Effectiveness of the AngioVac system in removal of intravascular masses: a single center experience

Authors: Austin Nickell1, Orlin Sergev1,2, Phanindra Antharam1,2, Cornelius Dyke1,2, Dubert Guerrero1,2

University of North Dakota School of Medicine and Health Sciences; Sanford Health

Introduction

Cardiovascular diseases including endocarditis, deep vein thrombosis, and septic emboli remain highly mortal diseases, resulting in numerous hospitalizations and deaths each year (15, 16, 20, 21). In addition to anticoagulation and thrombolytic therapies that are used for acute and chronic management of these conditions, surgical debridement can also be performed. However, critically ill and hemodynamically unstable patients are often not viable candidates for these procedures, owing to the stress placed on the body during sternotomy.

Furthermore, patients presenting with comorbidities such as coronary artery disease, heart failure, renal disease, obesity, and diabetes are predictors of early mortality in these invasive procedures (1–3, 17). An alternative to these invasive procedures is the AngioVac system designed by AngioDynamics in Latham, NY. Performed either percutaneously or open, this minimally invasive technique has been shown as an effective replacement for the removal and filtration of acute thrombi or emboli. This method is also indicated for the debridement of vegetations seen in right sided endocarditis and right atrial tumors (6, 8).

AngioVac Set-Up

This method requires two cutaneous access points: one for the AngioVac canula and the other for the return canula. These are inserted in a circuit fashion using a combination of patients’ femoral and jugular veins. (6, 10, 12). The AngioVac canula is then guided through the vascularule to the site of thrombi, emboli, or vegetation. With the device’s balloon inflated, funnel shaped tip, it facilitates aspiration using an external pump and suction of the intravascular thrombus or mass.

Methods/ Results

Methods/Results

Sanford Electronic Medial Records

33 AngioVac Surgeries Completed
28 Successful Procedures
5 Unsuccesful Procedures

Table 1: Patient Demographics

<table>
<thead>
<tr>
<th>Number of Procedures: 33</th>
<th>Average Age (years): 46.5</th>
<th>Male (n): 22 (67%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average BMI (kg/m²): 28.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt; 18.5 kg/m²): 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal (18.5 - 24.9 kg/m²): 11 (33%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight (25 - 29.9 kg/m²): 9 (27%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese (30 - 34.9 kg/m²): 5 (15%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severely Obese (35 - 39.9 kg/m²): 3 (9%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ASA physical status:

1. 1
2. 0
3. 6 (18%)
4. 24 (73%)
5. 3 (9%)

Average ASA Score: 3.9

Table 3: Post-Procedure Complications/ Outcomes

<table>
<thead>
<tr>
<th>Total</th>
<th>Median Time to procedure (days)</th>
<th>Median Total Length of Hospital Stay (days)</th>
<th>Median Length of stay s/p (days)</th>
<th>Median Length of ICU stay s/p (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 (24.24%)</td>
<td>5</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Vegetations on Pmachead Keeps (1 3%

Results Continued

Summarized Findings:

1. The most common indications for the procedure were endocarditis (n = 24; 73%), RA/RV mass (n = 5; 15%), and DVT/PE (n = 2; 6%).
2. Patient preexisting comorbidities included hypertension (n = 17; 52%), IDU (n = 14; 42%), CAD (n = 10; 30%), and diabetes (n = 12; 36%).
3. Post-procedurally the median length of hospital stay s/p was 10 days (IQR = 18–8) with nearly all patients being directed to the ICU directly following the procedure (n = 32; 97%).
4. The most common complications seen after the procedure were shock requiring vasopressors (n = 13; 39%), pleural effusion (n = 9; 27%), and sepsis (n = 4; 12%).
5. Single occurrence of 30-day mortality post procedurally

Conclusion

- The 85% success rate that was reported in our institution is comparable to a previous reported rate of 70% (10).
- AngioVac procedure offered a less invasive option to high-risk surgical patients presenting with right sided endocarditis requiring vegetation debulking, intravascular thrombi or cardiac masses
- Success rate was fairly high with relatively low complication rates with no direct mortality observed after 30 days

AngioVac is an effective and safe option in removal of vascular clots or masses

References

Introduction

• Despite efforts, children's pain remain undertreated in emergent settings1
  – Fear of potential side effects in children
  – Inappropriate pain assessment tools
• Prior studies showed undertreated pain in self-identified adult Hispanic and Black patients2
• What about the kids?
  – Gap as it relates to pediatrics, opioid use in acute fracture management, and race
• We sought to: Determine the association of race and the utilization of pain medication in children who have suffered an upper and/or lower extremity fracture
• Our hypothesis was as follows: “There will be a statistically significant difference in the percentage of white versus black and other race patients who receive opioid pain medication”

Methods

• Retrospective, cross-sectional analysis using the 2011–2018 National Hospital Ambulatory Care Survey-Emergency Department (NHACS-ED)
• Patients’ selection criteria: <18 years old and Upper and/or lower limb fracture using associated ICD-9/10 codes
• Clinical Variables: upper/lower limb fracture diagnosis, pain rating, analgesic received, services provided
• Demographic Variables: Age, race, sex, year of visit, insurance status, metropolitan statistical area (MSA) status
• Data analyzed using summary statistics and bivariate comparisons (Chi-squared tests and GLM means)
• Significance tests two-sided (p-value < 0.05)

Discussion

• Strengths
  – NHACS-ED is a very large dataset across the United States
  • Allows us to compare multiple variables while still having reliable estimates. Allows generalization to the population. Weighting for nonresponse bias
  – Specificity of ICD-9 & 10 Codes
  • Many other studies investigate all long bone fractures (i.e. phalanx fractures), some may not warrant opioids
• Limitations
  – Different races may preferentially decline certain pain medications. Patients may be misclassified by race, no data on analgesics given prior to ED visit

Conclusions

• The overall pain medication administration for children did not change over the study period
  – Utilization of opioids for children with fractures significantly decreased, but SNC-2 use did not increase proportionally to compensate
• Our study showed other races were more likely to receive opioids, contradicting previous studies
  – Minority children from 2014-2017 were more likely to receive analgesics, but less likely to receive opioids and achieve optimal pain reduction3
• Future Considerations: Investigate specific reasons for reduced use of opioid in children
  • Further break down opioid utilization by ethnicity in addition to race (other race category non-specific)

Results

Table 1: Characteristics of U.S. Emergency Department Visits Substantiated by Race, 2011–2018

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total Estimated N=145,544 Unweighted N=1,104,760</th>
<th>White Estimated N=101,070 Unweighted N=952,381</th>
<th>Black Estimated N=7,640 Unweighted N=55,875</th>
<th>Other or Unknown Estimated N=36,834 Unweighted N=57,497</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>5.3%</td>
<td>5.2%</td>
<td>6.0%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>2.5%</td>
<td>2.9%</td>
<td>2.5%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>15.0 (12.0)</td>
<td>15.0 (12.0)</td>
<td>15.0 (12.0)</td>
<td>15.0 (12.0)</td>
</tr>
<tr>
<td>Insurance status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>36.8%</td>
<td>36.7%</td>
<td>37.3%</td>
<td>38.3%</td>
</tr>
<tr>
<td>Government</td>
<td>52.5%</td>
<td>53.2%</td>
<td>52.1%</td>
<td>53.3%</td>
</tr>
<tr>
<td>Other</td>
<td>8.5%</td>
<td>8.7%</td>
<td>8.6%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Pain Rating (0-10)</td>
<td>3.3 (2.0)</td>
<td>3.3 (2.0)</td>
<td>3.5 (2.3)</td>
<td>3.3 (2.0)</td>
</tr>
<tr>
<td>NOS (%)</td>
<td>7.9%</td>
<td>8.0%</td>
<td>7.6%</td>
<td>7.9%</td>
</tr>
<tr>
<td>EMS (%)</td>
<td>10.1%</td>
<td>10.2%</td>
<td>9.9%</td>
<td>10.1%</td>
</tr>
<tr>
<td>Pain Medication (Opioid)</td>
<td>60.5%</td>
<td>61.1%</td>
<td>60.4%</td>
<td>60.8%</td>
</tr>
<tr>
<td>Services Provided (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>47.0%</td>
<td>46.7%</td>
<td>47.5%</td>
<td>47.0%</td>
</tr>
<tr>
<td>Total %</td>
<td>80.0%</td>
<td>80.6%</td>
<td>81.1%</td>
<td>79.6%</td>
</tr>
</tbody>
</table>


Outcomes from Malignant Pleural Effusion Treatments: An investigation into length of stay, survival rates, and dyspnea scores in patients receiving indwelling pleural catheters, talc pleurodesis, or both.

Megan DeVillers, Zachary Mohs, Stephanie Ziegler, Marc Basson, MD, William Newman, MD

Background
- Malignant pleural effusions (MPEs) affect approximately 150,000 people and almost 15% of cancer patients yearly. MPE patients have a poor prognosis with most only surviving 3-12 months post-diagnosis.
- Due to the short life expectancy, MPE treatments are often palliative in nature and highly symptom-dependent, with most patients primarily complaining of shortness of breath.
- The most common treatments include pleurodesis (TPS) or insertion of indwelling pleural catheters (IPC).
- Previous MPE research studies have been done on non-US populations and have come to contradicting conclusions about the optimal treatment approach.
- The objective of this study was to further compare the three most common treatments by investigating three outcome variables (length of stay, survival rate, and dyspnea score) to determine which treatment may be best suited for patients with MPE.

Methods
- Retrospective chart analysis was conducted for 314 MPE patients that underwent talc pleurodesis, insertion of an indwelling pleural catheter, or a combination of both procedures between January 1, 2010 and December 31, 2020. The talc pleurodesis group had 228 patients, the IPC group totaled 48 patients, and the combination group had 38 patients.
- Demographics were similarly distributed in each group, with the majority of patients being Caucasian males between the ages of 66 and 70.
- Survival rate (Figure 1) was measured by finding the number of days between date of procedure and death/censor date. This data was then run through a Cox proportional hazard regression model to adjust for likelihood of mortality when patients are chosen for each of the three interventions and adjusted for baseline dyspnea and ECOG scores.

Results
- Dyspnea scores (Figure 2) were estimated by researchers after reviewing patient complaints in the chart and were ranked as either none, mild, moderate, or severe. Scores were collected both prior to the procedure and until end of study or patient death/loss to follow up.
- Length of Stay (Figure 3) was determined by finding the cumulative time between all hospital admission duration following the procedure, truncated at 400 days.
- Non-parametric comparison tests for multiple comparisons were used for continuous and ordinal variables. Chi-squared tests were used for categorical variables. Bonferroni adjustment was used for multiple comparisons. R version 4.0.2 and StataMP version 15 were used for statistical calculations.

Results Continued
- Figure 2 displays baseline pre-procedure average dyspnea scores for patients as well as quarterly average dyspnea scores post-intervention. While there is improvement in dyspnea noted after each procedure, there is no significant difference in improvement among the groups.
- Figure 3 displays total number of days spent in the hospital for each test group (truncated at 60 days). The results show that the IPC and the IPC + TPS groups have a relatively similar LOS at 3 and 2 days, respectively. The TPS group, however, has a median LOS of 7 days.

Limitations
- This study has several limitations that were noted throughout the project:
  - The population studied was primarily made up of middle-aged Caucasian males. The data collected and conclusions made may not apply to other genders, races, or ethnicities.
  - The dyspnea scores were estimated by researchers based on patient complaints within the charts, meaning they may not be reliable from patient to patient or physician to physician. Some patients also describe their shortness of breath as pain, which can make scoring unreliable.
  - The difference in number of patients between the three groups could affect the results. More research should be done with a larger sample to obtain a higher statistically and clinically powerful result.

Conclusions
- Given the collected data, intervention type does not appear to be a statistically significant or clinically relevant factor in post procedure survival after adjusting for baseline ECOG and dyspnea scores.
- There were also no statistically significant or clinically relevant differences in dyspnea scores post-procedure between the three treatment groups.
- The primary outcome variable reviewed was Length of Stay. There was a statistically significant and clinically relevant difference between LOS for patients that received TPS (7 days) and those that received IPC/combination treatments (3 and 2 days). This information could be useful for clinicians to provide to patients if they are deciding between multiple treatment options for their MPE. In addition, these results could be valuable to hospital systems as they are acutely attuned to length of stay and how it relates to overhead costs.
Abstract

There are three commonly used approaches to the management of symptomatic malignant pleural effusion (MPE) patients: pleurodesis (TPS), obliteration of the pleural space via talc pleurodesis (TPS), or a combination of both. To our knowledge, no published studies have looked at the complications associated with these interventions in a purely U.S. population. This prompted us to utilize the VA Health Care System’s VINCI database to retrospectively review the chart of each subject who had undergone one of these interventions from 1/1/2010 to 12/31/2020. The demographics of the subjects were evenly distributed between the three intervention groups. Subjects meeting the inclusion criteria were distributed as n=48 for IPC, n=228 for TPS, n=38 for IPC + TPS. Complications were recorded as either pulmonary or extrapulmonary. Pulmonary complications included intervention failures (i.e., change to an alternative form of management), pneumonia/chest infections, lung entrapments, and other complications (i.e., pneumothorax, intubation, etc.). Extrapulmonary complications included medications/chemo events, non-pulmonary infections, cardiac arrhythmias, chest tube dislodgement, and chest tube inadvertent removals. It was found that there were no statistically or clinically significant differences in extrapulmonary complications based on intervention. The most common extrapulmonary complication was medication/chemo adverse events, seen in 43.8% of IPC and 36.5% of the TPS or dual treatment group. There were significant differences seen in the pulmonary complications, with intervention failure rates being the most striking. While there was no difference in failure rates over the first 90 days, IPC exhibited a significantly higher failure rate than the other two approaches one-year post-intervention (37.5 vs 20.7%; p=0.01). Pneumonia/chest infection rate (31.3 vs 16.2%; p=0.013), lung entrapment (14.6 vs 4.5%; p=0.015), and other complications (22.9 vs 12.4%; p=0.00) were higher in the IPC group as well. Based on the collected data and noting the limitations of this data, it is reasonable to conclude that in this U.S. population, IPC is associated with more adverse events, and thus is represented as median with intra-quartile range (IQR) in parenthesis.

Methods

The VA Health Care System’s VINCI database was utilized for retrospective chart review. All patients who had been coded as having an MPE from 1/1/2010 to 12/31/2020 were obtained. Subjects were then filtered down to those coded as having either IPC or TPS. From those, 314 fit the criteria for inclusion into the study. Subjects’ social security number and date of birth were subjected to an automated de-identification using patient SID numbers and recorded. Demographic data such as age, sex, race, ethnicity, cancer treatment, tumor histopathology, and baseline ECOG were collected and summarized in Table 1.

Results/Discussion

These two intervention strategies can also be used in tandem and have been shown to shorten hospital stays and allow for earlier removal of the IPC. There have been multiple studies published that have looked at the complications associated with these interventions in a strictly U.S. population.

Interventions

Of the 48 other complications, pneumothorax (33.3%), nausea (16.5%), rash (10.6%), and vomiting (9.7%) being most common. The demographics (Table 1) were evenly distributed across all three intervention groups. There were no statistically, or clinically significant differences seen in Extrapulmonary complications in any group (Table 2). There were 103 med/chemo adverse events reported with hematologic events (34.9%), nausea (16.5%), rash (10.6%), and vomiting (9.7%) being most common.

Conclusions

Based on the data collected and the limitations of the data, IPC is associated with higher long term failure. We have also clearly shown that IPC is associated with greater rates of pneumonitis/pleural infections and other pulmonary complications. While IPC does seem to be associated with higher rates of lung entrapment, that may be artifically high since TPS is commonly avoided in patients with entrapped lungs due to its low efficacy.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.
Asymptomatic Preoperative COVID-19 Screening: A Single Center Study

Stacy Ploom, Tyler Beattie MD, Abe Sahnoun PhD, Dubert Guerrero MD

Introduction

- With the resumption of elective surgeries during the COVID-19 pandemic, patients required to undergo pre-procedural RT-PCR testing for SARS-CoV-2 to 1,2
- Identify asymptomatic and pre-symptomatic carriers
- Limit spread of virus
- Numerous risk factors correlated with severe COVID-19  
  - Presence of comorbid conditions 4,5,6,7,8
  - African American and Hispanic race 9
  - Smoking 10
  - Age > 60 years 4,9
  - Elevated CRP, ESR, WBC, ALP, AST, ALT, LDH, BUN, Cr and low PLT, Hgb, Alb 3
- Limited studies conducted to identify risk factors for:
  - Symptom progression in initially asymptomatic cases
  - Surgical delay during the pandemic
  - Medical delays associated with worse health outcomes

Objectives

- To describe our institutional experience with pre-operative patients tested for COVID-19
- To determine best predictors of symptom progression in initially asymptomatic cases
- To investigate risk factors for surgical delay

Methods

- A retrospective chart review was conducted on 165 surgical patients who had
  - Positive pre-procedural COVID-19 tests
  - No symptoms at the time of testing
  - Minimum 14 day follow up
- Demographic, clinical, and/or biomarker data were collected and compared between
  - Truly asymptomatic and symptom progressor cases
  - Delayed and non-delayed surgical cases
  - Risk factors for symptom progression or surgical delay were assessed
- Differences were analyzed for significance using
  - Chi-Square or Fischer’s exact test and Wilcoxon Signed-Rank Test
  - P-values were two-sided and a p-value < 0.05 was considered significant

Results

<table>
<thead>
<tr>
<th>Study Population Characteristics</th>
<th>Comorbidity</th>
<th>Gender</th>
<th>Race</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hypertension</td>
<td>Heart Disease</td>
<td>Congestive Heart Failure</td>
<td>COPD</td>
</tr>
<tr>
<td>%</td>
<td>17%</td>
<td>13%</td>
<td>42%</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>24%</td>
<td>66%</td>
<td>88%</td>
<td>5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 1: Patient Biomarkers and Symptom Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Biomarker</td>
</tr>
<tr>
<td>Mean C-Reactive Protein (CRP) (mg/l)</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Q1-Q3</td>
</tr>
<tr>
<td>Mean Alkaline Phosphatase (ALP) (U/L)</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Q1-Q3</td>
</tr>
<tr>
<td>Mean Alanine Transaminase (ALT) (U/L)</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Q1-Q3</td>
</tr>
<tr>
<td>Mean Aspartate Aminotransferase (AST) (U/L)</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Q1-Q3</td>
</tr>
<tr>
<td>Mean Platelets (x 10^3/ml)</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Q1-Q3</td>
</tr>
<tr>
<td>Mean White Blood Cell Count (WBC) (10^3/µl)</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Q1-Q3</td>
</tr>
</tbody>
</table>

Conclusions

- Among pre-operative patients tested for COVID-19, 2% were asymptomatic and infected with SARS-CoV-2
  - 25% were pre-symptomatic at time of testing
  - 75% remained truly asymptomatic over the minimum 14-day follow-up period
- While asymptomatic COVID-19 cases remain relatively low in pre-operative patients, it emphasizes a threat for transmission in the community or operating room
- Urgent or emergent cases proceeded without surgical delay, with most of these being obstetrical procedures
- No diagnostic, clinical, or laboratory features predicted symptom progression
  - May be due to small sample size or lack of biomarker values for select cases
- Large scale retrospective studies with detailed patient information needed

References

Comparison of Prognostic Scoring Systems for Individuals with Malignant Pleural Effusion

Stephanie Ziegler, BS1, Megan DeVillers, BS1, Zachary Mohs, BS1, Marc Basson, MD, PhD, MBA1, William P. Newman, MD1, 2

1 University of North Dakota School of Medicine and Health Sciences, Grand Forks.
2 Fargo Veterans Affairs Medical Center, Fargo, North Dakota.

Background

- Malignant Pleural Effusion (MPE) is an aggressive condition with increasing prevalence amongst cancer patients.
- The life expectancy is 3-12 months, often with a poorer quality of life.
- The available treatment options, pleurodesis or indwelling pleural catheter, are therapeutic and palliative in nature.
- Prognostication with a scoring system could guide the decision of a therapeutic intervention.
- We initiated an investigation of comparing existing partially validated prognostic scoring systems, LENT and clinical PROMISE, using a large data set of VA patients afflicted by MPE. Additionally, each prognostic scoring system was modified to be compared to the comprehensive score.

Methods

- Using the VA’s VINCI database (Corporate Data Warehouse), medical charts were reviewed for MPE between 11/1/2010 and 12/31/2020 for those who had one of the following interventions: indwelling pleural catheter (IPC), talc pleurodesis (TPS), or both IPC and TPS in the same procedure.
- Using the Joint Legacy Viewer (JLV), each student individually reviewed patient charts for prognostic scoring system variables.
- LENT system criteria: pleural fluid lactate dehydrogenase, Eastern Cooperative Oncology Group (ECOG) performance status score, neutrophil-to-lymphocyte ratio, and tumor type
- PROMISE system criteria: previous chemotherapy and radiotherapy, hemoglobin, white cell count, and C-Reactive Protein, plus the same variables as the LENT criteria
- All variables, except for age, are represented as median with intra-quartile range (IQR) in parenthesis.
- Non-parametric comparison tests with Bonferroni adjustment for multiple comparisons were used for continuous and ordinal variables. Chi-squared tests were used for categorical variables.
- R packages survival and survminer were used for survival analysis and Kaplan-Meier curve development with pROC for ROC curve depiction and analysis.
- R version 4.0.2 and StaTaMP version 15

Results

Table 1. Demographics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall</th>
<th>IPC</th>
<th>TPS</th>
<th>IPC + TPS</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>66 (32)</td>
<td>67 (31)</td>
<td>65 (32)</td>
<td>66 (33)</td>
<td>0.48</td>
</tr>
<tr>
<td>Gender</td>
<td>313</td>
<td>184</td>
<td>129</td>
<td>313</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>Male (%)</strong></td>
<td>204 (65)</td>
<td>120</td>
<td>84</td>
<td>204</td>
<td>0.97</td>
</tr>
<tr>
<td><strong>ECOG baseline</strong></td>
<td>313</td>
<td>101 (32)</td>
<td>100 (32)</td>
<td>102 (32)</td>
<td>0.70</td>
</tr>
<tr>
<td><strong>Cancer type</strong></td>
<td>314</td>
<td>67 (21)</td>
<td>67 (21)</td>
<td>68 (21)</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Chemotherapy</strong></td>
<td>314</td>
<td>106 (34)</td>
<td>105 (33)</td>
<td>111 (35)</td>
<td>0.74</td>
</tr>
<tr>
<td><strong>Radiotherapy</strong></td>
<td>313</td>
<td>107 (34)</td>
<td>107 (34)</td>
<td>114 (36)</td>
<td>0.37</td>
</tr>
<tr>
<td><strong>Death (%)</strong></td>
<td>314</td>
<td>107 (34)</td>
<td>107 (34)</td>
<td>114 (36)</td>
<td>0.40</td>
</tr>
<tr>
<td><strong>Tumor pathology</strong></td>
<td>314</td>
<td>67 (21)</td>
<td>67 (21)</td>
<td>68 (21)</td>
<td>0.27</td>
</tr>
<tr>
<td><strong>Histology</strong></td>
<td>314</td>
<td>67 (21)</td>
<td>67 (21)</td>
<td>68 (21)</td>
<td>0.27</td>
</tr>
<tr>
<td><strong>Lung</strong></td>
<td>111 (35)</td>
<td>56 (18)</td>
<td>55 (17)</td>
<td>111 (35)</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Mesothelioma</strong></td>
<td>103 (33)</td>
<td>54 (17)</td>
<td>49 (16)</td>
<td>103 (33)</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Hematological/Lymphoma</strong></td>
<td>111 (35)</td>
<td>56 (18)</td>
<td>55 (17)</td>
<td>111 (35)</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>101 (32)</td>
<td>55 (18)</td>
<td>46 (15)</td>
<td>101 (32)</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Table 2. Data of Prognostic Scoring Systems (percentages in parenthesis)

<table>
<thead>
<tr>
<th>Score Risk Category</th>
<th>LENT Comprehensive Score</th>
<th>ECOG+Tumor Pathology Score</th>
<th>PROMISE Comprehensive Score</th>
<th>PROMISE ECOG+Tumor Pathology Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0(0)</td>
<td>13(43)</td>
<td>22(67)</td>
<td>90(29.7)</td>
</tr>
<tr>
<td>Moderate</td>
<td>20(66.7)</td>
<td>59(19.5)</td>
<td>10(38.3)</td>
<td>113(37.3)</td>
</tr>
<tr>
<td>High</td>
<td>103(33)</td>
<td>231(76.2)</td>
<td>1(3.3)</td>
<td>100(33.9)</td>
</tr>
<tr>
<td>Total</td>
<td>303</td>
<td>303</td>
<td>303</td>
<td>303</td>
</tr>
</tbody>
</table>

Figure 1. Performance of LENT score, clinical PROMISE score, and corresponding modified scores using ECOG and Tumor Pathology in patients with MPE. Kaplan-Meier (KM) survival curves for patients with moderate and high (A) LENT score and modified (C) low, moderate, and high LENT score. KM survival curves for patients with moderate and high (B) PROMISE comprehensive score and low, moderate, and high modified (D) PROMISE score.

Figure 2. ROC curve analysis for the LENT score and PROMISE score at 90 days. (A) LENT score and PROMISE score using complete score categories. (B) LENT score and PROMISE score using data from ECOG and tumor pathology only.

Summary & Conclusion

- There is a larger difference when scoring a patient’s prognosis using the clinical PROMISE comprehensive scoring system compared to the LENT comprehensive system.
- These results are clinically relevant; often, patients with a poor prognosis presumably desire to minimize their hospital days and discomfort. Therefore, patients with a poor prognosis could be identified using the clinical PROMISE score to assist in developing a care plan in correspondence with their health goals.
- The modified PROMISE and LENT scores using ECOG and tumor pathology alone resulted in statistically significant results when comparing survival curves.
- Despite the statistically significant survival results, the ROC curve analysis was insignificant with scores less than 0.7, deeming it to be only a marginally useful test.

Implications

- Prognostic scoring systems can add clinically relevant information that clinicians can present to patients in aiding a decision of therapeutic intervention.
- Prognostic scoring systems in the literature yield variable results and may not be an effective system for clinicians.
- Further investigation into biomarkers and other clinical evidence is needed to develop effective prognostic scoring systems for patients afflicted by MPE.

Limitations

- Some procedures were incorrectly coded in the U.S. VINCI system; however, with careful review, the correct information was gathered.
- Insufficient documentation of prognostic factors limits review.
- The small sample size of IPC patients, especially involving only U.S. Veterans with the majority being white, male patients.
- Failure of documentation of some ECOG scores required student estimation of the baseline ECOG scores.

Acknowledgements

- Special thanks to Dr. William P. Newman, PI, and the Fargo VA Healthcare System in Fargo, ND for providing the research opportunity
- UNDMSHS for granting the time and resources to learn the depths of clinical research
- Classmates for the support and meaningful discussions involving critical thinking

The views expressed in this poster are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.