When surveilling practicing intensitists to classify five case vignettes of suspected or confirmed sepsis, overall interrater agreement was poor (k2.0=0.59)

Sepsis is a syndrome without a validated criterion standard diagnostic test
- Early identification and appropriate management in the initial hours after sepsis develops improves outcomes
- Organ dysfunction can be identified via acute change in total Sequential Organ Failure Assessment score (SOFA) ≥ 2
- A quick SOFA score (qSOFA) provides simple bedside criteria to identify adult patients with suspected infection who are likely to have poor outcomes

“Surviving Sepsis Campaign 2016” recommends that hospitals have a performance improvement program for sepsis, including sepsis screening for high-risk patients

Cause and Effect Diagram

Areas for Development

1. Improving the current process of sepsis screening in hospitalized patients
   - Education of Sepsis Bundle Order Set
   - Automation of Sepsis Screening Score
   - Integration of Sepsis Screening Score into Electronic Health Record
   - Education of Dedicated Response Team of current Sepsis Guidelines

2. Improving supervision of night float residents evaluating patients for possible admission of patients to the Medical Intensive Care Unit

Supervision and Night Coverage

- Clinical supervision in ICU emphasizes safety while promoting development of clinical experience
- Overnight rotations for residents are often times of little direct or indirect supervision
- A nocturnal program was established at a tertiary academic medical center and a survey examined house staff perception of night float rotation pre-nocturnal and post-nocturnal program roll out
- Increased overnight supervision enhanced the clinical value of the night float rotation
- Increased rates of attending contact during critical clinical decision-making
- Improved perception of patient care
- Without decrease in house staff perceived decision making autonomy

Survey of LUMC Residents

- Do you have adequate supervision and resources at night?
- How often do you feel uncomfortable or unsure in your clinical judgment?
- How often do you feel unsupported in your decision making?
- How should night float residents receive supervision?

References

Introduction

- Elderly patients experience a higher risk of morbidity and mortality after the diagnosis of pulmonary embolism (PE).

Catheter-directed thrombolysis (CDT) has been shown to be an effective treatment modality for acutely reducing pulmonary artery pressures, improving right to left ventricular ratio and right ventricular systolic function with an acceptable safety profile among patients with intermediate and high risk PE.

- Elderly patients, however, were excluded from landmark trials, thus the safety of this intervention remains uncertain among those of advanced age.

Objectives

- To examine the safety of CDT for acute PE among elderly patients ≥ 65 years old.

- To ascertain whether the safety profile of CDT in elderly patients has changed over time with increased widespread use of this technology.

Methods

- Patients hospitalized between 2010-2017 with acute PE who underwent CDT during same admission were identified using administrative codes within the Nationwide Readmission Database.

- Patients were stratified by age cohorts of <65 and ≥ 65 years old and their demographic data was collected.

- Primary outcome was the rate of major bleeding (gastrointestinal bleeding (GIB) or intracranial hemorrhage (ICH)).

- Secondary outcomes included:
  1. rate of major bleeding among the following sub-groups 65-75, 76-85, and ≥85 years old;
  2. the annual trend of major bleeding complications over time;
  3. rates of in hospital mortality

- Pearson’s chi-squared test was used to compare categorical outcomes among groups and multivariable logistic regression was used to identify the effect size of covariates on in hospital mortality.

Results

- A total of 15,372 patients had CDT for PE, of which 6,705 (43.6%) patients were ≥ 65 years old.

- In ≥ 65 years old, there was increased rates of major bleeding (3.5% vs 2.9%, p=0.01), GIB (2.6% vs 1.6%, p=0.01) and ICH (9.5% vs 9.4%, p=0.91).

- After 1:1 matching (5,336 patients in each group), rates for major bleeding and ICH remained higher among patients ≥ 65 years old (3.4% vs 2.6%, p=0.009), and (0.9% vs 0.5%, p=0.03), while the rate of GIB was similar (2.5% vs 2.0%, p=0.08).

- Major bleeding rates were not different across age cohorts of 65-75, 76-85, and ≥85 years old (3.4%, 3.5%, and 3.3%, p=0.94).

- There was no change in major bleeding complication rates over time in both elderly and non elderly patients (Figure 1).

- The 30-day bleeding-related readmission rate was higher among those ≥65 years old (0.4% vs 0.1%, p=0.003).

- Major bleeding was the strongest predictor of in-hospital mortality in the elderly (OR 4.7; 95% CI 3.4-6.5, p=0.001).

Figure 1: Temporal trends of major bleeding complications among patients ≥65 versus <65 years old who had catheter directed thrombolysis

Results CTD

Figure 2: Effect size of each covariate on in-hospital mortality in the elderly.

Conclusion

- Elderly patients account for nearly half of patients receiving CDT for acute PE.

- Elderly patients suffer higher rates of bleeding complications after CDT.

- A major bleeding event in the elderly was associated with a ~5-fold increase in the odds of in-hospital mortality.

- Further studies are needed to investigate the safety of CDT use among the elderly.

References


Communication in a COVID Crisis
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Background & Problem Statement

- Better communication between stakeholders in a crisis is essential to prevent misinformation and ensure a coordinated response.
- Key objectives in crisis communication include clarity, honesty, and timeliness.

Discussion

- Communication breakdowns in crisis situations often occur due to technical challenges and lack of coordination.
- Key elements of effective crisis communication include clear messaging, consistent information, and transparent decision-making.

Proposed Next Steps & Follow Up

- Developing a comprehensive crisis communication plan that includes clear roles and responsibilities.
- Utilizing technology to enhance communication efficiency and reach.

Early Issues

- Lack of coordination between stakeholders.
- Inadequate information sharing.

Late Solutions and Persistent Challenges

- More consistent communication frameworks needed.
- Lack of shared understanding and language among stakeholders.

Successful Responses: The UW Washington Example

- Clear communication strategies and protocols.
- Utilization of technology to disseminate information.

References

Persistent Left Atrial Appendage Thrombus Despite Appropriate Anticoagulation: An Area of Uncertainty

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Introduction

Prior to cardioversion or ablation for atrial fibrillation many patients undergo a transesophageal echocardiogram (TEE) to rule out a thrombus. This is done because there is a high risk of stroke in patients with known thrombus when converting back into normal sinus rhythm. Typically patients are treated with systemic anticoagulation for 4 weeks and repeat imaging is performed again prior to cardioversion or atrial ablation if a thrombus is seen.

But for a particular group of patients there is persistence of a thrombus even on systemic anticoagulation. It is not known how to handle these patients and more importantly what happens to this thrombus. It is not known what the stroke risk for these patients might be as well.

Specific strategies for managing these patients may include switching anticoagulants, continuing with current therapy, or performing procedures such left atrial appendage ligation/resection are not known. But knowing which approach leads to a better outcome in terms of thrombus resolution and avoiding CVA’s would help guide clinical practice.

Hypothesis

The working hypothesis of the project is that there is an increased risk of stroke in patients with persistent atrial thrombus.

We expect that stroke risk is higher with those who have thrombus that persists through anticoagulation compared to patients who are not related to have a thrombus while on anticoagulation.

Methods

Inclusion Criteria:
1) Patients who underwent a TEE from 2011 – 2019 at LUMC
2) Those flagged for having the words “thrombus”, “clot”, or “spontaneous echo contrast” appear in the report
3) Those who have had their LAA surgically excised or occluded

Exclusion Criteria:
1) Those lost to follow up
2) Those listed as having “possible” or “potential” thrombus as opposed to being described as definite

Via a retrospective analysis each patient had information obtained through chart review including anticoagulant used, duration of anticoagulation, information on therapeutic levels of anticoagulation if possible, indication for anticoagulation, CHADS2/VASC score, clinical heart failure, and cardiomyopathy

Notes also made on any confirmatory studies showing left atrial thrombus such as CT, MRI, or surgery

Rates of stroke will be calculated for patients prior to imaging with TEE and rates after

Specific anticoagulants will be analyzed to determine if some drugs are more likely to lead to persistent thrombosis than others.

Primary outcome for this study would be rate of stroke

Secondary outcomes would be mortality, significant bleeding, thrombus resolution, and other systemic emboli

References


