Surgery Research Conference

2018-2020 Research Residents

ACCME Accreditation Statement: The Medical College of Wisconsin is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. AMA Credit Designation Statement: The Medical College of Wisconsin designates this live activity for a maximum of 1.0 AMA PRA Category 1 Credit™. Physicians should claim only the credit commensurate with the extent of their participation in the activity. Hours of Participation for Allied Health Care Professionals: The Medical College of Wisconsin designates this activity for up to 1.0 hours of participation for continuing education for allied health professionals.
Research Highlights
RFA: Research Affairs Committee New Faculty Pilot Grant

**Award Summary:** The Research Affairs Committee (RAC) New Faculty Pilot Grant provides seed funding to faculty within 4 years of their first MCW appointment for the initiation of new projects. The primary goal of the award is to help applicants obtain preliminary results that will enable them to compete successfully for extramural funding.

**Sponsor:** Research Affairs Committee  
**Amount:** $25,000/year for one year  
**Contact:** Lizzy Schneidler  
**LOI Due Date:** September 10th
2019 Carl W. Eberbach Memorial
Friday, June 14, 2019

Condon-Donegan Research Competition
2:00 – 3:45 p.m.
Helfaer Auditorium, 1st Floor Froedtert Hospital

The 59th Carl W. Eberbach Lecture
“Competency Based Education in Surgery”
4:00 – 5:00 p.m.
Helfaer Auditorium, 1st Floor Froedtert Hospital

Mary E. Klingensmith, MD is the Mary Culver Distinguished Professor and Vice Chair for Education in Surgery at Washington University in Saint Louis, where she has been on faculty since 2000. Dr. Klingensmith was the Residency Training Program Director in General Surgery at Wash U from 2001-2012. She serves as Associate Director for the School of Medicine Simulation Center, and has been a Loeb Teaching Fellow at the medical school for four years. She is the founding director of the medical school’s Academy of Health Professions Educators.
Clinical Research Power Lunch:

Tuesday, July 23rd
11:45 am Lunch
12:00-1:00 pm Presentation
Alumni Center

LUNCH provided with RSVP (Infoscope) by 7/8/19

Lisa Haney, BS, CCRC
Director of Research, Nura

Division of Research
Department of Surgery
## Cardiothoracic Surgery

**Prospective Trial of Low-Fidelity Deliberate Practice of Aortic and Coronary Anastomoses.** *Journal of Surgical Education.*  
(Spratt JR, Brunsvold M, Joyce D, Ngu, Antonoff M, Loor G)

**A Rare Cause of Stroke Four Weeks After Ascending Aortic Aneurysm Repair.** *Journal of Cardiothoracic and Vascular Anesthesia.*  
(Hill GED, Aranda PS, Harvey JF, Olund TJ, Almassi GH, Joyce LD, Pagel PS)

**Successful Treatment of Refractory Status Asthmaticus Accompanied by Right Ventricular Dysfunction Using a Protek Duo Tandem Heart Device.** *Journal of Cardiothoracic and Vascular Anesthesia.*  
(Hill GED, Traudt RJ, Durham LA, Pagel PS, Tawil JN)

## Research

**Aurora kinase B-phosphorylated HP1alpha functions in chromosomal instability.** *Cell Cycle.*  

**CBX5/G9a/H3K9me-mediated gene repression is essential to fibroblast activation during lung fibrosis.** *Journal of Clinical Investigation.*  

## Vascular Surgery


**Unplanned 30-day readmissions after endovascular aneurysm repair: An analysis using the Nationwide Readmissions Database.** *Journal of Vascular Surgery.*  
(Dua A, Rothenberg KA, Wohlauer M, Rossi PJ, Lewis BD, Brown KR, Seabrook GR, Lee CJ)


## Pediatric Congenital Cardiac Surgery

**Waiting for Weight - 2.0 is the New 2.5.** *Seminars in Thoracic & Cardiovascular Surgery.*  
(Mitchell, ME)

**Commentary: Single ventricle patients and shunts-ACute event is not pretty.** *Journal of Thoracic & Cardiovascular Surgery.*  
(Woods RK & Hraska V)
Transplant Surgery


Surgical Oncology

Small, asymptomatic, nonfunctioning pancreatic neuroendocrine tumors: Observation becoming standard of care? Surgery. (Clarke CN & Evans DB)

Trauma & Acute Care Surgery
Reply to Letter: Observing Pneumothoraces: The 35 Millimeter Rule Is Safe for Both Blunt and Penetrating Chest Trauma. The Journal of Trauma and Acute Care. (Eddine SBZ & de Moya MA)

Pediatric Surgery

General Surgery
Next Month:

Office of Technology Development

Kevin Boggs, MBA, PhD
Director,
Office of Technology Development

Kalpa Vithalani, PhD
Assistant Director,
Office of Technology Development

July 10th, 2019
HRC H1210/1230/1250
5:00-6:00pm
Impact of Area of Deprivation Index On Hospital Readmissions after Surgery for Pancreas Cancer

Ashley Krepline

Division of Research Meeting
June 12, 2019
Readmissions after Pancreatic Resection

- 30 day readmission after pancreatic surgery ranges from 11-30%
- Readmissions are most commonly related to infectious complications or gastrointestinal disorders limiting oral intake
- Discharge to home has been associated with decreased rates of readmission\(^1\)
- Factors associated with increased risk of readmission: any complication, Clavien-Dindo grade 3 or 4 complication, wound infection, increased length of stay\(^1,2\)
- Admission for observation has been associated with living within 50 miles of the index hospital, however distance from hospital was not associated with readmissions\(^3\)

\(^1\)Fischer et al. Annals of Surgery 2017
\(^2\)Mazmudar et al. J. of Surg. Onc. 2018
\(^3\)Simpson et. Al. HPB. 2018
Area of Deprivation Index (ADI)

• Score composed of US Census Long Form and American Community Survey data based on zip code + 4 code
• Average national ADI is 100
• High ADI signifies more neighborhood disadvantage
• Neighborhood census block ranked at a state and national level

ADI and Readmissions

• Patients from areas of higher ADI experienced higher rates of readmissions among patients admitted to medical services.
• Multivariate analysis demonstrated higher readmission rates among older, unmarried men with high ADI

Kind et al. NEJM 2018
Hu et al. Am J of Medical Quality. 2018
Objectives

• To examine the impact of ADI on hospital length of stay, readmissions, and patient outcomes among patients who underwent pancreatectomy for localized pancreatic cancer

Methods

• Patients with resectable and borderline resectable pancreatic cancer treated from 2009-2018 at MCW with neoadjuvant therapy were included
• Demographic and clinicopathologic were abstracted for:
  • 30- and 90-day readmission data
  • Readmission was defined as admission for >24 hours
• Patients with no available ADI were excluded
• ADI was categorized as: <90, 90-100, 100-110, and >110
• Distance from home address to MCW was abstracted and stratified by <50 miles, 50-100 miles, and >100 miles

https://www.neighborhoodatlas.medicine.wisc.edu/
ADI of Patient Cohort

519 patients with resectable and borderline resectable pancreatic cancer

453 (87%) patients with ADI data

310 (69%) patients completed neoadjuvant therapy and resection

n = 310 patients
Median ADI = 97.317 (IQR: 17.66)
<table>
<thead>
<tr>
<th>Clinical Characteristics by ADI for Patients Who Completed All Neoadjuvant Therapy and Resection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total N=310</strong></td>
</tr>
<tr>
<td>Male sex, n (%)</td>
</tr>
<tr>
<td>Age, median (IQR)</td>
</tr>
<tr>
<td>Clinical Stage, n (%)</td>
</tr>
<tr>
<td>Resectable</td>
</tr>
<tr>
<td>Borderline Resectable</td>
</tr>
<tr>
<td>Operation, n (%)</td>
</tr>
<tr>
<td>Pancreaticoduodenectomy</td>
</tr>
<tr>
<td>Distal Pancreatectomy</td>
</tr>
<tr>
<td>Total Pancreatectomy</td>
</tr>
<tr>
<td>Node negative pathology, n (%)</td>
</tr>
<tr>
<td>Length of Stay (days), median (IQR)</td>
</tr>
</tbody>
</table>
# Readmission Data by Area Deprivation Index

<table>
<thead>
<tr>
<th></th>
<th>Total N=310</th>
<th>Low ADI (n=152)</th>
<th>High ADI (n=158)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Post-op Complication, n(%)</td>
<td></td>
<td></td>
<td></td>
<td>0.40</td>
</tr>
<tr>
<td>Delayed Gastric Emptying</td>
<td>24 (48)</td>
<td>9 (41)</td>
<td>15 (54)</td>
<td></td>
</tr>
<tr>
<td>Pancreatic Fistula</td>
<td>25 (50)</td>
<td>13 (59)</td>
<td>12 (43)</td>
<td></td>
</tr>
<tr>
<td>Post Pancreatectomy Hemorrhage</td>
<td>1 (2)</td>
<td>0</td>
<td>1 (4)</td>
<td></td>
</tr>
<tr>
<td>Complication &gt; Clavien grade 3</td>
<td>42 (14)</td>
<td>21 (14)</td>
<td>21 (13)</td>
<td>0.89</td>
</tr>
<tr>
<td>90-Day Readmission</td>
<td>66 (21)</td>
<td>25 (16)</td>
<td>41 (26)</td>
<td>0.04</td>
</tr>
<tr>
<td>Time to readmission (days), median (IQR)</td>
<td>26 (32)</td>
<td>23 (34)</td>
<td>28 (32)</td>
<td>0.20</td>
</tr>
<tr>
<td>Readmission length of stay, median (IQR)</td>
<td>5 (5)</td>
<td>4 (4)</td>
<td>5 (4)</td>
<td>0.22</td>
</tr>
<tr>
<td>No. of 90-day readmissions, median (IQR)</td>
<td>1 (0)</td>
<td>1 (0)</td>
<td>1 (0)</td>
<td>0.34</td>
</tr>
<tr>
<td>Death within 90 days, n (%)</td>
<td>5 (2)</td>
<td>1 (1)</td>
<td>4 (3)</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>Total N=310</td>
<td>ADI &lt; 90 (n=94)</td>
<td>ADI 90-100 (n=84)</td>
<td>ADI 100-110 (n=103)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>-------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Male sex, n (%)</td>
<td>149 (48)</td>
<td>52 (55)</td>
<td>37 (44)</td>
<td>50 (49)</td>
</tr>
<tr>
<td>Age, median (IQR)</td>
<td>65 (13)</td>
<td>64.5 (14)</td>
<td>64.5 (12)</td>
<td>66 (12)</td>
</tr>
<tr>
<td>Clinical Stage, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resectable</td>
<td>155 (50)</td>
<td>45 (48)</td>
<td>38 (45)</td>
<td>54 (52)</td>
</tr>
<tr>
<td>Borderline Resectable</td>
<td>155 (50)</td>
<td>49 (52)</td>
<td>46 (55)</td>
<td>49 (48)</td>
</tr>
<tr>
<td>Operation, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pancreaticoduodenectomy</td>
<td>247 (80)</td>
<td>72 (77)</td>
<td>64 (76)</td>
<td>86 (84)</td>
</tr>
<tr>
<td>Distal Pancreatectomy</td>
<td>43 (14)</td>
<td>16 (17)</td>
<td>12 (14)</td>
<td>11 (11)</td>
</tr>
<tr>
<td>Total Pancreatectomy</td>
<td>20 (6)</td>
<td>6 (6)</td>
<td>8 (10)</td>
<td>6 (6)</td>
</tr>
<tr>
<td>Node negative pathology, n (%)</td>
<td>185 (61)</td>
<td>60 (68)</td>
<td>50 (61)</td>
<td>61 (59)</td>
</tr>
<tr>
<td>Length of Stay (days), median (IQR)</td>
<td>9 (4)</td>
<td>9 (4)</td>
<td>8 (4)</td>
<td>9 (5)</td>
</tr>
</tbody>
</table>
Distance Distribution by ADI

Overall Median Distance 46 miles (IQR 172)

ADI<90
Median: 29 (IQR: 369)

ADI 90-100
Median 41 IQR 86

ADI 100-110
Median 71 IQR 159

ADI>110
Median 99 IQR 239

P=0.003
# Readmission Data by Area Deprivation Index Category

<table>
<thead>
<tr>
<th>Specific Post-op Complication, n(%)</th>
<th>Total N=310</th>
<th>ADI &lt; 90 (n=94)</th>
<th>ADI 90-100 (n=84)</th>
<th>ADI 100-110 (n=103)</th>
<th>ADI &gt;110 (n=29)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed Gastric Emptying</td>
<td>24 (48)</td>
<td>4 (17)</td>
<td>7 (64)</td>
<td>11 (55)</td>
<td>2 (8)</td>
<td>0.47</td>
</tr>
<tr>
<td>Pancreatic Fistula</td>
<td>25 (50)</td>
<td>10 (40)</td>
<td>4 (1)</td>
<td>8 (32)</td>
<td>3 (12)</td>
<td></td>
</tr>
<tr>
<td>Post Pancreatectomy Hemorrhage</td>
<td>1 (2)</td>
<td>0</td>
<td>0</td>
<td>1 (100)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Complication &gt; Clavien grade 3</td>
<td>42 (14)</td>
<td>14 (15)</td>
<td>9 (11)</td>
<td>13 (13)</td>
<td>6 (21)</td>
<td>0.56</td>
</tr>
<tr>
<td>90-Day Readmission</td>
<td>66 (21)</td>
<td>14 (15)</td>
<td>19 (23)</td>
<td>23 (22)</td>
<td>10 (34)</td>
<td>0.14</td>
</tr>
<tr>
<td>Time to readmission (days), median (IQR)</td>
<td>24 (23)</td>
<td>19 (28)</td>
<td>24 (17)</td>
<td>26 (24)</td>
<td>17 (14)</td>
<td>0.26</td>
</tr>
<tr>
<td>Readmission length of stay, median (IQR)</td>
<td>5 (5)</td>
<td>4 (4)</td>
<td>5 (7)</td>
<td>5 (3)</td>
<td>7 (4)</td>
<td>0.70</td>
</tr>
<tr>
<td>No. of 90-day readmissions, median (IQR)</td>
<td>1 (0)</td>
<td>1 (1)</td>
<td>1 (0)</td>
<td>1 (0)</td>
<td>1 (0)</td>
<td>0.62</td>
</tr>
<tr>
<td>Death within 90 days, n (%)</td>
<td>5 (2)</td>
<td>1 (1)</td>
<td>0</td>
<td>3 (3)</td>
<td>1 (3)</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Reason for Readmission by ADI Category

- 90-Day Readmissions (n=66)
  - 39 Procedure Related
  - 20 Failure to Thrive
  - 7 Other

Reason for Readmission by ADI Category

- ADI <90
- ADI 90-100

Low High

90-Day Readmissions (n=66)
- 39 Procedure Related
- 20 Failure to Thrive
- 7 Other
## Logistic Regression for 90-day Readmission following Neoadjuvant Therapy and Surgery

<table>
<thead>
<tr>
<th></th>
<th>Univariable</th>
<th>Multivariable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>ADI (Ref: ADI&lt;90)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADI 90-100</td>
<td>1.67</td>
<td>0.78-3.59</td>
</tr>
<tr>
<td>ADI 100-110</td>
<td>1.64</td>
<td>0.79-3.42</td>
</tr>
<tr>
<td>ADI &gt;110</td>
<td>3.01</td>
<td>1.16-7.80</td>
</tr>
<tr>
<td>Operation (Ref: Whipple)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distal Pancreatectomy</td>
<td>1.81</td>
<td>0.86-3.81</td>
</tr>
<tr>
<td>Total Pancreatectomy</td>
<td>2.91</td>
<td>1.13-7.53</td>
</tr>
<tr>
<td>Postoperative Complication (Ref: None)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delayed Gastric Emptying</td>
<td>4.39</td>
<td>1.84-10.46</td>
</tr>
<tr>
<td>Pancreatic Fistula</td>
<td>5.62</td>
<td>2.40-13.17</td>
</tr>
</tbody>
</table>
Conclusions

• At a tertiary referral center for PC, the median ADI reflected that of the national average, but there were significant outliers.

• Patients with the highest ADI had a median distance to travel for care 3x that of patients with the lowest ADI.

• The most common reason for readmission was procedure related complication.

• In an adjusted logistic regression, patients with the highest ADI had a 3-fold increased odds of readmission as compared to patients with the lowest ADI.

• Patients from the highest ADI neighborhoods may have barriers to access care, including a long travel distance, that need to be considered.
Acknowledgments

Pancreatic Cancer Group
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- Brian Hunt, MD
- Abdul Khan, MD
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- Kara Sonntag, RD

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- Lily Wang, PhD

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- Anne Laulederkind
- Poojitha Sitaram, PhD

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- WeCare Fund
- American Cancer Society Pilot Grant
- Dept of Veterans Affairs
- NIH/NCI
- Batterman Foundation
- Lockton Fund
Vital Capacity Is Superior To RibScore At Predicting Pulmonary Complications After Rib Fractures

Kelly A. Boyle, MD; Christopher M. Dodgion MD, MBA, MSPH; Savo Bou Zein Eddine, MD; James Ford, BS; Ryan T. DeAngelis, BS; David J. Milia, MD; Marc A. de Moya, MD; Thomas W. Carver, MD
62 year old female s/p MVC
Right 3-8, Left 3-7 rib fractures
RibScore 4
Vital capacity 62%

Admission to ICU?
Background

• Incidence of rib fractures → ~10% of trauma patients
  – 90% have associated injuries
  – 50% may require operative and intensive unit care
  – ~30% develop pulmonary complications
  – 2 – 30% risk of mortality

• Well established morbidity & mortality
  – Age, number of rib fractures, injury severity score, comorbidities
Radiographic Scoring Systems

Pros:
• Rapid, objective
• Assist clinical decisions
• Accurate prognostication

Cons:
• Requires chest CT
• Overtriage to ICU
Vital Capacity

Pros:
• Bedside evaluation of pulmonary function
• Rapid, reproducible, dynamic
• Accurate prognostication

Cons:
• Not universally available
• Requires trained personnel
• Subject to patient effort
Objective

Compare physiologic parameter vital capacity (VC) to radiographic rib fracture scoring system RibScore

Hypothesis

Vital capacity will outperform RibScore in determining which patients are at highest risk for pulmonary complications
Methods

Retrospective study of adult trauma patients with rib fractures

- **Time frame**: January 2015 – March 2018
- **Site**: Urban academic level 1 trauma center in Milwaukee, WI
- **Primary outcome**: Pulmonary complication
  - Pneumonia, unplanned intubation, unplanned transfer to ICU for respiratory concern, tracheostomy
- **Exclusion**: no chest CT, no VC within first 48 hours
# Results

<table>
<thead>
<tr>
<th>Characteristic, n (%)</th>
<th>Total Patients</th>
<th>Pulmonary Complication</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>656</td>
<td>38 (5.8%)</td>
<td></td>
</tr>
<tr>
<td>Age, median (IQR)</td>
<td>51 (32, 63)</td>
<td>59 (49, 72)</td>
<td></td>
</tr>
<tr>
<td>Age ≥ 55</td>
<td>275 (41.9%)</td>
<td>24 (63.1%)</td>
<td>0.006</td>
</tr>
<tr>
<td>Age ≥ 65</td>
<td>152 (23.2%)</td>
<td>12 (31.6%)</td>
<td>0.206</td>
</tr>
<tr>
<td>Gender, Male</td>
<td>459 (70.0%)</td>
<td>28 (73.7%)</td>
<td>0.607</td>
</tr>
<tr>
<td>In-hospital Mortality</td>
<td>7 (1.1%)</td>
<td>1 (2.6%)</td>
<td>0.334</td>
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</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>RibScore Characteristics, n (%)</th>
<th>Total Patients</th>
<th>Pulmonary Complication</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥6 Rib Fractures</td>
<td>256 (39.0%)</td>
<td>24 (63.2%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Flail Chest</td>
<td>80 (12.2%)</td>
<td>9 (23.7%)</td>
<td>0.026</td>
</tr>
<tr>
<td><strong>Bilateral Fractures</strong></td>
<td>155 (23.6%)</td>
<td>17 (44.7%)</td>
<td>0.002</td>
</tr>
<tr>
<td>First Rib Fracture</td>
<td>129 (19.7%)</td>
<td>9 (23.7%)</td>
<td>0.521</td>
</tr>
<tr>
<td>≥3 Displaced Fractures</td>
<td>191 (29.1%)</td>
<td>16 (42.1%)</td>
<td>0.069</td>
</tr>
<tr>
<td>Fracture in Each Area</td>
<td>86 (13.1%)</td>
<td>10 (26.3%)</td>
<td>0.013</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>VC characteristics, n (%)</th>
<th>Total Patients</th>
<th>Pulmonary Complication</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st VC &lt;30%</td>
<td>262 (39.9%)</td>
<td>26 (68.4%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean First 3 VC &lt;30%</td>
<td>139 (21.2%)</td>
<td>20 (52.6%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean Day 2 VC &lt;30%</td>
<td>146 (22.3%)</td>
<td>25 (65.8%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st VC &lt;30%</td>
<td>3.89 (1.89 – 7.98)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean First 3 VC &lt;30%</td>
<td>4.84 (2.34 – 10.01)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean Day 2 VC &lt;30%</td>
<td>11.12 (4.54 – 27.78)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RibScore ≥4</td>
<td>3.81 (1.75 – 8.26)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Results

ROC Curve for First VC

Sensitivity vs 1 - Specificity

AUC 0.705

ROC Curve for mean Day 2 VC

Sensitivity vs 1 - Specificity

AUC 0.792

ROC Curve for RibScore

Sensitivity vs 1 - Specificity

AUC 0.658
Limitations

• Retrospective study

• Selective imaging for trauma patients at our institution
  – 450 patients without chest CT excluded

• Variability in VC measurements
  – Timing of first VC
  – Frequency of VC
  – Patient effort
Conclusions

• VC outperforms RibScore in predicting pulmonary complications

• VC <30% could be used for risk stratification / admit disposition
  – Will require prospective validation

Treat the patient, not the imaging
Thank You

Questions?
keboyle@mcw.edu
tcarver@mcw.edu

@MCWTraumaACS
CRS/HIPEC in the Palliative Treatment of Peritoneal Carcinomatosis

Erin A. Strong, MD, MBA, MPH, Matthew Hembrook, MBA, Susan Tsai, MD, MPH, Kathleen Christians, MD, Harveshp Mogal, MD, T. Clark Gamblin, MD, MBA, MS, Callisia N. Clarke, MD

MCW General Surgery Research Conference
Wednesday, June 12, 2019
Introduction

• Palliation in Peritoneal Carcinomatosis (PC)
  – Patients with PC may develop intractable symptoms that decrease quality of life (QoL).
  – Palliation is a controversial indication for CRS/HIPEC given the morbidity and mortality.
    • Overall, morbidity and mortality for CRS/HIPEC are similar to other major oncologic surgeries (i.e. Whipple, esophagectomy, trisegmental and R lobe hepatectomy).1
    • However, morbidity and mortality for CRS/HIPEC with palliative intent are less well known.
  – Decision-making for palliative CRS/HIPEC requires understanding of acceptable patient risk and expected outcomes.

1. Foster et al. JAMA Netw Open. 2019;2(1):e186847
Introduction

• Palliative Care Consultation (PCC) in Incurable PC
  – ASCO Clinical Practice Guidelines for Palliative Care\(^1\)
    • Interdisciplinary palliative care referrals for “advanced disease”
    • Early palliative care involvement (within 8 weeks diagnosis)
    • Inpatient or outpatient consultations/care
  – Factors associated with palliative care use in CRS/HIPEC patients\(^2\)
    • MCW HIPEC admission July 2013-June 2014
    • PCC appropriately emphasizes symptom management
    • Triggers for PCC are ill-defined, but should be based on relative and absolute indications

Study Aims

1. To characterize the **clinical features and outcomes** of patients undergoing CRS and/or HIPEC with palliative intent.
2. To characterize **palliative care consultation (PCC)** for patients undergoing CRS and/or HIPEC with palliative intent.
Methods

• Retrospective review
• Single institution
• February 2008 – February 2018
• Inclusion Criteria
  – Primary Peritoneal or GI Malignancy, CRS and/or HIPEC with Palliative Intent
• Exclusion Criteria
  – Primary GYN Malignancy, Curative Intent Surgery
• Outcomes
  – Clinical
    • Primary: Patient-reported symptom improvement
    • Secondary: 30-Day Mortality, Overall Survival (OS), Progression-Free Survival (PFS)
  – Palliative Care Consultation (PCC)
    • Rate & Timing of PCC
Methods

N=277 Patients Referred for CRS/HIPEC

N=19 Palliative Procedures in 17 Patients

N=9 CRS/HIPEC

N=9 CRS Only

N=1 HIPEC Only
## Methods

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Sex</td>
<td>8 (44%)</td>
</tr>
<tr>
<td>Median Age, yrs (IQR)</td>
<td>57 (47-62)</td>
</tr>
<tr>
<td>ASA Class</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>13 (68%)</td>
</tr>
<tr>
<td>IV</td>
<td>6 (32%)</td>
</tr>
<tr>
<td>ECOG</td>
<td></td>
</tr>
<tr>
<td>0-1</td>
<td>15 (79%)</td>
</tr>
<tr>
<td>≥ 2</td>
<td>4 (21%)</td>
</tr>
<tr>
<td>Preop Nutrition Status</td>
<td></td>
</tr>
<tr>
<td>Median Albumin (IQR)</td>
<td>3.3 (3.2-4.1) g/dL</td>
</tr>
<tr>
<td>Median Prealbumin (IQR)</td>
<td>13 (4-16) mg/dL</td>
</tr>
<tr>
<td>Preop Admission</td>
<td>5 (26%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Malignancy</td>
<td></td>
</tr>
<tr>
<td>Colorectal</td>
<td>7 (39%)</td>
</tr>
<tr>
<td>Appendiceal</td>
<td>6 (33%)</td>
</tr>
<tr>
<td>Mesothelioma</td>
<td>3 (17%)</td>
</tr>
<tr>
<td>Gastric</td>
<td>1 (6%)</td>
</tr>
<tr>
<td>Sarcoma</td>
<td>1 (6%)</td>
</tr>
<tr>
<td>Indications</td>
<td></td>
</tr>
<tr>
<td>Ascites</td>
<td>8 (42%)</td>
</tr>
<tr>
<td>Obstruction</td>
<td>5 (26%)</td>
</tr>
<tr>
<td>Abdominal Pain</td>
<td>4 (21%)</td>
</tr>
<tr>
<td>GI Bleed</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (5%)</td>
</tr>
</tbody>
</table>

Table 1. Selected baseline demographic and clinicopathologic features
## Results

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Postop Complications</strong></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>10 (53%)</td>
</tr>
<tr>
<td>Clavien I/II</td>
<td>6 (32%)</td>
</tr>
<tr>
<td>Clavien ≥ 3</td>
<td>4 (21%)</td>
</tr>
<tr>
<td><strong>Median LOS (IQR)</strong></td>
<td>10 (8-18)  days</td>
</tr>
<tr>
<td><strong>Discharge Location</strong></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>16 (84%)</td>
</tr>
<tr>
<td>SNF</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Hospice</td>
<td>2 (11%)</td>
</tr>
<tr>
<td><strong>30-Day Readmission</strong></td>
<td>2 (11%)</td>
</tr>
<tr>
<td><strong>90-Day Readmission</strong></td>
<td>5 (26%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>30-Day Symptom Improvement</strong></td>
<td>16 (84%)</td>
</tr>
<tr>
<td><strong>90-Day Symptom Improvement</strong></td>
<td>12 (63%)</td>
</tr>
<tr>
<td><strong>30-Day Mortality</strong></td>
<td>2 (11%)</td>
</tr>
<tr>
<td><strong>90-Day Mortality</strong></td>
<td>3 (16%)</td>
</tr>
<tr>
<td><strong>Median PFS, mos (IQR)</strong></td>
<td>2.9 (1.4-5.6)</td>
</tr>
<tr>
<td><strong>Median OS, mos (IQR)</strong></td>
<td>12.5 (6.2-28.4)</td>
</tr>
</tbody>
</table>

*Table 2. Selected clinical outcomes*
Results

Figure 1. Swimmer plot demonstrating overall survival relative to symptom-free interval for each patient following their palliative procedure(s) with table showing histology, indication for surgery, and palliative procedure performed for each patient.

1. Morris et al. JSR 2017;211(1):79-86
## Results

<table>
<thead>
<tr>
<th>Patient Cohort</th>
<th>Strong et al. 2019</th>
<th>Morris et al. 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total N</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Rate of PCC</td>
<td>58%</td>
<td>38%</td>
</tr>
<tr>
<td>Inpatient</td>
<td>73%</td>
<td>70%</td>
</tr>
<tr>
<td>Outpatient</td>
<td>17%</td>
<td>13%</td>
</tr>
<tr>
<td>Both</td>
<td>0</td>
<td>17%</td>
</tr>
<tr>
<td>Median Interval in mos (IQR)</td>
<td>Diagnosis to PCC 8.9 (2.2-46.2)</td>
<td></td>
</tr>
<tr>
<td>MCW Surgical Consult to PCC</td>
<td>2.7 (0.4-27.8)</td>
<td>10.3 (5.0-16.1)</td>
</tr>
<tr>
<td>PCC to Death</td>
<td>4.7 (1.3-8.1)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Rate and timing of palliative care consultation (PCC) compared to the results of a study of MCW CRS/HIPEC patients by Morris et al.¹

¹ Morris et al. JSR 2017;211(1):79-86
Conclusion

• **Summary**
  – Palliative CRS-HIPEC is overall effective in achieving patient-reported symptom improvement (89%).
  – Procedures are associated with high morbidity (58% complication rate, 26% Clavien ≥ III) and mortality (11% at 30 days).
  – There is potential to improve integration and benefit of palliative care consultation.
  – Careful patient selection remains paramount.

• **Future Directions**
  – Quantifiable preoperative fitness and risk for surgery
  – Patient-centered outcomes approach with standardized QoL measures at defined time intervals
  – Collaborative projects to increase study sample sizes and evaluate interventions for palliative CRS/HIPEC and palliative care utilization
QUESTIONS?
MATERNAL STRESS AND RESILIENCE IN PRENATAL DIAGNOSIS OF FETAL ANOMALIES

CHRISTINA BENCE, MD

PI: AMY WAGNER, MD; TERRI DEROON-CASSINI, PHD
Stress and anxiety are prevalent in pregnant mothers after receiving an abnormal fetal diagnosis.

Antepartum maternal distress can negatively affect the unborn child.

Higher levels of resilience can be protective against psychological distress.

CHW Fetal Concerns Center (FCC) has no psychological health screening or counseling routinely available to patients.
SPECIFIC AIMS

1. Establish longitudinal trends in prevalence for depression, anxiety, PTSD, and resilience throughout pregnancy in women prenatally diagnosed with a fetal anomaly.

2. Evaluate for protective effect of higher resilience profiles against maternal distress.

3. Identify risk factors for distress in this peripartum population including socioeconomic status, psychiatric history, and cumulative exposure to stress over a lifetime.
STUDY DESIGN

- Survey-based, prospective longitudinal pilot study

- Eligibility criteria: pregnant women ≥18yo seen by a pediatric surgeon at FCC for an abnormal fetal diagnosis

- Survey measures – assess depression, anxiety, stress related to the diagnosis, resilience, lifetime exposure to stressful events

- Maternal and Surgeon ratings of fetal diagnostic severity (comparative)

- Maternal and infant chart reviews
STUDY TIMELINE

0

Mother Screened in FCC

Consult with FCC Surgeon

2 wks s/p FCC Consult

Delivery (~3-6 mos later)

Survey #1: Pre-Consult

Survey #2: Post-Consult

Survey #3: Post-Delivery

Prenatal Chart Review

Surgeon Rating of Dx Severity

Maternal & Infant Chart Reviews

N = 22

N = 16

N = 6
# Preliminary Demographics, Oct – June

<table>
<thead>
<tr>
<th>Demographics</th>
<th>N = 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age, yrs (mean ± SD)</td>
<td>28 ± 5.3</td>
</tr>
<tr>
<td>Education level completed, no. (%)</td>
<td></td>
</tr>
<tr>
<td>• Less than high school</td>
<td>0</td>
</tr>
<tr>
<td>• Graduated high school</td>
<td>8 (36%)</td>
</tr>
<tr>
<td>• Some college</td>
<td>4 (18%)</td>
</tr>
<tr>
<td>• Graduated college</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>• Advanced degree</td>
<td>4 (18%)</td>
</tr>
<tr>
<td>Employed, no. (%)</td>
<td>16 (73%)</td>
</tr>
<tr>
<td>In a committed relationship, no. (%)</td>
<td>21 (96%)</td>
</tr>
<tr>
<td>Prior history of psych diagnosis</td>
<td>4 (18%)</td>
</tr>
<tr>
<td>Location where prenatal diagnosis made</td>
<td>100% non-MCW *21/22 from w/l 200mi of MKE</td>
</tr>
<tr>
<td>Est. gestational age at diagnosis, median (range)</td>
<td>20 wks (13-34)</td>
</tr>
</tbody>
</table>
Prenatal Diagnoses

Rating of Diagnostic Severity:
1. Expect mild short-term illness and normal long-term outcome
2. Expect moderate short-term illness or mild long-term disability
3. Expect severe short-term illness or significant long-term disability
4. Expect illness is not survivable

Gastroschisis - Av. Sev. Score = 2
CDH - Av. Sev. Score = 3
Omphalocele - Sev. Score = 2-3
CPAM - Av. Sev. Score = 2
Ovarian Cyst - Av. Sev. Score = 1

CDH = congenital diaphragmatic hernia
CPAM = congenital pulmonary airway malformation
NUMBER OF PRENATAL SUBSPECIALTY CONSULTS PRIOR TO 1ST FCC VISIT PER PATIENT

# of Patients (N = 22)

<table>
<thead>
<tr>
<th># of Subspecialty Prenatal Consults</th>
<th># of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

- Maternal Fetal Med – 29
- Genetics – 4
- Pediatric Cardiology – 2
- Pediatric Surgery - 1
PRELIMINARY PRE-CONSULT SURVEY RESULTS

**Depression**
- Minimal: 63%
- Mild: 18%
- Moderate: 14%
- Severe: 5%
- Total: 37%

**Anxiety**
- Minimal: 72%
- Mild: 14%
- Moderate: 14%
- Severe: 28%
- Total: 28%

**PTSD**
- Minimal: 68%
- Mild: 14%
- Moderate: 14%
- Severe: 9%
- Total: 32%
PRE-CONSULT SURVEY RESILIENCE PROFILES

Our Patients

Resilience Scores by Quartile

- Q1
- Q2
- Q3
- Q4

% of Subjects

0% 10% 20% 30% 40% 50%
### COMPARING PRE AND POST-CONSULT SURVEY RESULTS

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Pre-consult Survey</th>
<th>Post-consult Survey</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considered dx a stressful event</td>
<td>81%</td>
<td>88%</td>
<td>0.6</td>
</tr>
<tr>
<td>Considered dx a traumatic event</td>
<td>33%</td>
<td>31%</td>
<td>0.9</td>
</tr>
<tr>
<td>How frightened child would not live?</td>
<td>62% mod-extremely</td>
<td>51% mod-extremely</td>
<td>0.53</td>
</tr>
</tbody>
</table>

**Maternal rating of dx severity**

1. Mild illness, normal outcome  81%  81%
2. Mod illness, mild disability  14%  13%
3. Severe illness, significant disability 0%  6%
4. Non-survivable 5%  0%

**Surgeon rating of dx severity**

1. Mild illness, normal outcome  16%  16%
2. Mod illness, mild disability  68%  16%
3. Severe illness, significant disability  0%  0%

**PTSD Scores Pre-Post:**

\[\downarrow = 10 \text{ patients}\]
\[\uparrow = 3 \text{ patients (CDH)}\]
FUTURE PLANS

- Complete interim data analysis for submission to International Fetal Medicine and Surgery Society meeting (deadline 6/30/19)
- We Care grant application currently in review
- Expand pilot over next 2 years
  - Include all patients seen in FCC
  - Include maternal collection of biomarkers of chronic stress burden (Allostatic Load)
- Ultimately create a universal psychological screening protocol for FCC patients with improved access to counseling
REFERENCES


