SOUTHWESTERN SURGICAL CONGRESS

FINAL PROGRAM

71st Annual Meeting

April 14–17, 2019
Hyatt Regency Huntington Beach, CA

www.swscongress.org
The Southwestern Surgical Congress would like to thank the following organizations for their marketing support at the SWSC Annual meeting:

**Avanos – Gold Sponsor**

**Portola Pharmaceuticals – Gold Sponsor**

The Southwestern Surgical Congress would like to thank the following company for their generous support via Educational Grant:

**DePuy Synthes**

**KLS Martin**

**Prytime Medical**

The Southwestern Surgical Congress would like to thank the following exhibiting companies for their generous support:

- ACell
- Avanos
- Aventic Group
- Baxter
- CSL Behring
- Chest Wall Injury Society
- DePuy Synthes
- Ethicon/LINX Reflux Management System
- Gore & Associates
- Karl Storz Endoscopy America Inc.
- KCI
- KLS Martin
- Lilian Tal Cop
- Pacira Pharmaceuticals
- Portola Pharmaceuticals
- TelaBio
- Teleflex
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Welcome from SWSC President</td>
</tr>
<tr>
<td>3</td>
<td>Officers, State Councilors &amp; Representatives</td>
</tr>
<tr>
<td>4</td>
<td>Committees</td>
</tr>
<tr>
<td>5</td>
<td>Past Presidents &amp; Meeting Locations</td>
</tr>
<tr>
<td>8</td>
<td>Educational Objectives</td>
</tr>
<tr>
<td>9</td>
<td>General Information</td>
</tr>
<tr>
<td>10</td>
<td>CME Credit Information</td>
</tr>
<tr>
<td>11</td>
<td>Optional Activities</td>
</tr>
<tr>
<td>13</td>
<td>Presidential Address</td>
</tr>
<tr>
<td>14</td>
<td>Guest Speakers</td>
</tr>
<tr>
<td>23</td>
<td>SWSC Lowry Fund</td>
</tr>
<tr>
<td>24</td>
<td>Awards</td>
</tr>
<tr>
<td>26</td>
<td>In Memoriam</td>
</tr>
<tr>
<td>27</td>
<td>New Members</td>
</tr>
<tr>
<td>29</td>
<td>Schedule at a Glance</td>
</tr>
<tr>
<td>35</td>
<td>Scientific Program</td>
</tr>
<tr>
<td>85</td>
<td>Scientific Paper Abstracts</td>
</tr>
<tr>
<td>123</td>
<td>Quick Shot Abstracts</td>
</tr>
<tr>
<td>209</td>
<td>ePoster Abstracts</td>
</tr>
<tr>
<td>281</td>
<td>Membership Directory</td>
</tr>
</tbody>
</table>

*See back cover for 2020 meeting.*
SWSC President Courtney Scaife MD welcomes you to the SWSC 2019 Annual Meeting at the Hyatt Regency Huntington Beach!

Hands-On Surgical Practicum
34 Oral Presentations
75 Quick Shots
66 ePosters

OTHER MEETING HIGHLIGHTS
Mock Oral Boards
Named Lectures will be Exciting Debates!
Community Surgeons Networking Coffee
Expert Panel Case Presentations
Top 3 Papers in Breast, General Surgery, Trauma, Colorectal
American College of Surgeons Update
## OFFICERS, STATE COUNCILORS & REPRESENTATIVES

### OFFICERS

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
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<tbody>
<tr>
<td>President</td>
<td>Courtney Scaife</td>
</tr>
<tr>
<td>President-Elect</td>
<td>S. Rob Todd</td>
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<td>Vice President</td>
<td>Shanu Kothari</td>
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<td>Treasurer</td>
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<td>Recorder</td>
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<td>Immediate Past President</td>
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<td>Past President</td>
<td>Clay Burlew</td>
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<td>APP Councilor</td>
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<td>ACS Board of Governors</td>
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<td>American Board of Surgery</td>
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<td>Kenric Murayama</td>
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<tr>
<td>Historian</td>
<td>Ronald Stewart</td>
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### STATE COUNCILORS

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<tr>
<td>Arizona</td>
<td>Barb Pockaj</td>
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<td>Andre Campbell</td>
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<td>Colorado</td>
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**STATE COUNCILORS**

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<tr>
<td>North Dakota</td>
<td>Randolph Szlabick</td>
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<tr>
<td>Oklahoma</td>
<td>Anthony Howard</td>
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<td>Paul Bjordahl</td>
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<td>Texas (Northern)</td>
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<td>Utah</td>
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<td>Wisconsin</td>
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**COMMITTEE CHAIRS**

<table>
<thead>
<tr>
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<tr>
<td>Communications</td>
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<td>*Walter Stuck MD</td>
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<td>*Thomas G. Orr MD</td>
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<td>*Lewis M. Overton MD</td>
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<td>1960</td>
<td>*Fred H. Krock MD</td>
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<td>*Howard D. Cogswell MD</td>
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<td>*Charles M. O’Leary MD</td>
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<td>*Edgar J. Poth MD</td>
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<td>*Eugene M. Bricker MD</td>
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<td>*Wayne C. Bartlett MD</td>
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<td>1966</td>
<td>*O. Ernest Grua MD</td>
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<td>*John A. Growdon MD</td>
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<td>*Robert B. Howard MD</td>
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<td>*John H. Clark MD</td>
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<td>*Jean C. Gladden MD</td>
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<td>*J. Robert Spencer MD</td>
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<td>*John G. Shellito MD</td>
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<td>*James B. Growdon MD</td>
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<td>1974</td>
<td>*Lawrence H. Wilkinson MD</td>
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<td>1975</td>
<td>*George H. Mertz MD</td>
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<td>1976</td>
<td>*John B. Gramlich MD</td>
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<td>1977</td>
<td>*Howard T. Robertson MD</td>
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<td>*Cyril Costello MD</td>
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<td>1979</td>
<td>*MacDonald Wood MD</td>
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<td>1980</td>
<td>*Gilbert S. Campbell MD</td>
</tr>
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<td>1981</td>
<td>*Wallace L. Chambers MD</td>
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### PAST PRESIDENTS & MEETING LOCATIONS (continued)

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<tr>
<th>Year</th>
<th>Name</th>
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<tr>
<td>1982</td>
<td>*Albert J. Kukral MD</td>
<td>Hotel del Coronado, Coronado, California</td>
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<td>1983</td>
<td>Livingston Parsons, Jr. MD</td>
<td>The Pointe Resort, Phoenix, Arizona</td>
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<td>1984</td>
<td>*Raymond C. Read MD</td>
<td>The Hyatt Regency, Honolulu &amp; Maui, Hawaii</td>
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<td>1985</td>
<td>*Claude H. Organ, Jr. MD</td>
<td>Caesars Palace Hotel, Las Vegas, Nevada</td>
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<td>1986</td>
<td>Ronald C. Elkins MD</td>
<td>Hyatt Regency San Francisco, California</td>
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<td>1987</td>
<td>*Joseph L. Kovarik MD</td>
<td>Hotel del Coronado, Coronado, California</td>
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<td>1988</td>
<td>Arlo S. Hermreck MD</td>
<td>The Pointe at Squaw Peak, Phoenix, Arizona</td>
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<td>1989</td>
<td>Frederic C. Chang MD</td>
<td>Hyatt Regency Monterey, California</td>
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<td>1990</td>
<td>Kent C. Westbrook MD</td>
<td>LaQuinta Golf &amp; Tennis Resort, La Quinta, California</td>
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<td>1991</td>
<td>William F. Sasser MD</td>
<td>The Mirage, Las Vegas, Nevada</td>
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<td>1992</td>
<td>David V. Feliciano MD</td>
<td>Marriott’s Camelback Inn Resort, Scottsdale, Arizona</td>
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<td>1993</td>
<td>Dominic Albo, Jr. MD</td>
<td>Hyatt Regency Monterey, California</td>
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<td>1994</td>
<td>Ernest Poulos MD</td>
<td>The Westin LaPaloma, Tucson, Arizona</td>
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<td>1995</td>
<td>Robert B. Sawyer MD</td>
<td>Hyatt Regency Hill Country Resort, San Antonio, Texas</td>
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<td>1996</td>
<td>Carey P. Page MD</td>
<td>Marriott’s Camelback Inn Resort, Scottsdale, Arizona</td>
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<td>1997</td>
<td>James H. Thomas MD</td>
<td>Westin Mission Hills Resort, Rancho Mirage, California</td>
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<td>1998</td>
<td>Charles H. McCollum MD</td>
<td>Hyatt Regency Hill Country Resort, San Antonio, Texas</td>
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<td>1999</td>
<td>Ernest E. Moore, Jr. MD</td>
<td>Loews Coronado Bay Resort, Coronado, California</td>
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<td>2000</td>
<td>Victor J. Zannis MD</td>
<td>The Broadmoor, Colorado Springs, Colorado</td>
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<td>2001</td>
<td>Nicholas P. Lang MD</td>
<td>Fiesta Americana Coral Beach Resort, Cancun, Mexico</td>
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<td>2002</td>
<td>James A. Edney MD</td>
<td>Hotel del Coronado, Coronado, California</td>
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<td>2003</td>
<td>Russell G. Postier MD</td>
<td>Loews Ventana Canyon Resort, Tucson, Arizona</td>
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<td>2004</td>
<td>Jon S. Thompson MD</td>
<td>Hyatt Regency Monterey, California</td>
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<td>2005</td>
<td>Jeffrey R. Saffle MD</td>
<td>Westin La Cantera Resort, San Antonio, Texas</td>
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<td>2006</td>
<td>Ernest L. Dunn MD</td>
<td>Kauai Marriott Resort and Beach Club, Kauai, Hawaii</td>
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</tbody>
</table>
PAST PRESIDENTS & MEETING LOCATIONS (continued)

2007 - Scott R. Petersen MD - Rancho Las Palmas Resort and Spa 
Rancho Mirage, California
2008 - Alan G. Thorson MD - Fairmont Acapulco Princess, Acapulco, Mexico
2009 - Maria D. Allo MD - Hotel del Colorado, Coronado, California
2010 - Frederick A. Moore MD - Loews Canyon Resort, Tucson, Arizona
2011 - Edward Nelson MD - JW Marriott Ihilani, Oahu, Hawaii
2012 - Robert C. McIntyre, Jr. MD - Terranea Resort, Rancho Palos Verdes, California
2013 - David Antonenko MD, PhD - Bacara Resort, Santa Barbara, California
2014 - Kenric M. Murayama MD - Westin Keirland Resort, Scottsdale, Arizona
2015 - Ronald Stewart MD - Hyatt Regency Monterey, California
2016 - John Potts, III - Hotel del Coronado - Coronado, California
2017 - Clay Cothren Burlew - Hyatt Regency Maui – Maui, HI
2018 - Daniel Margulies - The Meritage Resort & Spa, Napa, CA

* Deceased
LEARNING OBJECTIVES

The scientific program of the Annual Meeting of the Southwestern Surgical Congress will provide contemporary information on the management of a broad range of surgical diseases for community surgeons, academic surgeons and the surgeon-in-training. Topic areas discussed will incorporate a comprehensive perspective of surgical practice including abdominal and gastrointestinal surgery, emergency general surgery, trauma / critical care surgery, surgical education, thoracic and vascular surgery, surgical oncology, and breast and endocrine surgery. The intent of the program is to broaden the knowledge base of the audience and enhance the quality of patient care and patient safety. Audience participation and interaction will be encouraged. The content and format of the program have been developed based on evaluations and suggestions of attendees of previous programs of the Southwestern Surgical Congress.

At the end of this activity, attendees will / will be able to perform the following:

1. Develop an understanding of current issues relevant to the advancement of the art and practice of surgery, specifically in the evaluation and management of hernia, breast, endocrine, gastrointestinal, thoracic, vascular, pediatric surgery, trauma / critical care and emergency / acute care surgical disease.

2. Discuss the highlighted translational data and evidence-based practice with respect to the potential impact on the future of patient care and evolution of surgical best practice.

3. Implement a strategy to establish new technologies within the context of the individual’s current surgical practice.
EDUCATIONAL OBJECTIVES

CME CERTIFICATES AND EVALUATION FORMS
Evaluation completion, CME and Self Assessment credit will be completed online. You will receive emailed instructions on how to claim CME online immediately following the conference.

DISCLOSURE INFORMATION
In compliance with the ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. All reported conflicts are managed by a designated official to ensure a bias-free presentation. Please see the insert to this program for the complete disclosure list.

GENERAL INFORMATION

HOTEL
Hyatt Regency Huntington Beach Resort and Spa
21500 Pacific Coast Highway
Huntington Beach, CA 92648
714.698.1234

REGISTRATION
The registration desk hours are as follows (Grand Foyer East):
Sunday 7:30am – 5:00pm
Monday 6:30am – 12Noon
Tuesday 6:30am – 5:00pm
Wednesday 6:45am – 11:30am
CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation
This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and Southwestern Surgical Congress. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

_AMA PRA Category 1 Credits™ - Annual Meeting_

The American College of Surgeons designates this live activity for a maximum of 27.0 _AMA PRA Category 1 Credits™_. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Of the _AMA PRA Category 1 Credits™_ listed above, a maximum of 12.0 credits meet the requirements for Self-Assessment.
OPTIONAL ACTIVITIES

Monday, April 15th

6:45am – 7:30am | Yoga on the Beach
$30/person
Start your morning with a moment of yoga on the beach. You will greet the day with an invigorating yoga flow class to energize the body and awaken the mind. Towels and yoga mats included. Namaste!

12:15pm | Golf Tournament
12:15pm (Departure), 1:00pm (Shotgun Start)
$150/person
Tustin golf course is located approximately a half hour from the Hyatt. SWSC will provided transportation to and from the golf course. Tustin Ranch Golf Club is a first-class picturesque facility secluded within the community of Tustin, CA. It features a signature Ted Robinson designed golf course that the readers of the Orange County Register have consistently voted the best “Orange County Golf Course and Driving Range” for multiple years including 2015, 2012, 2010, 2009 and 2007. Additionally, California Golf Course Owner’s Association voted the Tustin Golf Club the “CGCOA Course of the Year” for 2008. Golf Digest Magazine ranked the challenging Tustin Ranch Golf Club four-stars several years in a row.

1:00pm – 3:00pm | Kickball Tournament
$15/person
Come join your fellow SWSC attendees for a kickball tournament on the beach! Kickball will be set up in front of the Hyatt.
Monday, April 15th

1:00pm – 2:00pm | Surf Lesson
$130/person

Learn to surf in with the best surf instructors in Surf City USA. This 1-hour lesson takes place right in front of the Hyatt on a sandy beach break perfect for learning. Our lessons come with surfboards and wetsuits that have been specifically designed to make the learning experience as enjoyable as possible. Our instructors have an excellent track record of getting people standing quickly and ensuring everyone is having a great time in the water. We have the lowest student to instructor ratio available to make sure everyone gets the individual attention they need. We teach everyone from 8 to 80 years old and know that learning to surf will be the highlight of your trip to Huntington Beach. Surfboards and Wetsuits included; moderate swimming ability recommended.

Tuesday, April 16th

7:00am – 7:45am | SWSC 5k Lowry Fund Run
$50/person

Come everyone and enjoy a 5K fun run along the Pacific Coast Highway boardwalk along the beach area! Proceeds go to support the SWSC Lowry Fund.

1:00pm – 4:00pm | Bike Scavenger Hunt
$55/person

Cruise the best bike path in Southern California to scenic Huntington Beach. Our custom scavenger hunt will have your group exploring the history and enjoying the sights of Surf City USA. Our Polaroid cameras will help you create special keepsakes of your trip and ensure this is a vacation you never forget. Mostly traveling on a flat, dedicated bike path. Total distance: 3-5 miles
SWSC PRESIDENTIAL ADDRESS

Sunday April 14, 2019
4:30pm – 5:15pm | Salon D

Introduction: Edward Nelson MD |
University of Utah/Huntsman Cancer Institute

Putting Patients First

Courtney Scaife MD | University of Utah/
Huntsman Cancer Institute

Dr. Courtney Scaife is a Professor of Surgery at the University of Utah who specializes in the care of patients requiring surgical treatment related to gastrointestinal oncology. Dr. Scaife earned her undergraduate degree from DePauw University and medical degree from the University of Wisconsin. Her general surgery residency was done at the University of Utah which was followed by a two-year fellowship in surgical oncology at the University of Texas MD Anderson Cancer Center. Dr. Scaife joined the faculty at the University of Utah in 2003 and is a tenured academic surgeon. Dr. Scaife’s focus in surgery involves diseases of the liver, pancreas, and gastrointestinal tract. Her clinical efforts include both complex surgical endeavors as well as academic research. She has received numerous research grants and participates with other colleagues in the areas of diagnosis and treatment of cancer, in particular pancreatic cancer.
Cindy B. Matsen is a fellowship trained breast surgeon at the University of Utah, Huntsman Cancer Institute. She is board certified in General Surgery and is an Assistant Professor in the Department of Surgery and specializes in the surgical treatment of breast cancer and benign breast diseases. She received her undergraduate degree from the University of Oregon and her MD from the University of Chicago Pritzker School of Medicine. She then completed a residency in General Surgery at the University of Utah and a fellowship in Breast Surgical Oncology at Memorial Sloan Kettering Cancer Center in New York City. She has special interests in young breast cancer patients DOctor-patient communication, patient education, and decision making. She has research interests in shared decision making, health communication, and cancer care delivery. Her works focuses on better understanding how shared decision making is viewed and implemented by providers and designing interventions to improve the shared decision making process. She is particularly interested in preference elicitation and how better training of providers in preference elicitation techniques
can improve cancer outcomes. She enjoys collaborative work and has ongoing collaborations with researchers in communication, population health, epidemiology, engineering, and molecular biology. Her overall goal is to improve our ability to provide patient-centered care for cancer patients.

Colleen Murphy MD is an Assistant Professor of Surgery at the University of Colorado School of Medicine. She also serves as the Medical Director of the Lone Tree Breast Center. Dr. Murphy received her medical degree from Case Western Reserve University School of Medicine and completed general surgery residency at Indiana University. During residency, she also completed a two-year research fellowship in Breast Oncology at Memorial Sloan Kettering Cancer Center. After residency, she completed a clinical fellowship in Breast Surgical Oncology at Dana-Farber Cancer Institute, Massachusetts General Hospital, and Brigham and Women’s Hospital. Following fellowship, she was an attending surgeon at Brigham and Women’s Hospital and the Dana-Farber Cancer Institute and served on the faculty at Harvard Medical School before moving to Colorado. When she arrived in Denver, she founded and directed the first nationally accredited multidisciplinary breast cancer clinic in Colorado in the private sector. Three years later, she returned to academic medicine to direct the University of Colorado Hospital’s Lone Tree Breast Center. Her academic interests include oncoplastic breast surgery and managing high-risk patients. She is also a founding faculty member of the University of Colorado Hospital’s Excellence in Communication program.
THOMAS G. ORR MEMORIAL LECTURESHP
PAST PRESENTERS

1966 - Michael E. DeBakey MD
1967 - Edgar J. Poth MD
1968 - Stanley R. Friesen MD
1969 - Philip B. Price MD
1970 - Kenneth C. Sawyer MD
1971 - Merlin K. DuVal MD
1972 - C. Frederick Kittle MD
1973 - Erie E. Peacock MD
1974 - Eugene M. Brickner MD
1975 - William R. Waddell MD
1976 - Denton A. Cooley MD
1977 - Gilbert S. Campbell MD
1978 - Howard T. Robertson MD
1979 - Norman M. Rich MD
1980 - W. Gerald Rainer MD
1981 - Arthur C. Beall, Jr. MD
1982 - Arlo S. Hermreck MD
1983 - G. Rainey Williams MD
1984 - Samuel A. Wells, Jr. MD
1985 - Layton F. Rikkers MD
1986 - Ronald C. Jones MD
1987 - W. Sterling Edwards MD
1988 - Laurence Y. Cheung MD
1989 - Tom R. DeMeester MD
1990 - Charles M. Balch MD
1991 - Alex G. Little MD
1992 - Donald E. Fry MD
1993 - Keith Reemtsma MD
1994 - C. James Carrico MD
1995 - Frederick L. Grover MD
1996 - Ernest E. Moore, Jr. MD
1997 - Nicholas P. Lang MD
1998 - Alden H. Harken MD
1999 - Frederick A. Moore MD
2000 - H. Harlan Stone MD
2001 - Russell G. Postier MD
2002 - Richard J. Andrassy MD
2003 - Keith Lillemoe MD
2004 - Alan Thorson MD
2005 - Nathaniel Soper MD
2006 - Thomas Weber MD
2007 - Byers W. Shaw MD
2008 - Shuvo Roy, PhD
2009 - Mark A. Talamini MD
2010 - Barbara Lee Bass MD
2011 - John Potts, III MD
2012 - David Mercer MD
2013 - Alicia Mangram MD
2014 - Daniel R. Margulies MD
2015 - Raul S. Coimbra MD, PhD
2016 - Donald Lesslie MD
2017 - S. Rob Todd MD
2018 - Kenric Murayama MD
The Robotic Platform Should be Used More Liberally in Place of Laparoscopic Cholecystectomy and Hernia Repair

**PRO | Alexander Raines MD** | Oklahoma University Health Sciences Center
**CON | Sean J. Langenfeld MD** | University of Nebraska Medical Center

**Alexander R. Raines MD, FACS** is an Assistant Professor, Director of Robotic Surgery, Co-Director of the Medical Student Surgical Clerkship, and Residency Program Site-Director – OU Edmond for the OU Department of Surgery. He is also Director of Career Advising for the OU College of Medicine, and a contracting general surgeon for the Oklahoma City VA Hospital. A native of Lincoln, NE, Dr. Raines earned his undergraduate degree from the University of Kansas, his medical degree from the University of Nebraska, and completed his general surgery residency at the University of Oklahoma after which he became a board-certified general surgeon (American Board of Surgery) and immediately joined the OU Department of Surgery faculty. Dr. Raines loves his job, loves the privilege of earning the trust of his patients with the goal of improving their lives through surgery, and loves the opportunity to help shape the future of medicine. Dr. Raines
particularly enjoys spending time outside of the hospital with his life partner, Kammi, and her daughter, Izabel. They love cheering on the Oklahoma City Thunder basketball team, playing ball with their dog, Nora, and catching the latest movies. They work hard to maintain a healthy work-life balance.

Sean Langenfeld is an associate professor of surgery and the chief of colon and rectal surgery at the University of Nebraska Medical Center. Research interests include social media, online reputation management, colorectal cancer, and minimally invasive colorectal surgery.
EDGAR J. POTH MEMORIAL LECTURESHIP

PAST PRESENTERS

1975 - George H. Mertz MD
1976 - Frank G. Moody MD
1977 - Claude H. Organ, Jr. MD
1978 - Raymond C. Read MD
1979 - William W. Monafo MD
1980 - George C. Morris MD
1981 - Ronald C. Elkins MD
1982 - MacDonald Wood MD
1983 - J. Bradley Aust MD
1984 - Ernest E. Moore, Jr. MD
1985 - Stephen L. Wangensteen MD
1986 - David V. Feliciano MD
1987 - David Roos MD
1988 - Kent C. Westbrook MD
1989 - Carey P. Page MD
1990 - James H. Tomas MD
1991 - Lawrence W. Way MD
1992 - Jon M. Burch MD
1993 - Jeffrey R. Saffle MD
1994 - G. Patrick Clagett MD
1995 - Jon S. Thompson MD
1996 - Wayne H. Schwesinger MD
1997 - Glenn C. Hunter MD
1998 - Courtney M. Townsend, Jr. MD
1999 - James A. Edney MD
2000 - Robert J. Fitzgibbons MD
2001 - Gregorio A. Sicard MD
2002 - Layton F. Rikkers MD
2003 - Kenneth W. Sharp MD
2004 - B. Timothy Baxter MD
2005 - John F. Eidt MD
2006 - David Antonenko MD, PhD

2007 - Edward W. Nelson MD
2008 - Kenric Murayama MD
2009 - Karen R. Borman MD
2010 - Alden D. Harken MD
2011 - Anees Chagpar MD
2012 - Clay Cothren Burlew MD
2013 - R. Stephen Smith MD
2014 - Peter Angelos MD, PhD
2015 - J. Patrick Walker MD
2016 - David Mercer MD
2017 - Christine Cocanour MD
2018 - Walt Biffl MD
REBOA Should be Included in the Resuscitation of the Critically Injured Patient

PRO | James M. Haan MD | St. Francis Via Christi
CON | Dennis Y. Kim MD | LA County Harbor-UCLA Medical Center

Dr. James Haan is a general surgeon at St. Francis Via Christi. He completed his Fellowship at University of Maryland Medical Center, his Residency at University of Iowa Hospitals and Clinics, and received his medical degree from University of Michigan Medical School. He is a board certified Critical Care surgeon.

Dr. Dennis Kim is originally from Toronto, Canada and attended medical school at McMaster University. He completed a general surgical residency and fellowship in Critical Care Medicine at the University of Ottawa. Following this, he completed a second fellowship in Trauma & Surgical Critical Care at UC San Diego. He is a graduate of the ASE’s Surgical Education Research Fellowship (SERF) and earned a Masters in Medical Education at the University of Dundee. In 2012, Dr. Kim joined the faculty at Harbor-UCLA Medical Center in South Los Angeles. He is currently an Associate
Professor of Clinical Surgery at the David Geffen School of Medicine at UCLA and also serves as the Vice Chair for the College of Applied Anatomy and Co-Director of the Surgery Clerkship. He is currently the Medical Director of the Surgical Intensive Care Unit and Program Director for the Surgical Critical Care Fellowship program at Harbor-UCLA. Dr. Kim is an active clinician, educator, mentor, and clinical researcher. He is a two-time recipient of the Kaiser Permanente Award for Excellence in Teaching (UCSD/UCLA) and has also been awarded the Clinical Advancement and Recognition of Excellence in Service and Collins Day Outstanding Teacher Awards. He serves on national committees for the American Association for the Surgery of Trauma, Eastern Association for the Surgery of Trauma, American College of Surgeons, and the Society of Critical Care Medicine. He has authored over 100 peer-reviewed articles/abstracts and 20 book chapters. Dr. Kim is happily married and enjoys spending time with his wife, Alexis, and four children.
CLAUDE H. ORGAN, JR. MEMORIAL LECTURESHIP
PAST PRESENTERS

1996 - V. Suzanne Klimberg MD
1997 - LaSalle D. Leffall, Jr. MD
1998 - Samuel A. Wells, Jr. MD
1999 - Hiram C. Polk, Jr. MD
2000 - F. Charles Brunicardi MD
2001 - John B. Cone MD
2002 - Douglas S. Reintgen MD
2003 - Frank Lewis MD
2004 - Philip Schauer MD
2005 - Sean J. Mulvihill MD
2006 - John Hanks MD
2007 - Glen D. Warden MD
2008 - Dmitry Oleynikov MD
2009 - Mary L. Brandt MD
2010 - Ernest E. Moore MD
2011 - Ronald M. Stewart MD
2012 - Eugene Foley MD
2013 - Kelly McMasters MD
2014 - Shanu N. Kothari MD
2015 - Roxie M. Albrecht MD
2016 - Terry C. Lairmore MD
2017 - John Moore MD
2018 - Gregory J. Jurkovich MD
The Lowry Fund honors Nonie Lowry, Past SWSC Director, for her strength, professionalism, and dedication to the Southwestern Surgical Congress. Donations to the Fund will be used for the annual Lowry Award (best paper by a new member), educational grants for medical students and residents, and other educational initiatives to be supported and defined by the Southwestern Surgical Congress. The Lowry Fund Donor Levels are named for the first 6 Presidents of the SWSC. Donations made to the Lowry Fund of the SWSC Foundation are tax deductible.

To view the Lowry Fund Donor Wall visit www.swscongress.org/lowryfund/
JACK A. BARNEY RESIDENT’S AWARD
Dr. Jack A. Barney received his medical degree in 1956 from the University of Oklahoma. He completed his surgical residency training at St. Anthony Hospital and the University of Oklahoma Health Science Center before entering private practice in Oklahoma City. Dr. Barney continued in private practice in Oklahoma City and Clinical Assistant Professor of Surgery at the University of Oklahoma.

The Barney award is given to the best paper presented by a resident.

1987 - Ronald M. Stewart MD
1988 - T.L. Demmy MD
1989 - Ronald M. Stewart MD
1990 - George Orloff MD
1991 - L. Lee Nelson MD
1992 - Phillip M. Brown MD
1993 - Timothy C. Hollingsed MD
1994 - Walter L. Biffl MD
1995 - Daniel R. Meldrum MD
1996 - David A. Partrick MD
1997 - Evan R. Kokoska MD
1998 - Tari King MD
1999 - David G. Affleck MD
2000 - Philip A. Woodworth MD
2001 - Elizabeth K. Paulsen MD
2002 - Sandra Wong MD
2003 - Ketan Desai MD
2004 - Joseph A. Davis MD
2005 - Elizabeth Fitzsullivan MD
2006 - Hyong Kim MD
2007 - Marcene McVay MD
2008 - Jodi Gerdes MD
2009 - Jennifer Keller MD
2010 - Brenda Kopriva MD
2011 - Stephanie Cohen MD, MS
2012 - Paul Bjordahl MD
2013 - Irminne Van Dyken MD
2014 - Katie Wiggins-Dohlvik MD
2015 - Abdul Alarhayem MD
2016 - Abdul Alarhayem MD
2017 - Hunter Moore MD
2018 - Cynthia Tom MD
LOWRY AWARD
The Lowry Award is given in recognition of the best paper by a new member (within the first two years of membership from your induction date).

2017 - Derek Wall MD
2018 - Ahmed Khouqueer MD

BEST ADVANCED PRACTICE PROVIDER PAPER AWARD
The Best APP Paper Award is given in recognition of the best paper by an Advanced Practice Provider.

2018 - Annika Kay PA-C, MPAS
IN MEMORIAM

Deaths reported as of March, 2019

Paul Becker– Denver, CO

Basil Pruitt – San Antonio, TX
(SWSC Lowry Fund Donor – Price Level)

Please report any known member deaths to the Southwestern Surgical Congress:

Southwestern Surgical Congress
swsc@lp-etc.com
913.402.7102
2018–2019 NEW MEMBERS

APP
Christina Pelo PA-C
Olivia Tucker PA-C

Associate
Maria Baimas-George MD, MPH
Patrick Bonasso MD
Julia Coleman MD MPH
Nosayaba Enofe MD
Viktor Gabriel MD
Benjamin Grams MD
Chad Hall MD
Justin Hatchimonji MD, MBE
Yohanis O’Neill-Castro MD
Andrew Wang MD

Fellow
Mentor Ahmeti MD
Theresa Chin MD, MPH
Geoffrey Chow MD
Jamie Coleman MD
Jamie Fitch MD
Kelly Hewitt MD
Paul Kolkman MD
Ionnis Konstantinidis MD
Mark Mawhinney MD
Cynthia Millward MD
Yosef Nasseri MD
Michael Porter MD
Nelson Royall MD
Kyle Vincent MD
Rebecca Vogel MD
Christine Waller MD
SCHEDULE
AT-A-GLANCE
Sunday, April 14, 2019

7:30am – 5:00pm   Registration Open  Grand Foyer East
8:00am – 11:30am  Surgical Practicum  Salon D
9:20am – 9:40am   Morning Beverage Break  Grand Foyer East
11:00am – 12Noon  Surgical Practicum Hands on Lab | REBOA  Catalina
11:00am – 12Noon  Surgical Practicum Hands on Lab | Rib Plating  Salon F
12Noon – 1:00pm   Attendee Luncheon – Sponsored by Portola Pharmaceuticals  Salon G
12Noon – 1:00pm   GME Luncheon | Surgical Practice and Employment: Comparing Different Business Models  Salon E
1:00pm – 2:30pm   Scientific Session 1: Surgical Oncology  Salon D
2:30pm – 2:45pm   Introduction of New Members  Salon D
2:45pm – 3:15pm   Multi Center Trials Meeting  Salon D
2:45pm – 3:15pm   Afternoon Beverage Break  Grand Foyer East
3:15pm – 4:30pm   Scientific Session 2: Trauma  Salon D
4:30pm – 5:15pm   SWSC Presidential Address  Salon D
5:30pm – 6:25pm   ePoster Session  Salon ABC
6:25pm – 6:35pm   Industry Spotlight – Sponsored by Avanos  Salon ABC
6:35pm – 7:30pm   SWSC Welcome & Exhibitor Reception  Salon ABC
SCHEDULE AT-A-GLANCE (continued)

Monday, April 15, 2019

6:30am – 12Noon  Registration Open  Grand Foyer East
6:30am – 12Noon  Exhibit Hall & ePoster Displays Hours  Salon ABC
6:30am – 8:30am  Continental Breakfast  Salon ABC
6:45am – 7:45am  Community Surgeons Networking Breakfast  Salon ABC
6:45am – 7:30am  Yoga on the Beach
6:45am – 8:00am  Quick Shot Session 1: Trauma  Salon D
6:45am – 8:00am  Quick Shot Session 2: General Surgery  Salon E
6:45am – 8:00am  Quick Shot Session 3: Trauma/Critical Care  Salon G
8:10am – 8:55am  Thomas G. Orr Memorial Lectureship | Debate  Salon D
8:55am – 10:20am  American College of Surgeons | Advocacy  Salon D
8:55am – 12Noon  Advanced Practice Provider Symposium  Salon E
10:20am – 10:35am  Morning Beverage Break  Salon ABC
10:35am – 12Noon  Advanced Practice Provider Symposium | Research Collaboration  Salon E
1:00pm  Golf Tournament  Tustin Golf Course
1:00pm – 2:00pm  Surf Lesson
1:00pm – 3:00pm  Kickball Tournament
Tuesday, April 16, 2019

6:30am – 5:00pm  Registration Open  Grand Foyer East
6:30am – 2:45pm   Exhibit Hall & ePoster Displays Hours  Salon ABC
7:00am – 7:45am  SWSC Inaugural Lowry Fund Run
7:00am – 8:15am  Quick Shot Session 4: Trauma 2  Salon D
7:00am – 8:15am  Quick Shot Session 5: Case Presentations  Salon E
7:00am – 8:15am  Quick Shot Session 6: General Surgery 2  Salon G
6:45am – 8:30am  Continental Breakfast  Salon ABC
8:15am – 9:30am  Scientific Session 3: General Surgery  Salon D
9:30am – 10:00am  Morning Beverage Break  Salon ABC
10:00am – 11:15am  Scientific Session 4: General Surgery 2  Salon D
11:15am – 12Noon  Expert Panel Case Presentations  Salon D
12Noon – 2:00pm  Mock Oral Boards  Salons E & F
12:15pm – 1:30pm  The Intersection of Financial Planning, Wellness, Math, and Psychology  Salon G
1:00pm – 4:00pm  Bicycle Scavenger Hunt
1:30pm – 2:30pm  Scientific Session 5: Trauma2  Salon D
2:30pm – 2:45pm  Afternoon Beverage Break  Salon ABC
2:45pm – 3:45pm  Scientific Session 6: General Surgery 3  Salon D
3:45pm – 4:30pm  Edgar J. Poth Memorial Lectureship | Debate  Salon D
4:30pm – 5:00pm  SWSC Annual Business Meeting  Salon D
5:15pm – 6:00pm  SWSC Advanced Practice Provider Reception  Red Chair Lounge
Tuesday, April 16, 2019

5:15pm – 6:00pm  SWSC Program & Publications Committees Reception (by invitation)  Pub Happy Hour

6:00pm – 9:00pm  SWSC Reception  Lighthouse Courtyard

Wednesday, April 17, 2019

6:45am – 11:30am  Registration Open  Grand Foyer East

6:45am – 8:30am  Continental Breakfast  Grand Foyer East

7:00am – 8:00am  Quick Shot Session 7: Hernia  Salon D

7:00am – 8:00am  Quick Shot Session 8: General Surgery 3  Salon E

7:00am – 8:00am  Quick Shot Session 9: General Surgery 4  Salon G

8:00am – 9:15am  Scientific Session 7: Trauma 3  Salon D

9:15am – 10:00am  Claude H. Organ, Jr. Memorial Lectureship | Debate  Salon D

10:00am – 11:30am  Top 3 Papers: Breast, General Surgery, Trauma, Colorectal  Salon D

11:30am – 12:00noon  Awards Presentation & Closing Session  Salon D
SCIENTIFIC PROGRAM

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible
• APP Paper Competition Eligible
Saturday, April 13, 2019

12Noon – 1:45pm | Salon E
SWSC Executive Committee Meeting

2:00pm – 2:30pm | Salon E
SWSC Membership Committee Meeting

2:30pm – 3:00pm | Salon E
SWSC Publications Committee Meeting

3:00pm – 3:30pm | Salon E
SWSC Communications Committee Meeting

3:30pm – 4:15pm | Salon E
SWSC Lowry Fund Governing Committee Meeting

4:30pm – 5:30pm | Salon E
SWSC Council Meeting

6:30pm – 7:00pm | California Courtyard
SWSC Lowry Fund Donors Reception

7:00pm – 8:30pm | California Courtyard
SWSC Presidents & Residents Reception
Sunday, April 14, 2019

7:30am – 5:00pm | Grand Foyer East
Registration Open

8:00am – 9:20am | Salon D
Surgical Practicum – Part I
Moderator: Daniel Dent MD | UT Health San Antonio

   Rural Surgery Emergencies
   Kelly Hewitt MD | Samaritan Pacific Communities Hospital

   REBOA
   Laura Moore MD | University of Texas McGovern Medical School – Houston

   Diverticulitis
   Moriah Wright MD | Colon and Rectal Surgery Inc.

   Thyroid/Parathyroid Update and Review
   Melanie Lyden MD, MHPE | Mayo Clinic

9:20am – 9:40am | Grand Foyer East
Morning Beverage Break

9:40am – 11:00am | Salon D
Surgical Practicum – Part II

   Anorectal
   Molly Gross MD | Iowa Clinic

   Rib Plating
   Thomas White MD | Intermountain Medical Center

   Inguinal Hernia
   Mark Savarise MD, MBA | University of Utah

   Necrotizing Soft Tissue Infections
   Krista Kaups MD, MSc | UCSF Fresno
11:00am – 11:30am | Salon D
Surgical Practicum – Part III

   Ergonomics for Surgeons
   Yvonne Savarise DPT | University of Utah

11:00am – 12Noon | Catalina
Surgical Practicum Hands on Lab | REBOA
Faculty: Laura Moore MD | University of Texas McGovern Medical School – Houston
Megan Brenner MD | University of California – Riverside

11:00am – 12Noon | Salon F
Surgical Practicum Hands on Lab | Rib Plating
Faculty: Thomas White MD | Intermountain Medical Center
Frederic Pieracci MD | Denver Health Medical Center
Frank Zhao MD | The Queen’s Medical Center/University of Hawaii
Francis Ali-Osman MD | Honor Health John C. Lincoln Medical Center

12Noon – 1:00pm | Salon G
Attendee Luncheon – Sponsored by Portola Pharmaceuticals

12Noon – 1:00pm | Salon E
GME Luncheon | Surgical Practice and Employment: Comparing Different Business Models
Moderator: Daniel Dent MD | UT Health San Antonio

   Academic Practice
   Lillian Liao MD, MPH | UT Health San Antonio

   Private and Large Group Practices
   Thomas White MD | Intermountain Medical Center

   Working in a Critical Access Hospital
   Kelly Hewitt MD | Samaritan Pacific Communities Hospital
1:00pm – 2:30pm | Salon D

Scientific Session 1: Surgical Oncology
Moderator(s): Courtney Scaife MD | University of Utah/Huntsman Cancer Institute
Rebecca Britt MD | Eastern Virgnia Medical School

1:00pm – 1:15pm
* 1. RECTAL CANCER LOCOREGIONAL STAGING: ENDORECTAL ULTRASOUND COMPARED TO HIGH RESOLUTION PELVIC MAGNETIC RESONANCE IMAGING
Presenter: Adeseye Adekeye MD, PhD | University of North Dakota
Invited Discussant: Alan Thorson MD | Colon and Rectal Surgery, Inc.

1:15pm – 1:30pm
2. ROLE OF RIGHT HEMICOLECTOMY IN PATIENTS WITH LOW GRADE APPENDICEAL MUCINOUS ADENOCARCINOMA
Presenter: Christine Sutanto BS | Cedars Sinai Medical Center
Invited Discussant: Ioannis Konstantinidis MD | Texas Tech University Health Sciences Center

1:30pm – 1:45pm
* 3. CYTOREDUCTION WITH ISOLATED LIMB CHEMOTHERAPY IMPROVES SURVIVAL IN PATIENTS WITH REGIONAL IN-TRANSIT MELANOMA METASTASES CONFINED TO AN EXTREMITY
Presenter: Ton Wang MD | University of Michigan Medical School
Invited Discussant: Richard Gray MD | Mayo Clinic

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible
• APP Paper Competition Eligible
1:45pm – 2:00pm
* 4. MAKING AN INFORMED CHOICE: WHICH BREAST RECONSTRUCTION TYPE HAS THE LOWEST COMPLICATION RATE?
**Presenter:** Patrick Hangge MD | Mayo Clinic Arizona
**Invited Discussant:** Joshua Mammen MD, PhD | University of Kansas

2:00pm – 2:15pm
* 5. COMPARING TREATMENT PATTERNS OF HEPATOCELLULAR CARCINOMA AT ACADEMIC CENTERS AND NON-ACADEMIC CENTERS WITHIN THE MOUNTAIN REGION
**Presenter:** Daniel Cheng MD, MPH | University of Nevada Las Vegas
**Invited Discussant:** Saju Joseph MD | Valley Health System

2:15pm – 2:30pm
* 6. ARE WE CHOOSING WISELY IN ELDERLY FEMALES WITH BREAST CANCER?
**Presenter:** Esteban Calderon MD | Mayo Clinic Arizona
**Invited Discussant:** Colleen Murphy MD | University of Colorado School of Medicine

2:30pm – 2:45pm | Salon D
**Introduction of New Members**

2:45pm – 3:15pm | Salon D
**Multi Center Trials Meeting**

2:45pm – 3:15pm | Grand Foyer East
**Afternoon Beverage Break**

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible • APP Paper Competition Eligible
3:15pm – 4:30pm | Salon D

**Scientific Session 2: Trauma**

**Moderator(s):** Lillian Liao MD, MPH | University of Texas Health San Antonio
Maria Allo MD | Santa Clara Valley Med Center/Stanford

### 3:15pm – 3:30pm

* 7. IT’S SOONER THAN YOU THINK: BLUNT SOLID ORGAN INJURY PATIENTS ARE ALREADY HYPER-COAGULABLE UPON HOSPITAL ADMISSION – RESULTS OF A BI-INSTITUTIONAL, PROSPECTIVE STUDY

**Presenter:** Julia Coleman MD, MPH | University of Colorado School of Medicine
**Invited Discussant:** Frank Zhao MD | The Queen’s Medical Center/University of Hawaii

### 3:30pm – 3:45pm

+ 8. A MULTICENTER ANALYSIS OF THE AMERICAN SOCIETY OF ANESTHESIOLOGISTS PHYSICAL STATUS CLASSIFICATION ON OUTCOMES AND MORTALITY PREDICTIVE ABILITY IN ADULT TRAUMA PATIENTS UNDERGOING SURGERY WITHIN 24 HOURS

**Presenter:** Viktor Gabriel MD | University of California Irvine Medical Center
**Invited Discussant:** Susan McLean MD | Texas Tech University Health Sciences Center El Paso

### 3:45pm – 4:00pm

* 9. AN EVALUATION OF BLOOD PRODUCT UTILIZATION RATES WITH MASSIVE TRANSFUSION PROTOCOL; BEFORE AND AFTER THROMBO-ELASTOGRAPHY USE IN TRAUMA

**Presenter:** Mitchell Unruh MD | University of Kansas School of Medicine – Wichita
**Invited Discussant:** Peter Kennealey MD | University of Colorado School of Medicine

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible  • APP Paper Competition Eligible
4:00pm – 4:15pm
* 10. PLATELET DYSFUNCTION ON THROMBOELASTOGRAM IS ASSOCIATED WITH SEVERITY OF ISOLATED BLUNT TRAUMATIC BRAIN INJURY
Presenter: Annika Kay PA-C | Intermountain Medical Center
Invited Discussant: Dennis Kim MD | Harbor-UCLA Medical Center

4:15pm – 4:30pm
* 11. PREHOSPITAL SHOCK INDEX CORRELATES WITH TRANSFUSION, RESOURCE UTILIZATION AND MORTALITY; ROLE OF FIRST PATIENT VITALS
Presenter: Faisal Jehan MD | Westchester Medical Center
Invited Discussant: Justin Regner MD | Baylor Scott & White Medical Center – Temple

4:30pm – 5:15pm | Salon D
SWSC Presidential Address
Introduction: Edward Nelson MD | University of Utah/Huntsman Cancer Institute

Putting Patients First
Courtney Scaife MD | University of Utah/Huntsman Cancer Institute

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible • APP Paper Competition Eligible
5:30pm – 6:25pm | Salon ABC

**ePoster Kiosk 1**

**Moderator(s):** Randeep Jawa MD | Stony Brook University School of Medicine
Elizabeth Scherer MD, MPH | University of Texas Health San Antonio

5:30pm – 5:35pm

**P 1. ANALYSIS OF THE USE OF LIPOSOMAL BUPIVACAINE VERSUS BUPIVACAINE PAIN CATHETERS FOR POST-OPERATIVE PAIN CONTROL AFTER BARIATRIC SURGERY**

**Presenter:** Gale Albrecht PharmD, BCCCP, MS | Denver Health Medical Center

5:35pm – 5:40pm

**P 2. ABERRANT SINGLE CYSTIC ARTERY ORIGINATING FROM A RIGHT REPLACED HEPATIC ARTERY ENTERING THE GALLBLADDER FROM THE POSTERIOR INFERIOR ASPECT**

**Presenter:** Hugo Bonatti MD | Meritus Health

5:40pm – 5:45pm

**P 3. THE EVER SHRINKING OPERATIVE TRAUMA EXPERIENCE IN SURGERY RESIDENCY: CAUSE FOR CONCERN**

**Presenter:** Michael Jones MD | St. Joseph’s Hospital and Medical Center

5:45pm – 5:50pm

**P 4. THE VALUE OF AN APPRENTICESHIP AT A SAFETY NET TRAUMA HOSPITAL FOR TRAINING CHIEF GENERAL SURGERY RESIDENTS**

**Presenter:** Hunter Moore MD, PhD | Denver Health Medical Center
5:50pm – 5:55pm  
P 5. IDIOPATHIC HEPATIC PORTAL VENOUS GAS IN A SEPTIC PATIENT: A DIAGNOSIS OF EXCLUSION  
Presenter: David Murray BA | University of Oklahoma College of Medicine – Tulsa

5:55pm – 6:00pm  
P 6. INITIAL EXPERIENCE WITH PREPECTORAL BREAST RECONSTRUCTION AND AEROFORM TISSUE EXPANDERS  
Presenter: Melody Bedrossian BS | University of Miami, Miller School of Medicine

6:00pm – 6:05pm  
7. THE FUTILITY OF OPEN CARDIAC MASSAGE IN PENETRATING CARDIAC TRAUMA  
Presenter: Faran Bokhari MD | Cook County Health System

6:05pm – 6:10pm  
P 8. NON-INVASIVE TIME-RESOLVED SPECTROSCOPY PROVES SENSITIVE TO DECREASED CEREBRAL PERFUSION: INCIDENTAL FINDING IN PILOT STUDY  
Presenter: George P. Philipopoulos BS | University of California Irvine Medical Center

6:10pm – 6:15pm  
P 9. ABDOMINAL VISCERAL VASCULAR INJURY AFTER BLUNT TRAUMA  
Presenter: Alison Halpern MD | Denver Health Medical Center

6:15pm – 6:20pm  
P 10. THORACIC COMPARTMENT SYNDROME FOLLOWING NECROTIZING SOFT TISSUE INFECTION AND SEPSIS  
Presenter: Andrew Martin MD | University of Florida
6:20pm – 6:25pm
P 11. REPAIR OF AN ACUTE LUNG HERNIA AND A NOVEL TECHNIQUE IN SURGICAL STABILIZATION OF RIB FRACTURES
Presenter: Chris Kuppler MD | Carolinas Medical Center

5:30pm – 6:25pm | Salon ABC
ePoster Kiosk 2
Moderator(s): Richard Frazee MD | Baylor Scott & White Temple
Krista Kaups MD, MSc | UCSF Fresno

5:30pm – 5:35pm
P 12. PHLEGMONOUS GASTRITIS-EARLY DIAGNOSIS AND TREATMENT IS KEY TO OUTCOME
Presenter: Drew Albright DO | St. Joseph’s Hospital and Medical Center

5:35pm – 5:40pm
P 13. GASTROINTESTINAL SURGICAL INTERVENTION AND RESIDUAL CANCER RISK IN A FAMILIAL ADENOMATOUS POLYPOSIS PATIENT REGISTRY
Presenter: Austin Cannon MD | University of Utah School of Medicine

5:40pm – 5:45pm
P 14. RESECTION OF PANCREATOBLASTOMA WITH PORTAL VEIN TUMOR EXTENSION
Presenter: Seyed Arshad MD | University of New Mexico

5:45pm – 5:50pm
P 15. A CASE OF SQUAMOUS CELL CARCINOMA ARISING FROM AN INCLUSION CYST FOUND WITHIN CHRONICALLY RECURRING GLUTEAL ABScesses
Presenter: Jun Elegino DO | St. Anthony Hospital
5:50pm – 5:55pm  
P 16. CONCOMITANT BLEEDING RIGHT COLON CANCER AND ACUTE PULMONARY EMBOLISM: EXPERIENCE WITH THREE CASES  
Presenter: Hugo Bonatti MD | Meritus Health

5:55pm – 6:00pm  
P 17. COLORECTAL CANCER IN CYSTIC FIBROSIS: AN UNDERAPPRECIATED CORRELATION  
Presenter: Benjamin Grams MD | University of Nebraska Medical Center

6:00pm – 6:05pm  
P 18. A RARE CASE OF A 65 YEAR OLD FEMALE WITH A MESENTERIC PARAGANGLIOMA  
Presenter: Raffaele Rocco MD | Mayo Clinic Rochester

6:05pm – 6:10pm  
P 19. TO WHAT EXTENT DO GUIDELINES GUIDE US? AN EXAMINATION OF THE AMERICAN THYROID ASSOCIATION DIFFERENTIATED THYROID CANCER GUIDELINES  
Presenter: Joshua Prenner BA | University of Chicago Pritzker School of Medicine

6:10pm – 6:15pm  
P 20. TUBE CECOSTOMY AS A BRIDGE TO DEFINITIVE SURGERY FOR COLONIC OBSTRUCTION  
Presenter: Zoe Wong BS | Peninsula Hospital

6:15pm – 6:20pm  
P 21. LAPAROSCOPIC BILATERAL ADRENALECTOMY IN VON-HIPPEL LINDBAU SYNDROME  
Presenter: Geoffrey S. Chow MD | University of Oklahoma College of Medicine – Tulsa
6:20pm – 6:25pm
P 22. CARCINOGEN EFFECT ON GI CANCERS GLOBALLY WITHIN THE LAST CENTURY
Presenter: Ritu Calla | California Northstate University

5:30pm – 6:25pm | Salon ABC
ePoster Kiosk 3
Moderator(s): Gail Tominaga MD | Scripps Memorial Hospital
Mentor Ahmeti MD | Sanford Medical Center Fargo

5:30pm – 5:35pm
P 23. HAND MOTION ANALYZER: A NOVEL TECHNIQUE IN ROBOTIC SURGERY EDUCATION
Presenter: Oscar Talledo MD | University of Oklahoma Health Sciences Center

5:35pm – 5:40pm
P 24. CHOOSING THE RIGHT PATH: A COST EFFECTIVENESS ANALYSIS OF ANTERIOR ABDOMINAL STAB WOUNDS
Presenter: Alexander Colonna MD, MSCI | University of Utah School of Medicine

5:40pm – 5:45pm
P 25. EPIDEMIOLOGIC INVESTIGATION OF GUNSHOT WOUNDS FROM A LEVEL I TRAUMA CENTER
Presenter: David Watson BS | University of Kansas School of Medicine – Wichita

5:45pm – 5:50pm
P 26. ECHOCARDIOGRAPHY AFTER PENETRATING CARDIAC INJURY: EVOLUTION OF MANAGEMENT
Presenter: Stuart Hurst MD | Emory University School of Medicine
5:50pm – 5:55pm
P 27. LAPAROSCOPIC REPAIR OF BILATERAL MORGAGNI HERNIAS
Presenter: Benjamin Axtman MD | University of Oklahoma Health Sciences Center

5:55pm – 6:00pm
P 28. ISOLATED SPLENIC HEMANGIOMATOSIS: A CASE REPORT
Presenter: Caren Millard MD | St. Joseph’s Hospital and Medical Center

6:00pm – 6:05pm
P 29. AN UNEXPECTED TURN: TRAUMATIC DEXTROCARDIA
Presenter: Joanne Leibe DO | St. Anthony Hospital

6:05pm – 6:10pm
P 30. SUPERIOR MESENTERIC ARTERY ABSENCE AND THORACIC ORIGIN OF THE CELIAC AXIS IN AN ASYMPTOMATIC ADULT: A CASE REPORT
Presenter: Sigrid Johannesen MD | University of Oklahoma Health Sciences Center

6:10pm – 6:15pm
P 31. OUTCOMES IN PATIENTS ADMITTED WITH NON-TRAUMA-ASSOCIATED PNEUMOMEDIASTINUM AT A TERTIARY CARE FACILITY
Presenter: Phillip Blotevogel BS | University of Oklahoma Health Sciences Center

6:15pm – 6:20pm
P 32. PROXIMAL HUMERUS FRACTURES IN THE ELDERLY: CONCOMITANT FRACTURES AND MANAGEMENT
Presenter: Kelly Zachariasen MD | University of Kansas School of Medicine – Wichita
6:20pm – 6:25pm  
**P 33. BITES TRIAL: A FEASIBILITY STUDY FOR A RANDOMIZED CONTROLLED TRIAL TO DETERMINE THE EFFECTIVENESS OF FASCIAL CLOSURE TECHNIQUE TO DECREASE POSTOPERATIVE COMPLICATIONS**  
**Presenter:** Clint Gates MD | University of Kansas School of Medicine – Wichita

5:30pm – 6:25pm | Salon ABC  
ePoster Kiosk 4  
**Moderator(s):** Paul Kolkman MD | Methodist Hospital Omaha  
Sam Smith MD | University of Arkansas for Medical Sciences

5:30pm – 5:35pm  
**P 34. SYMPTOMATIC TYPE IV PARAESOPHAGEAL HERNIA**  
**Presenter:** Joshua Davis MS4 | University of Oklahoma College of Medicine – Tulsa

5:35pm – 5:40pm  
**P 35. METABOLOMIC SIGNATURE IN THE SERUM OF PATIENTS AFTER LONG BONE INJURY AND REAMING**  
**Presenter:** Julie Dunn MD | University of Colorado School of Medicine Health North

5:40pm – 5:45pm  
**P 36. DOES PRIVATE VEHICLE TRANSPORT IN THE SETTING OF TRAUMA REALLY GET YOU MEDICAL CARE QUICKER?**  
**Presenter:** Ursula Barghouth DO, MHA, MSPH | Henry Ford Hospital
5:45pm – 5:50pm  
**P 37. THE HIDDEN COST OF HIGHWAY CONSTRUCTION**  
**Presenter:** Lucia Nguyen MD | Baylor Scott and White Healthcare

5:50pm – 5:55pm  
**P 38. VENOUS THROMBOEMBOLISM TESTING PRACTICES AFTER ORTHOPAEDIC TRAUMA: PATIENT FACTORS MAY INCREASE RISK FOR SURVEILLANCE BIAS**  
**Presenter:** Bryce Haac MD | University of Maryland Medical Center

5:55pm – 6:00pm  
**P 39. MODERN MANAGEMENT OF EXTREMITY VASCULAR TRAUMA: CAN WE BYPASS THE VASCULAR SURGERY CONSULT?**  
**Presenter:** Cullen McCarthy MD | University of Oklahoma Health Sciences Center

6:00pm – 6:05pm  
**P 40. A CONTEMPORARY ANALYSIS OF DELAYED DIAGNOSES AFTER TRAUMATIC INJURY: THE ROLE OF OPERATIVE THERAPY**  
**Presenter:** Justin Hatchimonji MD | University of Pennsylvania

6:05pm – 6:10pm  
**P 41. PATTERNS OF INJURIES IN DROWNING PATIENTS – DO THESE PATIENTS NEED A TRAUMA TEAM?**  
**Presenter:** Eric Hunn MD | University of Kansas School of Medicine – Wichita

6:10pm – 6:15pm  
**P 42. URETEROSCOPIC LASER LITHOTRIPSY IN THE TREATMENT OF URETERIC STONES**  
**Presenter:** Min Thway MD | University of Medicine 1, Yangon, Myanmar
6:15pm – 6:20pm
P 43. NAILED IT!: CHALLENGES IN MANAGEMENT OF PUNCTURE CARDIAC INJURIES
Presenter: Stuart Hurst MD | Emory University School of Medicine

6:20pm – 6:25pm
P 44. ACCELERATED WOUND HEALING IN RECALCITRANT, CONTAMINATED ABDOMINAL/GROIN WOUNDS WITH PUBM XENOGRAFT
Presenter: Arya Nair | Texas Tech University Health Sciences

5:30pm – 6:25pm | Salon ABC
ePoster Kiosk 5
Moderator(s): Marilee McBoyle MD | University of Kansas-Wichita
Paul Nelson MD | Sunrise Health

5:30pm – 5:35pm
P 45. IF YOU DRINK DON’T DRIVE, AND GO BEFORE YOUR RIDE
Presenter: Luis De Leon Castro MD | Baylor College of Medicine

5:35pm – 5:40pm
P 46. TRAUMATIC PNEUMOMEDIASTINUM: QUESTIONING THE NEED FOR TRANSFER
Presenter: Michael Arnold MD | Carolinas Medical Center

5:40pm – 5:45pm
P 47. WHAT REALLY HAPPENS WITH THE SPLENIC CAPSULE THICKNESS WITH AGE?
Presenter: Nicholas Sheets MD, MPH | University of California San Francisco at Fresno
5:45pm – 5:50pm
P 48. HIGH VERSUS LOW ENERGY FALLS IN THE ELDERLY: DIFFERENCES IN LONG-TERM FUNCTIONAL OUTCOMES
Presenter: Sophia Jimenez BS | The Queen’s Medical Center

5:50pm – 5:55pm
P 49. VACCINATION BOOSTER ADHERENCE AMONG PATIENTS AFTER NON-TRAUMA SPLENECTOMY: AN OPPORTUNITY FOR PRACTICE IMPROVEMENT
Presenter: Aaron Alvarado BA | University of Kansas School of Medicine

5:55pm – 6:00pm
P 50. APPLICABILITY OF ST. JOHN SEPSIS AGENT IN IDENTIFYING SEPSIS IN TRAUMA PATIENTS
Presenter: Danielle Terrill | University of Missouri Kansas City

6:00pm – 6:05pm
P 51. DEHYDRATED AMNIOTIC MEMBRANE ALLOGRAFT PROMOTES HEALING OF COMPLEX WOUNDS
Presenter: Melody Bedrossian BS | Cedars Sinai Medical Center

6:05pm – 6:10pm
P 52. ENDOVASCULAR REPAIR IS A FEASIBLE OPTION FOR SUPERFICIAL FEMORAL ARTERY INJURIES: A NATIONWIDE ANALYSIS
Presenter: Sean Degmetich MD | Riverside University Health Systems

6:10pm – 6:15pm
P 53. EPIDEMIOLOGIC INVESTIGATION OF TRAUMA FROM A LEVEL I TRAUMA CENTER
Presenter: David Watson BS | University of Kansas School of Medicine – Wichita
6:15pm – 6:20pm
P 54. FEELING SALTY: EXAMINING THE EFFICACY OF ORAL SALT REPLETION IN ADULT TRAUMA PATIENTS
Presenter: Yvonne Chung MD, MPH | The University of Texas at Austin Dell Medical School

6:20pm – 6:25pm
P 55. INJURIES ASSOCIATED WITH THE ELECTRONIC SCOOTER
Presenter: Navpreet Dhillon MD | Cedars Sinai Medical Center

5:30pm – 6:25pm | Salon ABC
ePoster Kiosk 6
Moderator(s): Colleen Murphy MD | University of Colorado School of Medicine
Daniel Dent MD | University of Texas Health Science Center at San Antonio

5:30pm – 5:35pm
P 56. SURVIVING A BROKEN HEART: A TRAUMATIC BLUNT CARDIAC RUPTURE CASE REPORT
Presenter: Kiran Venincasa MD | University of Oklahoma Health Sciences Center

5:35pm – 5:40pm
P 57. 32 YEAR OLD MALE WITH COIL MIGRATION AFTER SPLENIC ARTERY PSEUDOANEURYSM EMBOLIZATION
Presenter: Bree Steinke DO | St. Anthony Hospital

5:40pm – 5:45pm
P 58. HITTING THE NAIL ON THE HEAD: DIAGNOSIS AND MANAGEMENT OF PENETRATING NECK INJURIES
Presenter: Cressilee Bryant MD | University of Oklahoma Health Sciences Center
5:45pm – 5:50pm
**P 59. THE BOVINE ARCH CASE SERIES: A NOVEL FINDING**
*Presenter:* Tashinga Musonza MD | Baylor College of Medicine

5:50pm – 5:55pm
**P 60. CHONDROID LIPOMA OF THE ABDOMINAL WALL: A CASE REPORT**
*Presenter:* Calliandra Hintzen MD | St. Joseph’s Hospital and Medical Center

5:55pm – 6:00pm
**P 61. DOUBLE JEOPARDY: MASSIVE PE DURING RECOVERY FROM MASSIVE HEMOTHORAX**
*Presenter:* Ashley Griffin MD | University of Mississippi Medical Center

6:00pm – 6:05pm
**P 62. PNEUMONECTOMY IN TRAUMA PATIENTS**
*Presenter:* Richelle Roelandt Homo BS | University of California Irvine Medical Center

6:05pm – 6:10pm
**P 63. CORE TEMPERATURE: MANAGEMENT OF CRANIOCEREBRAL PUNCTURE WOUND WITH A THERMOMETER PROBE**
*Presenter:* Bryan Morse MS MD | Emory University School of Medicine

6:10pm – 6:15pm
**P 64. BLADDER DRAINAGE AFTER REPAIR FOR TRAUMA: WHEN DOES IT END?**
*Presenter:* Christopher Mellon DO | Maricopa Medical Center
6:15pm – 6:20pm
**P 65. LAPAROSCOPIC VENTRAL HERNIA REPAIR AND APPENDECTOMY WITH TWO 5MM PORTS AND A SUTURE PASSER**
*Presenter:* Hugo Bonatti MD | Meritus Health

6:20pm – 6:25pm
**P 66. A SAFER PLACEMENT TECHNIQUE FOR PERCUTANEOUS DILATATIONAL TRACHEOSTOMY**
*Presenter:* Brent Emigh MD | The University of Texas at Austin Dell Medical School

6:25pm – 6:35pm | Salon ABC
**Industry Spotlight – Sponsored by Avanos**

6:35pm – 7:30pm | Salon ABC
**SWSC Welcome & Exhibitor Reception**

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible • APP Paper Competition Eligible
Monday, April 15, 2019

6:30am – 12Noon | Grand Foyer East
Registration Open

6:30am – 12Noon | Salon ABC
Exhibit Hall & ePoster Displays Hours

6:30am – 8:30am | Salon ABC
Continental Breakfast

6:45am – 7:45am | Salon ABC
Community Surgeons Networking Breakfast

6:45am – 7:30am
Yoga on the Beach

6:45am – 8:00am | Salon D
Quick Shot Session 1: Trauma
Moderator(s): Frank Zhao MD | The Queen’s Medical Center/
University of Hawaii
Lauren Steward MD, MPHS, MHSA | University of Colorado School of
Medicine

6:45am – 6:53am
Q5.1. PREHOSPITAL NEEDLE THORACOSTOMY: WHAT ARE THE INDICATIONS AND IS A POST-TRAUMA CENTER ARRIVAL CHEST TUBE REQUIRED?
Presenter: Benjamin Axtman MD | University of Oklahoma Health Sciences Center

6:53am – 7:01am
Q5.2. HELICOPTER TRANSPORT IN PEDIATRIC TRAUMA: A NEW METHODOLOGY USING NEED FOR SURGEON PRESENCE TO EVALUATE THE NECESSITY OF AIR TRANSPORT
Presenter: Paul McGaha MD | University of Oklahoma Health Sciences Center
7:01am – 7:09am
**QS 3. SURVIVING TRAUMATIC ARREST: WHO ARE THE TOP 1%?**
**Presenter:** Faran Bokhari MD | Cook County Health System

7:09am – 7:17am
**QS 4. COMPARISON OF NON-OPERATIVE AND OPERATIVE MANAGEMENT OF TRAUMATIC PENETRATING INTERNAL JUGULAR VEIN INJURY**
**Presenter:** Shelley Maithel MD | University of California Irvine Medical Center

7:17am – 7:25am
**QS 5. MANAGEMENT AND OUTCOMES OF TRAUMATIC AORTIC TRANSECTION AT A LEVEL 1 TRAUMA CENTER IN A RURAL STATE**
**Presenter:** Sigrid Johannesen MD | University of Oklahoma Health Sciences Center

7:25am – 7:33am
**QS 6. TRAUMATIC RENAL INJURIES: ANGIOGRAPHY & ANGIOINTERVENTIONS AT A LEVEL I VERIFIED ADULT & PEDIATRIC TRAUMA CENTER**
**Presenter:** Elizabeth Scherer MD, MPH | University of Texas Health Science Center at San Antonio

7:33am – 7:41am
**QS 7. TEAM ACTIVATION FOR SAME LEVEL FALLS—IS IT GETTING OLD?**
**Presenter:** Cressilee Bryant MD | University of Oklahoma Health Sciences Center
7:41am – 7:49am
**QS 8. SO YOU NEED A SURGEON? NEED FOR SURGEON PRESENCE AS AN ALTERNATIVE METRIC TO PREDICT MORTALITY AND ASSESS TRIAGE IN THE PEDIATRIC TRAUMA POPULATION**
**Presenter:** Paul McGaha MD | University of Oklahoma Health Sciences Center

7:49am – 7:57am
**QS 9. FATAL AGRICULTURAL ACCIDENTS IN KANSAS: A THIRTY-NINE YEAR FOLLOW-UP STUDY**
**Presenter:** Weston Keller MD | University of Kansas School of Medicine – Wichita

6:45am – 8:00am | Salon E
**Quick Shot Session 2: General Surgery**
**Moderator(s):** Eyas Alkhalili MD | Texas Tech University Health Sciences Center El Paso
Paul Bjordahl MD | Sanford USD Medical Center

6:45am – 6:53am
**QS 10. THE METABOLIC TIME LINE OF PANCREATIC CANCER: OPPORTUNITIES TO IMPROVE EARLY DETECTION OF DUCTAL ADENOCARCINOMA**
**Presenter:** Hunter Moore MD, PhD | University of Colorado School of Medicine School of Medicine

6:53am – 7:01am
**QS 11. OPTIMAL PERFUSION CHEMOTHERAPY: MITOMYCIN VS OXALIPLATION FOR HYPERThERMIC INTRAPERITONEAL CHEMOTHERAPY REGIMEN IN METASTATIC COLON CANCER**
**Presenter:** Matt Woeste MD | University of Louisville
7:01am – 7:09am

**QS 12. DUCTAL CARCINOMA IN-SITU WITH MICRO-INVASION: THE BAYLOR UNIVERSITY MEDICAL CENTER EXPERIENCE**

**Presenter:** Laura Ashley Ray MD | Baylor University Medical Center at Dallas

7:09am – 7:17am

**QS 13. BREAST CANCER TREATMENT IN THE ELDERLY: IS NONCOMPLIANCE ASSOCIATED WITH INCREASED RATE OF BREAST CANCER-RELATED DEATH?**

**Presenter:** Obi Agborbesong MD | University of Kansas School of Medicine – Wichita

7:17am – 7:25am

**QS 14. IN SEARCH OF THE ROOTS OF THE OPIOID EPIDEMIC: RESIDENT VERSUS ADVANCED PRACTICE PROVIDER PRESCRIBING PATTERNS**

**Presenter:** Lindsay O’Meara CRNP | University of Maryland Medical Center

7:25am – 7:33am

**QS 15. AUTO-DIURESIS PREDICTS RETURN OF BOWEL FUNCTION**

**Presenter:** Matthew Goldblatt MD | Medical College of Wisconsin

7:33am – 7:41am

**QS 16. ANALYSIS OF EMERGENT COLECTOMY OUTCOMES FOLLOWING IMPLEMENTATION OF ENHANCED RECOVERY AFTER SURGERY PATHWAY**

**Presenter:** Bobby D. Robinson MD | Baylor Scott and White Healthcare

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible
• APP Paper Competition Eligible
7:41am – 7:49am
**QS 17. ENHANCED RECOVERY AFTER BARIATRIC SURGERY PROTOCOLS RESULTS IN DECREASES IN LENGTH OF STAY, PAIN SCORES AND DIRECT PATIENT COSTS**
**Presenter:** Dmitry Oleynikov MD | University of Nebraska Medical Center

7:49am – 7:57am
**QS 18. PREDICTIVE PRE-OPERATIVE AND INTRA-OPERATIVE FACTORS OF ANASTOMOTIC LEAK IN GASTRECTOMY PATIENTS: OPTIMIZING ENHANCED RECOVERY AND JEJUNAL TUBE MANAGEMENT**
**Presenter:** Tripp Palmer MD | University of Louisville

6:45am – 8:00am | Salon G
**Quick Shot Session 3: Trauma/Critical Care**
**Moderator(s):** Krista Kaups MD, MSc | UCSF Fresno
James Haan MD | Kansas University School of Medicine Wichita

6:45am – 6:53am
**QS 19. LEUKEMOID REACTION ASSOCIATED WITH INCREASED MORTALITY IN TRAUMA PATIENTS**
**Presenter:** Bima Hasjim, BS, BA | University of California Irvine Medical Center

6:53am – 7:01am
**QS 20. THE DETRIMENTAL EFFECT OF FLUID BALANCE IN HEMORRHAGIC SHOCK: IN WHOM SHOULD WE CONSIDER DIURESIS?**
**Presenter:** Jeffrey Barletta PharmD | HonorHealth John C. Lincoln Medical Center
7:01am – 7:09am
**QS 21. PARADOXICAL DERANGEMENTS IN COAGULATION ASSOCIATED WITH ELEVATED CONCENTRATIONS OF BILE ACID CONSTITUENTS**
**Presenter:** Rashikh Choudhury MD | University of Colorado School of Medicine

7:09am – 7:17am
**QS 22. PRE-INJURY SUBSTANCE ABUSE IS PREDICTIVE OF DELIRIUM AND CLINICAL OUTCOMES IN THE ICU**
**Presenter:** Christopher Pearcy MD | Methodist Dallas Medical Center

7:17am – 7:25am
**QS 23. POSITIVE 48-HOUR FLUID BALANCE IS ASSOCIATED WITH INCREASED POST-TRAUMATIC ACUTE KIDNEY INJURY**
**Presenter:** Gabrielle Hatton MD | University of Texas Health Science Center at Houston

7:25am – 7:33am
**QS 24. POSITIVE FLUID BALANCE: A RISK FACTOR FOR ICU BOUNCEBACKS IN GERIATRIC TRAUMA PATIENTS**
**Presenter:** Benjamin Motz MD | Carolinas Medical Center

7:33am – 7:41am
**QS 25. SURGICALLY INACCESSIBLE PENETRATING CEREBROVASCULAR INJURY: HIGHER GRADE THAN BLUNT BUT SIMILAR MANAGEMENT**
**Presenter:** Joshua Sumislawski MD | University of Colorado School of Medicine

7:41am – 7:49am
**QS 26. SEPSIS RATES AFTER INVASIVE REWARMING FOR ACCIDENTAL HYPOTHERMIA: SIGNIFICANT MORBIDITY AFTER SURVIVAL TO NORMOTHERMIA**
**Presenter:** Vivian Nguyen MD | University of Colorado School of Medicine
SCIENTIFIC PROGRAM | Monday, April 15, 2019

7:49am – 7:57am
**QS 27. MASSIVE TRANSFUSION PROTOCOL OUTCOMES IN TRAUMA AND NON-TRAUMA PATIENTS: SUCCESSES AND OPPORTUNITIES**  
**Presenter:** Fady Nasrallah MD | Scripps Memorial Hospital La Jolla

8:10am – 8:55am | Salon D
**Thomas G. Orr Memorial Lectureship | Debate**  
**Moderator:** Courtney Scaife MD | University of Utah/Huntsman Cancer Institute

- **There is No Longer a Clinical Utility to Axillary Dissection in the Treatment of Breast Cancer**
  - **PRO** | Cindy B. Matsen MD | University of Utah/Huntsman Cancer Institute  
  - **CON** | Colleen D. Murphy MD | University of Colorado School of Medicine

8:55am – 10:20am | Salon D
**American College of Surgeons | Advocacy**  
**Moderator:** Courtney Scaife MD | University of Utah/Huntsman Cancer Institute

- **Opioids**  
  - John Daly MD, FACS, FRCSI (Hon), FRCSG (Hon) | Temple University/ Fox Chase Cancer Center

- **Firearm Injury Prevention**  
  - Ronald Stewart MD, FACS | University of Texas Health Science Center at San Antonio

- **Burnout, Resiliency, and the Future of CCO**  
  - Patricia L. Turner MD, FACS | American College of Surgeons

10:20am – 10:35am | Salon ABC
**Morning Beverage Break**
10:35am – 12Noon | Salon D

**American College of Surgeons | Community Surgeon Engagement**

**Moderator:** Courtney Scaife MD | University of Utah/Huntsman Cancer Institute

- **MOC/CME, CCC/Changes in SESAP and Review Courses**
  Karen Brasel MD, MPH, FACS | Oregon Health & Science University

- **Community Surgeon Issues and Engagement**
  Tyler Hughes MD FACS | University of Kansas School of Medicine – Salina

- **The Employed Surgeon: Resources for the Practicing Surgeon**
  Christian Shalgian MD, FACS | American College of Surgeons

8:55am – 12Noon | Salon E

**Advanced Practice Provider Symposium**

**Moderator(s):** Annika Kay PA-C | Intermountain Medical Center
Lindsay O’Meara CRNP | University of Maryland

- **8:55am – 9:10am**
  **Massive Transfusion: Patients Bleed Whole Blood**
  Brittany Glassett PA-C | Intermountain Medical Center

- **9:10am – 9:25am**
  **Frailty Screening: How should we incorporate this into our practice?**
  Kimberly Bruce CRNP | HonorHealth System

- **9:25am – 9:40am**
  **Palliative Care: Are we underutilizing our palliative care colleagues?**
  Barbara Eaton CRNP | University of Maryland Medical Center

- **9:40am – 9:55am**
  **The Use of Bedside Ultrasound in the ICU**
  Sean Yoder CRNP | Methodist Medical Center

- **9:55am – 10:10am**
  **Acute Pain Management and the Use of ERAS in the Acute Care Patient**
  Olivia Tucker PA-C | Scripps Memorial Hospital
10:20am – 10:35am | Salon ABC
**Morning Beverage Break**

10:35am – 12Noon
**Advanced Practice Provider Symposium | Research Collaboration**

1:00pm | Tustin Golf Course
**Golf Tournament**

1:00pm – 2:00pm
**Surf Lesson**

1:00pm – 3:00pm
**Kickball Tournament**
Tuesday, April 16, 2019

6:30am – 5:00pm | Grand Foyer East
Registration Open

6:30am – 2:45pm | Salon ABC
Exhibit Hall & ePoster Displays Hours

6:45am – 8:30am | Salon ABC
Continental Breakfast

7:00am – 7:45am
SWSC Inaugural Lowry Fund Run

7:00am – 8:15am | Salon D
Quick Shot Session 4: Trauma 2
Moderator(s): Alex Colonna MD MSCI | University of Utah
Lindsay O’Meara CRNP | University of Maryland Medical Center

7:00am – 7:08am
QS 28. IMPACT OF A DEDICATED TRAUMA HYBRID OPERATING ROOM ON SPLENIC INJURY MANAGEMENT AND SALVAGE RATES
Presenter: Mallory Wampler MD | University of Texas Health Science Center at San Antonio

7:08am – 7:16am
QS 29. GROUND LEVEL FALLS: INJURY SEVERITY WORSE THAN EXPECTED?
Presenter: Ann Holloway DO | HonorHealth John C. Lincoln Medical Center

7:16am – 7:24am
QS 30. THE UTILITY OF GLASGOW COMA SCALE IN PREDICTING MORTALITY IN OPERATIVE GERIATRIC TRAUMATIC BRAIN INJURY
Presenter: Gail Tominaga MD | Scripps Memorial Hospital La Jolla
7:24am – 7:32am  
**QS 31. MEAN ARTERIAL PRESSURE (MAP) THERAPY IS NOT ASSOCIATED WITH IMPROVED OUTCOMES FOLLOWING SPINAL CORD INJURY**  
**Presenter:** Lisa Maginot BS | Harbor-UCLA Medical Center

7:32am – 7:40am  
**QS 32. BILIARY COMPLICATIONS FOLLOWING HIGH GRADE LIVER INJURIES**  
**Presenter:** Andrew Kamrouz MD, MPH | Harbor-UCLA Medical Center

7:40am – 7:48am  
**QS 33. SOLID ORGAN INJURY AFTER PEDIATRIC TRAUMA. WHERE DO WE STAND?**  
**Presenter:** Muhammad Khan MD | Westchester Medical Center

7:48am – 7:56am  
**QS 34. OPEN VERSUS LAPAROSCOPIC DIAPHRAGM REPAIR FOR ISOLATED PENETRATING DIAPHRAGM INJURY IN TRAUMA**  
**Presenter:** Areg Grigorian MD | University of California Irvine Medical Center

7:56am – 8:04am  
**QS 35. TRENDS IN HEMATOLOGIC MARKERS AFTER BLUNT SPLENIC TRAUMA: RISK FACTOR OR EPIPHENOMENON?**  
**Presenter:** Eliza Moskowitz MD | University of Colorado School of Medicine School of Medicine

8:04am – 8:12am  
**QS 36. EFFECT OF ADDITIONAL BOOSTER POST-SPLENECTOMY VACCINATION PROGRAM ON VACCINATION COMPLIANCE IN TRAUMA PATIENTS**  
**Presenter:** Robert Gonzalez BS | University of Oklahoma Health Sciences Center
Quick Shot Session 5: Case Presentations

**Moderator(s):** Randolph Szlabick MD | University of North Dakota School of Medicine
Mark Cohen MD | University of Michigan

**7:00am – 7:08am**

*QS 37. DEPLOYMENT OF OPERATING ROOM TEAM (ORT) AND RESOURCE MOBILIZATION FOR COMPLEX PROCEDURES IN THE SURGICAL INTENSIVE CARE UNIT (SICU)*

**Presenter:** Ronald Sing DO | Carolinas Medical Center

**7:08am – 7:16am**

*QS 38. INDOCYANINE GREEN (ICG) USE FOR REVISIONAL BARIATRIC SURGERY*

**Presenter:** Dmitry Oleynikov MD | University of Nebraska Medical Center

**7:16am – 7:24am**

*QS 39. TRAUMATIC ABDOMINAL WALL HERNIAS: A CASE SERIES*

**Presenter:** Beatrice Caballero MS | Texas Tech University Health Sciences

**7:24am – 7:32am**

*QS 40. INTERCOSTAL NERVE CRYOABLATION FOR CONTROL OF TRAUMATIC RIB FRACTURE PAIN: A CASE REPORT*

**Presenter:** Kyrillos Awad DO | University of Hawaii

**7:32am – 7:40am**

*QS 41. LIVER TRANSPLANTATION AS A TREATMENT FOR GRADE V LIVER LACERATION*

**Presenter:** Katherine Ann Arnim PA-C | University of Colorado School of Medicine School of Medicine
7:40am – 7:48am
**QS 42. GIANT INGUINOSCROTAL HERNIA REPAIR AND ABDOMINAL WALL RECONSTRUCTION WITH INTERLAY VICRYL MESH TO PROTECT FULLY EXPOSED HOLLOW VISCERA**
**Presenter:** Erin Howell MD | Harbor-UCLA Medical Center

7:48am – 7:56am
**QS 43. CHRONIC PELVIC PAIN SECONDARY TO AN INTRAPERITONEAL FOREIGN BODY: A CASE REPORT**
**Presenter:** Bhavani Pokala MD | University of Nebraska Medical Center

7:56am – 8:04am
**QS 44. WHEN PLUG AND PATCH HERNIA REPAIR FAILS: A MULTIDISCIPLINARY APPROACH FOR THE MANAGEMENT OF BLADDER EROSION**
**Presenter:** Kristen Jogerst MD MPH | Mayo Clinic Arizona

8:04am – 8:12am
**QS 45. A CASE OF STRANGULATED AYMAND HERNIA MANAGED BY TOTAL EXTRAPERITONEAL REPAIR FOLLOWED BY LAPAROSCOPIC APPENDECTOMY**
**Presenter:** Shuyang Liu MS3 | Hilo Medical Center

7:00am – 8:15am | Salon G
**Quick Shot Session 6: General Surgery 2**
**Moderator(s):** Peter Kennealey MD | University of Colorado School of Medicine
Ioannis Konstantinidis MD | Texas Tech University Health Sciences Center

7:00am – 7:08am
**QS 46. OPTIMAL ANTIBIOTIC INTENT TO TREAT FOR COMPLICATED APPENDICITIS**
**Presenter:** Maclean Panshin BS | University of Colorado School of Medicine Health North
7:08am – 7:16am
**QS 47. RATES OF HYPERCALCERMIA AND HYPERPARATHYROIDISM AMONG PATIENTS WITH PORCELAIN GALLBLADDER**  
**Presenter:** Megan Berger MD | Mayo Clinic Rochester

7:16am – 7:24am
**QS 48. CHOLECYSTECTOMY WITH VERSUS WITHOUT INTRAOPERATIVE CHOLANGIOGRAM FOR GALLSTONE PANCREATITIS: ANALYSIS OF INTEGRATED HEALTH SYSTEM DATABASE**  
**Presenter:** Christina Lien DO | Kaiser Permanente Fontana Medical Center

7:24am – 7:32am
**QS 49. OLDER PATIENT AGE AND LONGER DURATION OF SYMPTOMS SIGNIFICANTLY INCREASES PERFORATION RISK IN APPENDICITIS; TIME TO OPERATION AND ANTIBIOTICS DO NOT**  
**Presenter:** Keith Hanson BA | Texas Tech University Health Sciences

7:32am – 7:40am
**QS 50. CORRELATION BETWEEN SUBJECTIVE AND OBJECTIVE MEASURES OF GASTROESOPHAGEAL REFLUX DISEASE**  
**Presenter:** Brittany Kothari CNA | Gundersen Health System

7:40am – 7:48am
**QS 51. PEDIATRIC WEIGHT LOSS SURGERY PATIENTS VARY BY PROCEDURE: PREOPERATIVE CHARACTERISTICS OF 402 ADOLESCENTS WITH MORBID OBESITY**  
**Presenter:** Danielle Tamburrini DO | Inspira Health Network
7:48am – 7:56am
QS 52. DIFFERENCES BETWEEN MALE AND FEMALE SEX IN OUTCOMES OF APPENDECTOMY
Presenter: Hayoung Park MD | Harbor-UCLA Medical Center

7:56am – 8:04am
QS 53. OUTCOME OF ROBOTIC COLORECTAL PROCEDURES: DOES MORNING START TIME MAKE A DIFFERENCE?
Presenter: Ruoyan Zhu BS | Cedars Sinai Medical Center

8:04am – 8:12am
QS 54. RETROSPECTIVE COMPARISON OF OPEN VERSUS LAPAROSCOPIC JEJUNOSTOMY TUBE PLACEMENT WITH UTILIZATION OF T-FASTENERS
Presenter: Jesse Conner MD | University of Oklahoma Health Sciences Center

8:15am – 9:30am | Salon D
Scientific Session 3: General Surgery
Moderator(s): Mark Savarise MD MBA | University of Utah
Brandon Grover DO | Gundersen Health System

8:15am – 8:30am
* 12. FOLLOW-UP TRENDS AFTER EMERGENCY DEPARTMENT DISCHARGE FOR ACUTELY SYMPTOMATIC HERNIAS: A SOUTHWESTERN SURGICAL CONGRESS MULTI-CENTER TRIAL
Presenter: Jillian Angelo MD | Harbor-UCLA Medical Center
Invited Discussant: Rebecca Vogel MD | Saint Anthony Hospital

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible        • APP Paper Competition Eligible
8:30am – 8:45am
* 13. IS LONG TERM NON-OPERATIVE MANAGEMENT WARRANTED IN VENTRAL HERNIA PATIENTS WITH COMORBIDITIES? A CASE-MATCHED, PROSPECTIVE 3 YEAR FOLLOW-UP, PATIENT-CENTERED STUDY
Presenter: Karla Bernardi MD | University of Texas Health Science Center at Houston
Invited Discussant: Brock Bordelon MD | Penrose Hospital

8:45am – 9:00am
14. OUTCOMES OF ROBOTIC VERSUS NON-ROBOTIC MINIMALLY-INVASIVE ESOPHAGECTOMY: AN AMERICAN COLLEGE OF SURGEONS NSQIP DATABASE ANALYSIS
Presenter: Gregory Harbison MS | University of Hawaii
Invited Discussant: Juliane Bingener MD | Mayo Clinic

9:00am – 9:15am
* 15. THE USE OF COMPONENT SEPARATION (CS) DURING ABDOMINAL WALL RECONSTRUCTION (AWR) IN CONTAMINATED FIELDS: A CASE-CONTROL ANALYSIS
Presenter: Sean Maloney MD | Carolinas Medical Center
Invited Discussant: Mark Cohen MD | University of Michigan

9:15am – 9:30am
* 16. UNEXPECTED COMPLICATED APPENDICITIS IN THE ELDERLY DIAGNOSED WITH ACUTE APPENDICITIS: AVOID NON-OPERATIVE MANAGEMENT
Presenter: Navpreet Dhillon MD | Cedars Sinai Medical Center
Invited Discussant: James Haan MD | Kansas University School of Medicine Wichita

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible • APP Paper Competition Eligible
9:30am – 10:00am | Salon ABC
Morning Beverage Break

10:00am – 11:15am | Salon D
Scientific Session 4: General Surgery 2
Moderator(s): Walt Biffl MD | Scripps Memorial Hospital La Jolla
Wayne Anderson MD | CHI St. Alexius Williston

10:00am – 10:15am
* 17. PROTOCOL DIRECTED MANAGEMENT OF SUSPECTED COMMON DUCT STONES, A SOUTHWESTERN SURGICAL CONGRESS (SWSC) MULTI-CENTER TRIAL (MTC)
Presenter: Chad Hall MD | Baylor Scott and White Healthcare
Invited Discussant: Rebecca Britt MD | Eastern Virginia Medical School

10:15am – 10:30am
18. LAPAROSCOPIC OMENTAL PATCH REDUCES LENGTH OF STAY AND COMPLICATIONS IN PERFORATED PEPTIC ULCER DISEASE: A SWSC MULTICENTER STUDY
Presenter: Adel Alhaj Saleh MD | Texas Tech University Health Sciences
Invited Discussant: Brandon Grover DO | Gundersen Health System

10:30am – 10:45am
* 19. EVALUATION OF A WATER-SOLUBLE CONTRAST PROTOCOL IN SMALL BOWEL OBSTRUCTION: A SOUTHWESTERN SURGICAL MULTICENTER TRIAL
Presenter: Eliza Moskowitz MD | University of Colorado School of Medicine School of Medicine
Invited Discussant: Jeff Holloway MD | Regional West Medical Center

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible
• APP Paper Competition Eligible
10:45am – 11:00am
* 20. ROBOT-ASSISTED CHOLECYSTECTOMY IS A SAFE BUT COSTLY APPROACH: A NATIONAL DATABASE REVIEW
Presenter: Bhavani Pokala MD | University of Nebraska Medical Center
Invited Discussant: Brock Bordelon MD | Penrose Hospital

11:00am – 11:15am
* 21. IDEAL TIMING OF EARLY CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS: AN ACS-NSQIP REVIEW
Presenter: Elizabeth Alore MD, MPH | Baylor College of Medicine
Invited Discussant: Randolph Szlabick MD | University of North Dakota School of Medicine

11:15am – 12Noon | Salon D
Expert Panel Case Presentations
Moderator: S. Rob Todd MD | Baylor College of Medicine
Panelists: Daniel Margulies MD | Cedars-Sinai Medical Center
Kenric Murayama MD | University of Hawaii John A. Burns School of Medicine
John Potts MD | ACGME

12Noon – 2:00pm | Salons E & F
Mock Oral Boards

12:15pm – 1:30pm | Salon G
Luncheon: The Intersection of Financial Planning, Wellness, Math, and Psychology
Daniel Dent MD | UT Health San Antonio

1:00pm – 4:00pm
Bicycle Scavenger Hunt
1:30pm – 2:30pm | Salon D

Scientific Session 5: Trauma 2
Moderator(s): Sharmila Dissanaike MD | Texas Tech University Health Sciences Center
Randeep Jawa MD | Stony Brook University School of Medicine

1:30pm – 1:45pm
* 22. ADDRESSING THE OPIOID CRISIS AT AN URBAN LEVEL 1 TRAUMA CENTER: IMPLEMENTATION OF A MULTI-MODAL PAIN REGIMEN TO DECREASE OPIOID USE
Presenter: Shuyan Wei MD | University of Texas Health Science Center at Houston
Invited Discussant: Alexander Colonna MD, MSCI | University of Utah

1:45pm – 2:00pm
* + 23. FILLED TO THE BRIM: THE CHARACTERISTICS OF OVER-TRIAGE TO A LEVEL 1 TRAUMA CENTER
Presenter: Maria Baimas-George MD, MPH | Carolinas Medical Center
Invited Discussant: Lindsay O’Meara CRNP | University of Maryland Medical Center

2:00pm – 2:15pm
* 24. THE EXTREMITY/MECHANISM/SHOCK INDEX/GCS (EMS-G) SCORE: A NOVEL PRE-HOSPITAL SCORING SYSTEM FOR EARLY AND APPROPRIATE MTP ACTIVATION
Presenter: Alexandra Kovar MD | University of Colorado School of Medicine
Invited Discussant: Ronald Sing DO | Atrium Health

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible
• APP Paper Competition Eligible
2:15pm – 2:30pm

25. IMPROVING LENGTH OF STAY ON A TRAUMA SERVICE

Presenter: Peter Schultz NP | Scripps Memorial Hospital La Jolla
Invited Discussant: Jeffry Nahmias MD, MHPE | University of California, Irvine

2:30pm – 2:45pm | Salon ABC
Afternoon Beverage Break

2:45pm – 3:45pm | Salon D

Scientific Session 6: General Surgery 3
Moderator(s): Saju Joseph MD | Valley Health System
Richard Gray MD | Mayo Clinic

2:45pm – 3:00pm

26. PHYSIOLOGIC STRESS AMONG SURGEONS WHO TAKE IN-HOUSE CALL

Presenter: Jamie Coleman MD | Denver Health Medical Center
Invited Discussant: Thomas White MD | Intermountain Medical Center

3:00pm – 3:15pm

* 27. FACTORS ASSOCIATED WITH GENERAL SURGERY RESIDENTS’ DECISIONS REGARDING FELLOWSHIP AND SUBSPECIALTY STRATIFIED BY BURNOUT AND QUALITY OF LIFE

Presenter: Natalie McClintock MD | Harbor-UCLA Medical Center
Invited Discussant: Marilee McBoyle MD | University of Kansas - Wichita

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible • APP Paper Competition Eligible
3:15pm – 3:30pm
* 28. MARIJUANA USE AND OUTCOMES IN ADULT AND PEDIATRIC TRAUMA PATIENTS AFTER LEGALIZATION
Presenter: Areg Grigorian MD | University of California Irvine Medical Center
Invited Discussant: Erik Peltz MD | University of Colorado School of Medicine

3:30pm – 3:45pm
* 29. TRENDS IN RESIDENT OPERATIVE TRAUMA: HOW TO TRAIN FUTURE TRAUMA SURGEONS?
Presenter: Tashinga Musonza MD | ACGME
Invited Discussant: Paul Nelson MD | Sunrise Health

3:45pm – 4:30pm | Salon D
Edgar J. Poth Memorial Lectureship | Debate
Moderator: Courtney Scaife MD | University of Utah/Huntsman Cancer Institute

   The Robotic Platform Should be Used More Liberally in Place of Laparoscopic Cholecystectomy and Hernia Repair
   PRO | Alexander Raines MD | Oklahoma University Health Sciences Center
   CON | Sean J. Langenfeld MD | University of Nebraska Medical Center

4:30pm – 5:00pm | Salon D
SWSC Annual Business Meeting

5:15pm – 6:00pm | Red Chair Lounge
SWSC Advanced Practice Provider Reception

5:15pm – 6:00pm | Pub Happy Hour
SWSC Program & Publications Committees Reception (by invitation)

6:00pm – 9:00pm | Lighthouse Courtyard
SWSC Reception

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible • APP Paper Competition Eligible
Wednesday, April 17, 2019

6:45am – 11:30am | Grand Foyer East
Registration Open

6:45am – 8:30am | Grand Foyer East
Continental Breakfast

7:00am – 8:00am | Salon D
Quick Shot Session 7: Hernia
Moderator(s): Kenric Murayama MD | University of Hawaii at Manoa-John A Burns School of Medicine
Rifat Latifi MD | Westchester Medical Center Health Network

7:00am – 7:08am
QS 55. COMPARISON OF EARLY VERSUS DELAYED COMPLEX DEFINITIVE ABDOMINAL RECONSTRUCTION WITH BIOLOGIC MESH POST DAMAGE CONTROL SURGERY
Presenter: Shekhar Gogna MD, MS | Westchester Medical Center

7:08am – 7:16am
QS 56. PREDICTORS OF 30-DAY READMISSION FOLLOWING COMPLEX ABDOMINAL WALL RECONSTRUCTION
Presenter: Andrew Shover MD | Harbor-UCLA Medical Center

7:16am – 7:24am
QS 57. FASCIAL DEHISCENCE FOLLOWING TRAUMA LAPAROTOMY: INTERRUPTED SUTURE CLOSURE MAY REDUCE THE RISK
Presenter: Jordan Weinberg MD | St. Joseph’s Hospital and Medical Center
7:24am – 7:32am
QS 58. THE IMPACT OF ANXIETY ON OUTCOMES AFTER VENTRAL HERNIA REPAIR (VHR)
Presenter: Kathryn Schlosser MD | Carolinas Medical Center

7:32am – 7:40am
QS 59. TRENDS OF INGUINAL AND FEMORAL HERNIA REPAIR IN THE UNITED STATES: AN ANALYSIS OF THE NATIONAL INPATIENT SAMPLE
Presenter: Geoffrey Chow MD | University of Oklahoma College of Medicine – Tulsa

7:40am – 7:48am
QS 60. OPEN ABDOMEN FOLLOWING EMERGENT LAPAROTOMY IS ASSOCIATED WITH HERNIA FORMATION
Presenter: Sean Maloney MD | Carolinas Medical Center

7:48am – 7:56am
QS 61. IMPACT OF SELF-AWARENESS OF HERNIAS ON ABDOMINAL WALL QUALITY OF LIFE
Presenter: Oscar Olavarria MD | University of Texas Health Science Center at Houston

7:00am – 8:00am | Salon E
Quick Shot Session 8: General Surgery 3
Moderator(s): Kelly Hewitt MD | Samaritan Pacific Communities Hospital
Jeffry Nahmias MD, MHPE | University of California, Irvine

7:00am – 7:08am
QS 62. STEPS FOR SURGEONS TO INTEGRATE PALLIATIVE CARE PRINCIPLES IN THE SURGICAL INTENSIVE CARE UNIT
Presenter: Helen Madsen MD | Denver Health Medical Center
7:08am – 7:16am
**QS 63. INFECTION IS THE PRIMARY DRIVER OF MAJOR LOWER EXTREMITY AMPUTATION IN AN INDIGENT POPULATION: IMPLICATIONS FOR POPULATION-BASED MANAGEMENT**
**Presenter:** Ahmed Khouqeer MD | Baylor College of Medicine

7:16am – 7:24am
**QS 64. PREDICTING NEED FOR EARLY TRACHEOSTOMY IN INTENSIVE CARE TRAUMA PATIENTS WITHOUT SEVERE HEAD INJURY, ANALYSIS FROM TRAUMA QUALITY IMPROVEMENT PROGRAM**
**Presenter:** Asad Azim MD | Westchester Medical Center

7:24am – 7:32am
**QS 65. PREDICTORS OF UNPLANNED REOPERATION FOLLOWING SURGICAL MANAGEMENT FOR SMALL BOWEL OBSTRUCTION**
**Presenter:** Sharmila Dissanaike MD | Texas Tech University Health Sciences

7:32am – 7:40am
**QS 66. REGIONAL ABDOMINAL WALL NERVE BLOCK VERSUS EPIDURAL ANESTHESIA FOR LIVER RESECTION: ANALYSIS OF THE AMERICAN COLLEGE OF SURGEONS NATIONAL SURGICAL QUALITY IMPROVEMENT PROGRAM DATABASE**
**Presenter:** Charles Trujillo MD | Arrowhead Regional Medical Center

7:40am – 7:48am
**QS 67. TELEPHONE FOLLOW UP TO DETERMINE OPTIMUM NUMBER OF PRESCRIBED OPIOID DOSES AFTER PEDIATRIC OUTPATIENT SURGERY**
**Presenter:** Bavana Ketha MD | Arkansas Children’s Hospital
7:48am – 7:56am
QS 68. DEDICATED TRAUMA CASE MANAGERS, THE MOST IMPORTANT TRAUMA TEAM MEMBER? THEIR IMPACT ON HOSPITAL LENGTH OF STAY (LOS), TRAUMA TEAM DYNAMICS, AND PROVIDER SATISFACTION
Presenter: Kelly Vide PA-C | The Queen’s Medical Center

7:00am – 8:00am | Salon G
Quick Shot Session 9: General Surgery 4
Moderator(s): Mark Mawhinney MD | Intermountain Alta View Clinic Sarah Judkins MD | Montrose Surgical Associates

7:00am – 7:08am
QS 69. GENERAL SURGEON SHORTAGE IN RURAL AND FRONTIER COUNTIES
Presenter: Brandon Stringer MD | University of Kansas School of Medicine – Wichita

7:08am – 7:16am
QS 70. OPEN VERSUS THORACOSCOPIC THYMECTOMY FOR PEDIATRIC MYASTHENIA GRAVIS: CLINICAL OUTCOMES
Presenter: Sarkis Derderian MD | University of Colorado School of Medicine School of Medicine

7:16am – 7:24am
QS 71. MEDICAL STUDENT PREPARATION FOR THE OR IN 2018: WHERE ARE WE?
Presenter: Kerry Swanson BS | University of Oklahoma College of Medicine – Tulsa

7:24am – 7:32am
QS 72. ERGONOMICS: THE SILENT KILLER OF SURGEONS
Presenter: Milos Buhavac MD | University of Utah School of Medicine
7:32am – 7:40am
**QS 73. IMPROVEMENTS IN ABSITE PERFORMANCE AND ACGME RESIDENT EVALUATIONS AFTER INSTITUTION OF A PROTECTED, RESIDENT-DRIVEN EDUCATIONAL CURRICULUM**
**Presenter:** Ryan Griffith MD | St. Joseph’s Hospital and Medical Center

7:40am – 7:48am
**QS 74. ALL THE KINGS HORSES AND ALL THE KINGS MEN**
**Presenter:** Max Hansen DO | University of North Dakota

7:48am – 7:56am
**QS 75. A TALE OF TWO CAMPUSES? AN ANALYSIS OF TWO AFFILIATED MEDICAL SCHOOL CAMPUSES WITH DIFFERENT MATCH RATES IN GENERAL SURGERY**
**Presenter:** R. Joesph Sliter MD | University of Kansas School of Medicine – Wichita

8:00am – 9:15am | Salon D
**Scientific Session 7: Trauma 3**
**Moderator(s):** Dennis Kim MD | Harbor-UCLA Medical Center
Susan McLean MD | Texas Tech University Health Sciences Center El Paso

8:00am – 8:15am
**30. BLUNT VS. PENETRATING TRAUMA: IS THERE A RESOURCE INTENSITY DISCREPANCY?**
**Presenter:** Jamie Fitch MD | Baylor College of Medicine
**Invited Discussant:** Elizabeth Scherer MD, MPH | University of Texas Health San Antonio
8:15am – 8:30am
31. WHO'S BEING LEFT BEHIND? UNINSURED EMERGENCY GENERAL SURGERY ADMISSIONS AFTER THE ACA
Presenter: Paul Albini MD | University of California San Diego
Invited Discussant: Wayne Anderson MD | CHI St. Alexius Williston

8:30am – 8:45am
32. UTILIZATION OF ENDOVASCULAR AND OPEN SURGICAL REPAIR OF VASCULAR INJURY: A 10-YEAR ANALYSIS OF THE NATIONAL TRAUMA DATABANK (NTDB)
Presenter: Anna Romagnoli MD | University of California Riverside School of Medicine
Invited Discussant: Gail Tominaga MD | Scripps Memorial Hospital

8:45am – 9:00am
33. NARROWED PULSE PRESSURE PREDICTS THE NEED FOR MASSIVE TRANSFUSION AND EMERGENT OPERATIVE INTERVENTION FOLLOWING PENETRATING TRAUMA
Presenter: Jonathan Warren BS | Harbor-UCLA Medical Center
Invited Discussant: Richard Frazee MD | Baylor Scott & White Temple

9:00am – 9:15am
34. RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA (REBOA) IS ASSOCIATED WITH IMPROVED SURVIVAL IN SEVERELY INJURIED PATIENTS: A PROPENSITY SCORE MATCHING ANALYSIS
Presenter: Ryo Yamamoto MD | University of Texas Health Science Center at San Antonio
Invited Discussant: Krista Kaups MD, MSc | UCSF Fresno
9:15am – 10:00am | Salon D
Claude H. Organ, Jr. Memorial Lectureship | Debate
Moderator: Courtney Scaife MD | University of Utah/Huntsman Cancer Institute

REBOA Should be Included in the Resuscitation of the Critically Injured Patient
PRO | James M. Haan MD | St. Francis Via Christi
CON | Dennis Y. Kim MD | LA County Harbor-UCLA Medical Center

10:00am – 11:30am | Salon D
Top 3 Papers: Trauma, Breast, Colorectal and General Surgery
Moderator: Courtney Scaife MD | University of Utah/Huntsman Cancer Institute

Top 3 Breast Papers
Barbara Pockaj MD | Mayo Clinic

Top 3 General Surgery Papers
Mark Mawhinney MD | Intermountain Alta View Clinic

Top 3 Trauma Papers
Alexander Colonna MD | University of Utah/Huntsman Cancer Institute

Top 3 Colorectal Papers
Sean J. Langenfeld MD | University of Nebraska Medical Center

11:30am – 12Noon | Salon D
Awards Presentation & Closing Session
SCIENTIFIC PAPER ABSTRACTS

* Denotes Jack Barney Competition Eligible
+ Denotes Lowry Paper Competition Eligible
• APP Paper Competition Eligible
*1. RECTAL CANCER LOCOREGIONAL STAGING: ENDORECTAL ULTRASOUND COMPARED TO HIGH RESOLUTION PELVIC MAGNETIC RESONANCE IMAGING

_A Adekeye, TWaage, RP Sticca_

**Presenter:** Adeseye Adekeye MD, PhD | University of North Dakota

**Background:** Appropriate pre-operative staging of disease state in rectal cancer is paramount for treatment decisions and improved survival. Endorectal Ultrasound (ERUS) and high-resolution pelvic MRI are the current imaging modalities recommended by national guidelines to assess tumor depth, nodal involvement and extension to mesorectal fascia and other pelvis viscera. In this study, we compare the concordance of ERUS and pelvic MRI in the locoregional staging of rectal cancer in a tertiary care hospital.

**Method:** We prospectively compared and assessed the diagnostic accuracy and concordance of pelvic MRI and ERUS in the locoregional staging of rectal cancer. During a 12-month period, the depth of primary tumor invasion (T-stage), and regional lymph node involvement (N-stage) were characterized in 35 consecutive rectal cancer patients. Each patient with biopsy-proven rectal adenocarcinoma without evidence of distant metastasis underwent both high-resolution pelvic MRI and ERUS studies, performed by 4 MRI specialized radiologists and 2 ERUS trained gastroenterologists. Fischer’s exact test was utilized to assess nominal variable significance of each imaging modality.

**Results:** For depth of primary tumor invasion alone (T-stage), imaging studies were discordant in 40% of patients, which was statistically significant p<0.05. For comparison of locoregional nodal involvement (N-stage), a 22.8% discordance between imaging modalities approached but was not statistically significant p=0.09. MRI evaluation identified more extensive nodal involvement in 14% of cases with node negative disease by ERUS. Overall discordance between both imaging modalities for T or N-staging was 57% (20 of 35 patients). 16 of 20 discordant cases resulted in upstaging of the primary tumor, with high statistical significance p=0.0001.

**Conclusion:** There was significant discordance between ERUS and high resolution pelvic MRI in staging of rectal cancer. MRI demonstrated more nodal involvement while both modalities showed equivalent upstaging for depth of tumor invasion.
2. ROLE OF RIGHT HEMICOLECTOMY IN PATIENTS WITH LOW GRADE APPENDEICEAL MUCINOUS ADENOCARCINOMA

YY Nasseri, C Sutanto, R Zhu, C Wai, JS Cohen, A Artinyan

Presenter: Christine Sutanto BS | Cedars Sinai Medical Center

Background: Low grade appendiceal mucinous adenocarcinomas (LAMA) are rare neoplasms with uncertain biologic behavior and little consensus about the most appropriate surgical management. These neoplasms characteristically spread to the peritoneum and have a low nodal metastatic rate. Nevertheless, right hemicolectomy is usually recommended.

Method: The SEER database was queried for all patients with non-metastatic low grade (well-differentiated) invasive appendiceal mucinous adenocarcinomas from 1988-2014. A descriptive analysis was performed. Surgical patients were categorized into 3 groups based on type of surgery: 1) appendectomy, 2) formal right hemicolectomy 3) non-formal colectomy (including ileocecectomy). Demographic, clinical and pathologic factors were compared between groups using univariate analysis. Disease specific and overall survival were compared between groups using the Kaplan-Meier method. Multivariate Cox-regression analysis was performed to determine the independent association of surgery type with survival.

Results: 1218 patients with LAMA were identified, 639 (52%) of which had metastatic disease, leaving a final dataset of 579 patients. The mean age of the population was 60.4 +/- 14.7 years. 302 (52.2%) patients were female. 133 (23%), 404 (70%), and 42 (7%) of patients had stage I, II, and III disease, respectively. 99 (17.1%) had appendectomy, 87 (15%) had non-formal colectomy, and 302 (52.2%) had formal right hemicolecotomy. There were no significant differences in age, sex, and T-stage by surgery type (p>0.05). On Kaplan-Meier analysis, we observed no significant differences in disease specific or overall survival by surgery type. On multivariate analysis controlling for age and stage, surgery type was not a significant predictor of disease specific or overall survival.

Conclusion: Low grade mucinous adenocarcinomas are rare tumors that often present with metastatic disease. In patients with localized disease, right hemicolecotomy did not increase disease specific or overall survival. The role of right hemicolecotomy for patients with localized LAMA should be re-explored.
3. CYTOREDUCTION WITH ISOLATED LIMB CHEMOTHERAPY IMPROVES SURVIVAL IN PATIENTS WITH REGIONAL IN-TRANSIT MELANOMA METASTASES CONFINED TO AN EXTREMITY

T Wang, MS Cohen

Presenter: Ton Wang MD | University of Michigan Medical School

**Background:** In-transit metastatic melanoma of the extremity is a clinically aggressive disease with a reported median survival time of only 20 months following diagnosis. For patients with unresectable disease confined to the limb, regional chemotherapy with hyperthermic isolated limb perfusion (HILP) or infusion (HILI) remains an effective option to treat patients. However, no studies thus far have included cytoreduction as part of the operative procedure. We hypothesize that combining cytoreduction with HILP/HILI should enhance results with this procedure and that outcomes in older patients may be as good as or better than in younger cohorts.

**Method:** We performed a retrospective analysis of a prospectively collected database of 33 patients with unresectable in-transit malignant melanoma of the extremities who underwent HILP or HILI at our institution between 2013 and 2017. 19 patients underwent HILP while 14 patients underwent HILI. At the time of operation, patients underwent aggressive cytoreduction of palpable disease along with isolated circulation of melphalan. The primary endpoint was response [complete (CR) or partial (PR)] determined at 3, 6, and 12 months post-operation per RECIST criteria. Secondary endpoints included adverse effects, overall survival at 1 and 3 years, and time to recurrence. A subgroup analysis was performed in older patients (age ≥80; 30% of entire cohort). Survival was calculated by Meier-Kaplan curve.

**Results:** After 3 months, total response was 100% for HILP (95%CR, 5%PR) and 83% for HILI (75%CR, 8%PR). CR rates after 6 months were 56% for HILP (p=0.007 vs. Z0020 trial rate of 20%) and 67% for HILI. After 1 year, CR rates were 50% (HILP) and 60% (HILI). HILP patients with CR at 6 months had an improved median time to recurrence of 18.3 months (vs. 13.4 months previously reported). For HILI, all patients who had a CR at 1 year maintained this to date or until death from other medical causes. Overall 1 and 3 year survival rates were 100% and 58% for HILP and 93% and 42% for HILI (29.5 month median survival for all patients). For older patients (≥80 years), 1 year CR rate was 56% with 1 and 3 year survival rates of 100% and 60%. No Wieberdink grade 4 or higher limb complications were observed.

**Conclusion:** Cytoreduction at the time of HILP or HILI for in-transit metastatic melanoma resulted in improved short-term and long-term outcomes without an increase in adverse events. Our 6 month CR rate of 56% for HILP is significantly higher than that in the Z0020 trial, and HILP patients with CR at 6 months had a longer median time to recurrence. Our overall 1 and 3 year survival rates are comparable to other published data. However, our cohort demonstrated that older patients (≥80 years) had improved survival and responses compared to younger groups. Further evaluation in larger cohorts will better validate these findings.
**4. MAKING AN INFORMED CHOICE: WHICH BREAST RECONSTRUCTION TYPE HAS THE LOWEST COMPLICATION RATE?**

*PT Hangge, K Jogerst, A Mohnsen, H Kosiorek, PA Cronin, CCH Stucky, N Wasif, RJ Gray, AM Rebecca, WJ Casey, III, BA Pockaj*

**Presenter:** Patrick Hangge MD | Mayo Clinic Arizona

**Background:** As women undergo mastectomies for breast cancer, they are faced with choosing from a variety of reconstruction options. Recent literature reports varying complication rates among 1-stage implant based breast reconstruction (IBBR, also termed direct-to-implant reconstruction), 2-stage IBBR (expander-to-implant), and autologous tissue reconstruction (ATR). The aim of this study was to investigate breast reconstruction outcomes at a single institution, in order to offer data-driven counseling for patients.

**Method:** A retrospective review was performed of patients who underwent mastectomy with 1-stage IBBR, 2-stage IBBR, or ATR for invasive breast cancer or DCIS at our institution from 2010-2017. The choice between 1-stage and 2-stage IBBR was at the discretion of the reconstructive surgeon. Patient demographics, pertinent co-morbidities, cancer characteristics, and neoadjuvant/adjuvant treatment, complications, and outcomes were recorded. Complications were classified as minor vs. major with major including any unplanned return to the operating room (OR). Baseline variables were compared using ANOVA F-test, chi-Square or Fisher’s exact test. Logistic regression was used to model risk factors associated with total and major complication rates.

**Results:** A total of 399 mastectomy patients who underwent reconstruction were identified. Overall complication rates were similar among 1-stage IBBR (59%), 2-stage IBBR (60%), and ATR (52%, p=0.54). ATR patients had lower major complication rates (25%) than IBBR (40%, p=0.03). Implant loss was not different between 1-stage (21%) and 2-stage IBBR (20%, p=0.76). Almost all patients underwent skin and/or nipple-sparing mastectomy (97%). Acellular dermal matrix was used in 82% of IBBR and was more common in 2-stage vs. 1-stage reconstructions. Subpectoral implant placement was more common for both 1-stage (77%) and 2-stage IBBR (99%). More 2-stage IBBR patients smoked (7% vs. 2%; p=0.02); otherwise there were no differences in major co-morbidities, tumor stage, or chemotherapy/radiation. Factors associated with major complications on multivariable analysis were diabetes (OR=7.1 95% CI: 1.9-26.9; p=0.004) and IBBR compared to ATR (1-stage: OR=2.1 95% CI: 1.1-4.2, p=0.04; and 2-stage: OR=2.1; 95% CI: 1.1-4.4, p=0.04).

**Conclusion:** Our data confirms other findings that complication rates after breast reconstruction are high. Patients should be counseled that IBBR is more likely to require unplanned return to the OR than ATR, with no difference between 1- and 2-stage among appropriately selected patients. Given diabetes was found to increase the risk for unplanned return to the operating room for all patients, careful perioperative diabetic management must be maintained with any type of breast reconstruction.
* 5. COMPARING TREATMENT PATTERNS OF HEPATOCELLULAR CARCINOMA AT ACADEMIC CENTERS AND NON-ACADEMIC CENTERS WITHIN THE MOUNTAIN REGION

**Df Cheng, CR St. Hill, JL Baynosa, DM Kirgan**

**Presenter:** Daniel Cheng MD, MPH | University of Nevada Las Vegas

**Background:** Treatment patterns for hepatocellular carcinoma (HCC) vary across the nation, and there is currently no literature looking specifically at the Mountain Region (MR). In our prior analysis of the MR, we demonstrated patients treated at Academic Centers (ACs) had overall improved survival compared to those treated at Non-Academic Centers (NACs). Our objective is to explore differences in the treatment approaches between ACs and NACs, which may contribute to this outcome disparity.

**Method:** Using the National Cancer Database (NCDB), we identified 6,500 HCC cases from 2004 to 2015 in the MR (AZ, CO, ID, MT, NM, NV, UT, WY). Of these cases, 3,494 (53.8%) were treated at NACs and 3,006 (46.2%) were treated at ACs. Using logistical regression analysis, we compared surgical (including local tumor destruction), systemic, and radiation treatment patterns between these two cohorts. Surgical treatment was provided in 859 cases. Logistical regression was performed to examine the effect of facility type and surgical approach on overall positive margin status. A subgroup analysis was repeated within the AC and NAC subgroups.

**Results:** There were significant differences in age, gender, race, ethnicity, Charlson/Deyo Score, NCDB Analytic Stage Group, Great Circle Distance, and Primary Payer between AC and NAC cases (p<0.01). Logistical regression was performed to control for these differences. At ACs, the odds of receiving or being recommended surgical treatment or systemic treatment were 2.31 times higher (p<0.01) and 1.85 times higher (p<0.01), respectively. The odds of receiving radiation was 0.41 times lower (p<0.01). After controlling for surgical approach, the odds of positive margins were 0.23 times lower (p<0.01) at ACs compared to NACs. Overall, the odds of positive margins were 3.11 times higher (p<0.01) with a laparoscopic approach compared to open or unspecified. On subgroup analysis, the odds of positive margins at ACs were not significantly different between all surgical approaches. The odds of positive margins at NACs were 3.49 times higher with a laparoscopic approach compared to open or unspecified (p=0.01).

**Conclusion:** Although AC and NAC patient populations were found to be different, when controlling for the differences, treatment at an AC increased the odds of receiving or being recommended surgical treatment and systemic treatment. Overall, treatment at an AC improved perioperative oncologic outcomes, including negative margin rate. This improvement persisted through all approaches, including the laparoscopic approach. In our analysis of the MR, these perioperative outcomes may contribute to the improved overall survival noted for patients treated at ACs compared to NACs. Although further study of this is warranted, efforts should be made to improve patient access to ACs in the MR.
**6. ARE WE CHOOSING WISELY IN ELDERLY FEMALES WITH BREAST CANCER?**

* E Calderon, HE Kosiorek, RJ Gray, P Cronin, N Wasif, CC Stucky, K Anderson, D Northfelt, A McCullough, IT Ocal, BA Pockaj  
**Presenter:** Esteban Calderon MD | Mayo Clinic Arizona

**Background:** Management of breast cancer in the elderly remains controversial. Three practice changing guidelines have been promoted by the Choosing Wisely Organization including refraining from ordering screening mammograms for patients with a life expectancy of less than 10 years (2009), omitting radiation therapy (RT) for women over 70 with T1N0M0 hormone receptor positive breast cancer after lumpectomy (BCT) (2013) and not performing sentinel lymph node biopsies (SLN) for women over 70 with clinically node negative hormone receptor positive breast cancer (2016). The goal of this study was to evaluate compliance and implementation of these guidelines in a single institution.

**Method:** A prospectively collected database of patients undergoing breast surgery for cancer was retrospectively queried for the years 2002 to 2017. To evaluate the use of mammogram, we evaluated the method of detection (imaging vs exam) of all patients > 75 years before and after 2009. Administration of RT after BCT was analyzed by dividing patients over age 70 into pre and post 2013 groups. In order to compare implementation of SLN in low risk (T1 ER+ Her2-) breast cancer, female patients age > 70 were divided into pre and post 2016 groups.

**Results:** Among patients >75 undergoing breast cancer surgery, the rate of initial presentation on mammography was not different among those before 2009(65%) vs. after 2009(66%). Patients with mammogram-detected tumors after 2009 had smaller tumors(p 70 with T1,ER+Her2- tumors prior to 2013 vs. 27% after(p=<0.001). Those who had RT after 2013 were younger(73.4 vs 78.5, p=0.001) but similar in all other features. There was no difference in local recurrence rate(p=0.56) and only one patient developed a local recurrence among those not undergoing radiation. SLN was performed in 91% of patients with T1, grade1/2,ER+Her2- tumors prior to 2016 vs. 56% after(p=<0.001). Patients who had SLN had larger tumors(mean 1.8cm vs 1.5cm, p=0.04) and a 17% rate of mastectomy vs. 0% among those who did not undergo SLN(p=<0.001).

**Conclusion:** Mammogram utilization has not significantly decreased among elderly patients presenting for breast cancer surgery since the implementation of the Choosing Wisely Guidelines. Among those >70 years, RT is less commonly administered and SLN is less frequently performed for low risk breast cancer since the Choosing Wisely Guidelines publication. The Choosing Wisely guidelines help in the management of breast cancer but the ultimate therapeutic decision is individualized through shared decision-making.
* 7. IT’S SOONER THAN YOU THINK: BLUNT SOLID ORGAN INJURY PATIENTS ARE ALREADY HYPERCOAGULABLE UPON HOSPITAL ADMISSION – RESULTS OF A BI-INSTITUTIONAL, PROSPECTIVE STUDY

**JR Coleman, A Kay, EE Moore, HB Moore, E Gonzalez, S Majercik, MJ Cohen, T White, FM Pieracci**  
**Presenter:** Julia Coleman MD, MPH | University of Colorado School of Medicine

**Background:** The optimal time to initiate venous thromboembolism (VTE) chemoprophylaxis is a point of contention in trauma patients, particularly those with blunt solid organ injury (BSOI). The benefit of mitigating thrombotic risk must be balanced against the risk of bleeding. Ideally, the decision to initiate VTE chemoprophylaxis should be based upon objective measurements of each patient’s coagulation status. We hypothesize that 1) BSOI patients are hypercoagulable within 12 hours of injury and 2) this hypercoagulable profile dominates in patients who develop clot complications.

**Method:** This is a prospective study of BSOI patients admitted to two Level-1 Trauma Centers’ trauma intensive care units (ICU) (2014-2018). Blood was collected upon admission and every 12 hours thereafter. Citrated kaolin thrombelastography (CK-TEG) was performed on patients from both sites, as well as tissue plasminogen activator (tPA)-challenge TEGs at one site. Hypercoagulability was defined as any of the following being outside of the 95% confidence interval for healthy volunteers: reaction (R) time, angle, maximum amplitude (MA), and LY30. Fibrinolysis phenotypes were shutdown (LY30 < 0.9%), physiologic lysis (LY30 0.9% – 2.9%) and hyperfibrinolysis (LY30 ≥ 3.0%). Response to 75 ng/mL tPA defined tPA-resistant (LY30 < 1.8%), mixed (LY30 1.8-27.7%) and tPA-sensitive (LY30 > 27.7%). Clot complications included VTE, cerebrovascular accidents and myocardial infarction.

**Results:** Overall, 95 patients were included. Injuries included liver (24%), pulmonary (16%) or spleen contusions/lacerations (11%), and there was associated TBI in 36%. On ICU admission, all patients were hypercoagulable: 88% by R (median R 4.8min), 66% by angle (median angle 70.6o), 33% by MA (median MA 67.5mm) and 58% were in fibrinolysis shutdown. Furthermore, 50% of patients were tPA-resistant, and 43% remained so at 108 hours. tPA-resistance was most pronounced in shutdown (p<0.01): 100% were resistant upon admission and 67% at 108 hours (p=0.02). Twelve patients(13%) developed clot complications. Compared to those without clot complications, they demonstrated decreased fibrinolysis at 12 hours (LY30 0.7% vs. 1.2% p=0.03) and higher clot strength at 48 hours (MA 71.8 vs. 68.1mm, p=0.04). Median time to VTE chemoprophylaxis was 43 hours (range 2-309), and was significantly longer in patients who developed clot complications compared to those who did not (61 vs. 41 hours, p=0.009).
Conclusion: BSOI patients are universally hypercoagulable upon ICU admission. This manifests as shortened time to clot formation, increased clot propagation and strength and tPA resistance and persists at least 108 hours. Patients with thrombotic complications have more pronounced increased clot strength within 12 hours and decreased fibrinolysis at 48 hours. Despite this hypercoagulability, VTE chemoprophylaxis was delayed for almost 48 hours in this patient population and longer in patients who ultimately developed thrombotic complications. Based on these data, we recommend that VTE chemoprophylaxis should be started immediately upon ICU admission in BSOI patients with evidence of hypercoagulability on TEG. Future studies are needed to investigate safety of initiating at this early timepoint.
Background: Current trauma risk models, such as the Revised Trauma Score (RTS) and Trauma and Injury Severity Score (TRISS) lack characterization of pre-injury clinical status. A prior European study reported that the American Society of Anesthesiologists Physical Status (ASA-PS) score is an independent predictor of mortality after trauma. Therefore we sought to evaluate the use of the ASA-PS score to predict mortality and length of stay (LOS), hypothesizing higher ASA PS would be associated with increased mortality and LOS. In addition we aimed to evaluate whether a combination of ASA PS with TRISS and/or RTS improved overall risk prediction for mortality.

Method: We performed a multicenter, retrospective review of adult trauma patients who underwent surgery within 24 hours of admission between 1/1/2016 – 1/1/2017. A chi-square test or Wilcoxon rank sum was used to compare the two groups of those who survived and those who died. Logistic and negative binomial regression modeling was used to test statistical significance of ASA-PS beyond risk scores for mortality and LOS, respectively. To compare the predictive ability of ASA PS, RTS and TRISS, area under the receiver operating curve (AROC) were additionally computed and compared.

Results: From 3,042 patients at 5 Level I trauma centers, 247 (8.1%) died. When comparing those who died to the survivors, the population that died were older (36 vs. 48 years p<0.0001), had a lower Glasgow Coma Scale (GCS) score (6 vs. 15, p<0.0001) and were on average more often transfused within 24 hours (87.8% vs. 21%, p<0.0001). The ISS was significantly higher in those who died (33 vs. 9, p<0.0001) as well as the ASA-PS (5 vs. 2, p<0.0001). ASA-PS was positively associated with mortality risk (p<0.001) and longer LOS (p<0.001). The AROC for mortality for TRISS was 0.937 (95%CI 0.921, 0.954), for RTS was 0.848 (95%CI 0.818, 0.877), and ASA-PS was 0.887 (95%CI 0.865, 0.909). ASA PS combined with TRISS (0.931) did not statistically significantly improve the predictive ability of TRISS alone (p=0.20).

Conclusion: Higher ASA-PS was associated with increased mortality and LOS and was a very good predictor of mortality in trauma patients undergoing surgery. The best predictor of mortality was TRISS. Adding ASA PS to TRISS did not result in a statistically significant improvement.
9. AN EVALUATION OF BLOOD PRODUCT UTILIZATION RATES WITH MASSIVE TRANSFUSION PROTOCOL; BEFORE AND AFTER THROMBOELASTOGRAPHY USE IN TRAUMA

M Unruh, J Reyes, SD Helmer, JM Haan

Presenter: Mitchell Unruh MD | University of Kansas School of Medicine – Wichita

Background: Judicious blood product utilization must be balanced with effective resuscitation of critically-ill trauma patients undergoing massive transfusion. Thromboelastography (TEG) is a functional coagulation test that measures mechanical properties of blood clot formation and degradation. The purpose of this study was to determine if TEG is associated with reduced blood product utilization for trauma patients undergoing massive transfusion protocol (MTP) compared to traditional coagulation tests.

Method: A retrospective review was conducted on an intent-to-treat basis of 67 trauma patients undergoing MTP at an American College of Surgeons level 1 verified trauma center from January 1, 2014 – December 31, 2015 (Period I) and July 1, 2015 – June 30, 2016 (Period II). Traditional coagulation tests guided transfusion during Period I (n=20) and the intent was that TEG guided transfusions during Period II (n=47). Transfusions of 14 of 47 patients in Period II (29.8%) were guided by traditional coagulation tests rather than TEG. Comparison of blood product administration (red blood cells, fresh frozen plasma, platelets, and cryoprecipitate) and hospital outcomes (intensive care unit admission and stay, mechanical ventilation use and duration, hospital length of stay, and mortality) were made between study periods.

Results: Demographics (age, sex, race), initial vitals, ISS and GCS scores were similar between study periods. Hemoglobin (9.9 vs. 11.6, P=0.016) and hematocrit (29.7 vs. 34.5, P=0.022) were higher in Period II. Intent-to-treat analysis demonstrated a significant reduction in red blood cell transfusions (11 vs. 6 units, P=0.001), number of patients receiving fresh frozen plasma (85.0 vs. 17.0%, P<0.001), and platelets (75.0 vs. 38.3%, P=0.006) in Period II. No difference was seen between Periods I and II in ICU days (7.0 vs. 11.0 days, P=0.073), hospital length of stay (10.5 vs. 14.0 days, P=0.618), or mortality (55.0 vs. 31.9%, P=0.076). As-treated analysis similarly demonstrated a significant reduction in red blood cell transfusions (5 vs. 10.5 units, P<0.001), number of patients receiving fresh frozen plasma (3.0 vs. 70.6%, P<0.001), and platelets (30.3 vs. 67.6%, P=0.002) with use of TEG. TEG did not alter hospital outcomes including mortality (33.3 vs 44.1%, P=0.365).

Conclusion: Use of TEG-directed transfusion in the critically-ill trauma patient conserved blood product utilization and appears to offer similar outcomes when compared to traditional coagulation tests. Further investigation on how utilization of TEG affects long-term outcomes and transfusion rates of other blood products is needed.
• 10. PLATELET DYSFUNCTION ON THROMBOELASTOGRAM IS ASSOCIATED WITH SEVERITY OF ISOLATED BLUNT TRAUMATIC BRAIN INJURY

AB Kay, SD Majercik, DS Morris, D Collingridge

Presenter: Annika Kay PA-C | Intermountain Medical Center

Background: Platelet dysfunction following traumatic brain injury (TBI) may be a separate phenomenon than that seen in the multiply-injured trauma patient. Thromboelastography (TEG) with platelet mapping (PM) allows assessment of clot strength selectively caused by arachidonic (AA) and adenosine diphosphate (ADP). Previous work in cardiothoracic and trauma surgery suggests that ADP inhibition ≥60% may best define presence of platelet dysfunction. We aimed to investigate the relationship between isolated blunt TBI and platelet dysfunction. We hypothesized that platelet dysfunction can be detected soon after injury, and that the degree of dysfunction is associated with increased TBI severity as well as in-hospital mortality.

Method: Retrospective review of adult trauma patients admitted to a single level 1 trauma center from August 2013 to March 2015 who suffered isolated severe blunt TBI, defined as AIS-head ≥3 and AIS-other ≤2. Patients were included if they received a TEG with PM (percentage ADP and AA inhibition) within 24 hours from injury. Patients on preinjury antiplatelet medications were excluded. Demographic, physiologic, and injury-related variables were abstracted, as were hospital data including laboratory test results, ICU and hospital length of stay, and in-hospital mortality. Descriptive data is reported as mean ± standard deviation. Binary and multiple linear regression were performed to determine which variables were associated with platelet dysfunction, as defined by percentage ADP inhibition (ADPi%).

Results: 119 subjects were analyzed. Subjects were middle-aged (58.4 ± 21.89 years) males (62.2%), who suffered from falls (63.9%). Hospital LOS was 6.35 ± 7.26 days. Initial GCS was 11.1 ± 4.5, and half (48.3%) suffered severe TBI, defined as AIS-head 5. Intraparenchymal hemorrhage was the TBI subtype most associated with higher ADPi% (r-squared 0.173, p=0.065). Multiple linear regression demonstrated that subjects with AIS-head 5 had ADPi% that was 17 points higher than subjects with AIS-head 3 (p=0.002). In binary logistic regression with platelet dysfunction defined as ADPi% ≥60, subjects with AIS-head 5 were more likely to have dysfunction than subjects with AIS-head 3 (OR 3.66; 95% CI 1.4-9.5, p=0.008). Platelet dysfunction was not associated with progression of intracranial hemorrhage. In-hospital mortality was 21%. The strongest predictor of mortality was AIS-head 5 (OR 13.16; 95% CI 1.398-123.791, p=0.024). ADPi% was statistically significant, but less predictive (OR 1.021; 95% CI 1.004-1.055, p=0.015).
Conclusion: Platelet dysfunction, measured by percentage ADP inhibition on TEG, occurs immediately after isolated severe blunt TBI. Increasing TBI severity is associated with a greater degree of platelet dysfunction, and intraparenchymal hemorrhage carries the greatest risk of platelet dysfunction compared to other TBI subtypes. Platelet dysfunction is associated with higher odds of in-hospital mortality. Further investigation is needed to determine whether this is a marker of disease severity, or a therapeutic target.
* 11. PREHOSPITAL SHOCK INDEX CORRELATES WITH TRANSFUSION, RESOURCE UTILIZATION AND MORTALITY; ROLE OF FIRST PATIENT VITALS.

FS Jehan, J Con, M Khan, K Prabhakaran, A Policastro, G Lambardo, P Anderson, R Latifi

Presenter: Faisal Jehan MD | Westchester Medical Center

**Background:** Prehospital trauma care is an important component of all trauma care systems and triage and care of trauma patients need to start early in the field. The aim of our study was to evaluate if prehospital shock index (SI) can predict transfusion requirements, resource utilization and mortality in trauma patients.

**Method:** We performed a 2-year analysis of the American College of Surgeons-Trauma Quality Improvement Program (ACS-TQIP) database. All adult patients (age > 18 years) were included. Patients transferred from other hospitals were excluded. Prehospital Shock index was calculated by dividing prehospital heart rate over systolic blood pressure. Patients were divided into two groups SI < 1 and SI > 1. Regression analysis was performed to control for demographics and injury parameters.

**Results:** A total of 144951 patients were analyzed. Mean age was 45±34 years, 62.5% were male. Median ISS was 11[9-17] and 88% blunt injuries. Overall morality was 5.1%. 9.1% patients had a prehospital SI > 1. Patients with prehospital SI > 1 were more likely to be transferred to the ICU (28% vs. 11%, p < 0.01) was associated with higher rates of adjusted ICU length of stay (3-days vs. 1-day, p < 0.01) had higher adjusted rates of blood products transfusion (pRBC, FFP and platelets) as well. SI 1 (pRBC: 0.7 vs. 1.9 units, p<0.01), (FFP: 0.5 vs. 1.3 units, p=0.01), (Platelet: 0.5 vs. 1.3 units, p=0.02).

**Conclusion:** Prehospital shock index can predict the need for transfusion, hospital resource use (ICU and operative room) and mortality. A prehospital SI > 1 can alert trauma centers to the need for timely preparation for patient arrival and early intervention.
FOLLOW-UP TRENDS AFTER EMERGENCY DEPARTMENT DISCHARGE FOR ACUTELY SYMPTOMATIC HERNIAS: A SOUTHWESTERN SURGICAL CONGRESS MULTI-CENTER TRIAL

* **JL Angelo, LH Spence, AH Kaji, DS Plurad, M Truitt, BT Grover, M Asis, A Barber, EC Callaghan, TJ Schroeppe, JL Regner, DY Kim**

**Presenter:** Jillian Angelo MD | Harbor-UCLA Medical Center

**Background:** Expeditious repair of acutely symptomatic hernias in the elective setting is recommended, as emergent repair is associated with worse outcomes. A retrospective study at a single county hospital found that the majority of patients with symptomatic hernias discharged from the emergency department (ED) never received outpatient follow-up and even fewer underwent operative intervention. The uninsured are less likely to receive surgery and are also at a higher risk for complicated hernias and mortality. The objective of this multi-center study was to determine if these trends persisted when examining a larger and more socioeconomically diverse patient population.

**Method:** We performed a 3-year retrospective analysis of adult patients with acutely symptomatic hernias who were discharged from the emergency departments of five geographically diverse hospitals. The main outcome measure was the incidence of hernia repair. Secondary outcomes included the incidence and timing of clinic follow-up, ED visits and complications. Variables analyzed were age, gender, race, BMI, comorbidities, hospital type, incidence of hernia-related pain, prior repair, and hernia type (inguinal, ventral, umbilical, incisional). Data was stratified by insurance type to determine the effect of race, gender, and hospital type on the likelihood of repair.

**Results:** Of 673 patients, 253 (37.6%) underwent repair and 288 (42.8%) were evaluated in the clinic after discharge from the ED. Rates of follow-up were highest among those with insurance vs. without (p<0.0001). A total of 119 patients (17.7%) returned to the ED for hernia-related complaints, of which 25 (21%) underwent urgent intervention. Patients with public or no insurance were more likely than those with private insurance to require urgent surgery (p=0.004). Variables associated with surgery were younger age, male gender, lower BMI, incarceration, inguinal hernia, and clinic follow-up. Regardless of insurance type, patients at community hospitals were more likely to undergo hernia repair (OR=5.8; 95% CI=4.1-8.3, p=<0.0001). Although time to clinic follow-up (days) varied greatly by insurance type (private, 8; public, 41; none, 55), time to surgery post-clinic visit was not significant (p=0.08).

**Conclusion:** While the plan of care for patients with acutely symptomatic hernias discharged from the ED often depends on outpatient follow-up, more than 50% of patients are not seen or lost to follow-up and almost 20% return to the ED with hernia-related complaints. Those without access to expeditious clinic follow-up, specifically the uninsured, are at particularly high risk. More research is required to better identify the barriers to adequate follow-up in this patient population and to re-evaluate the role of deferred operative management among patients with acutely symptomatic hernias.
13. IS LONG TERM NON-OPERATIVE MANAGEMENT WARRANTED IN VENTRAL HERNIA PATIENTS WITH COMORBIDITIES? A CASE-MATCHED, PROSPECTIVE 3-YEAR FOLLOW-UP, PATIENT-CENTERED STUDY

K Bernardi, AC Martin, OA Olavarria, JL Holihan, JR Flores-Gonzalez, NB Lyons, AN Milton, P Shah, TC Ko, MK Liang

Presenter: Karla Bernardi MD | University of Texas Health Science Center at Houston

Background: Individuals with comorbid conditions (e.g. obesity or smoking) are at increased risk to develop a ventral hernia and complications following ventral hernia (VH) repair. The impact of management strategy on outcomes and quality of life (QoL) in the long term are unknown. We hypothesized that in the long term, QoL is better among patients with VHs managed operatively than those managed non-operatively.

Method: This was the 3-year follow-up to a prospective observational study of patients with comorbidities and ventral hernias. Non-operative management was recommended if smoking, obesity, or poorly controlled diabetes was present. On follow-up, patients were contacted by phone to complete a standardized interview. Primary outcome was change in QoL from baseline. QoL was measured utilizing the modified Activities Assessment Scale (AAS), a validated, hernia-specific QoL survey. The minimal clinically important difference was considered a change of 7 points on a scale of 1-100 where 1=poor QoL and 100=perfect. Risk-adjusted outcomes between operative and non-operative groups were compared using: (1) paired t-test on matched subset and (2) multivariable linear regression on the overall cohort.

Results: Overall, 195 patients enrolled in the study and 137 (70%) (non-operative=85; operative=52) were followed to completion. In the matched cohort (n=80; 40 from each group), both groups had similar baseline clinical and hernia characteristics. In the operative group, 10 (25%) patients experienced a recurrence at three years. In the non-operative group, 15 (37.5%) patients underwent repair from whom 3/15 (20%) received emergent repair, and all three experienced a hernia recurrence. Between the two groups, the operative cohort experienced a significantly greater improvement in QoL (28.4±27.1 v. 11.8±23.8, p=0.005). On multivariable analysis of the whole cohort, operative management was associated with a 19.5 (95% CI 7.0-31.9) greater change in QoL compared to non-operative management.

Conclusion: This is the first long term prospective study comparing management strategies in patients with comorbid conditions and VH. Elective repair was associated with improved QoL in the long term. Therefore, optimization of patients with comorbid conditions should be preferred over pursuing non-operative management.
14. OUTCOMES OF ROBOTIC VERSUS NON-ROBOTIC MINIMALLY-INVASIVE ESOPHAGECTOMY: AN AMERICAN COLLEGE OF SURGEONS NSQIP DATABASE ANALYSIS

GJ Harbison, JD Vossler, NH Yim, KM Murayama

Presenter: Gregory Harbison MS | University of Hawaii

**Background:** Utilization of a robotic-assisted minimally-invasive surgical approach is rapidly increasing for esophagectomy. The purpose of this study was to assess for differences in postoperative outcomes between robotic and non-robotic minimally-invasive esophagectomy. Being that robotic and non-robotic minimally invasive surgical approaches are based on similar fundamental anatomic and physiologic principles, it is hypothesized that there is no difference in postoperative outcomes between the two approaches.

**Method:** A retrospective review of the ACS-NSQIP 2016-2017 main and esophagectomy targeted procedure databases was conducted. All patients undergoing robotic or non-robotic minimally-invasive esophagectomy were included. Univariate analysis was conducted using the Chi-squared test. Multivariate analysis was conducted using a multivariate logistic regression model that included demographics and preoperative variables that were different between the robotic and non-robotic groups at a univariate p-value of <0.25. A risk adjusted odds ratio and corresponding 95% confidence interval for patients receiving a robotic esophagectomy for each morbidity and mortality was calculated. Statistical significance was assigned to p-values <0.05. Statistical analysis was performed using SAS version 9.4.

**Results:** 798 esophagectomy procedures were analyzed, which included 113 robotic and 685 non-robotic minimally-invasive procedures. Patients undergoing robotic esophagectomy were more likely to have CHF (1.77% vs. 0.15%; p=0.0090), diabetes (24.78% vs. 16.64%; p=0.0362), dyspnea within 30 days of surgery (18.58% vs. 8.32%; p=0.0007), and be white (92.04% vs. 75.04%; p<0.0001). No other demographic or preoperative variables were found to be different between the two approaches. Robotic approach was not found to be an independent risk or protective factor for postoperative mortality (OR=1.77; 95%CI=0.47-6.75), overall morbidity (0.65; 0.41-1.02), pulmonary complications (0.57; 0.30-1.07), venous thromboembolism (0.69; 0.23-2.07), wound complications (0.70; 0.38-1.30), sepsis or septic shock (0.74; 0.35-1.57), bleeding requiring transfusion (1.19; 0.57-2.49), anastomotic leak (0.73; 0.40-1.35), unplanned conversion to open (1.06; 0.54-2.09), readmission (1.45; 0.82-2.59), reoperation (0.92; 0.52-1.61), or length of hospital stay (difference in means ± SE= 1.59 days ± 0.97).

**Conclusion:** The results of this study support the hypothesis that there is no difference in postoperative outcomes between robotic and non-robotic minimally-invasive esophagectomy.
invasive approaches to esophagectomy. These results were expected given the similar fundamental anatomic and physiologic principles upon which these two surgical approaches are based. Given the increased cost of robotic-assisted procedures and lack of evidence for clinical benefit, perhaps the robotic approach should be reserved for cases that would otherwise be impossible to perform by a non-robotic minimally-invasive approach.
15. THE USE OF COMPONENT SEPARATION (CS) DURING ABDOMINAL WALL RECONSTRUCTION (AWR) IN CONTAMINATED FIELDS: A CASE-CONTROL ANALYSIS
SR Maloney, VA Augenstein, KA Schlosser, E Oma, T Prasad, KW Kercher, RF Sing, PD Colavita, BT Heniford
Presenter: Sean Maloney MD | Carolinas Medical Center

Background: CS involves incisions into the rectus and/or oblique muscles to allow for supplementary fascial medialization during AWR. It is difficult to use CS more than once and thus choosing when to use it is important to understand. Contaminated operative fields increase the incidence of wound complications, which can triple the incidence of hernia repair failure. The use of CS in these cases is often questioned. The aim of this study was to compare similar AWRs in contaminated fields when CS was and was not utilized.

Method: A prospective, single institution hernia study examined all patients undergoing ventral hernia repair with CS. Cases using preperitoneal mesh and CDC class 2, 3, and 4 were included in analysis. A case control cohort with similar BMI, sex, and defect size was identified using propensity score matching technique from cases without CS (No-CS).

Results: There were 286 CSs performed in contaminated cases. After propensity score matching, 61 CSs (32.8% external oblique release) were compared to 61 No-CSs. These groups were similar in defect area (CS: 287.1±150.4 vs No-CS: 277.6±218.4cm², p=0.156), BMI (32.0±7.0 vs 32.2±6.0kg/m², p=0.767), rates of diabetes (26.2% vs 32.8%, p=0.427), and having panniculectomy performed (52.5% vs 36.1%, p=0.068). Mesh was used in all cases. Biologic mesh was used in 44.3% of CS cases and 49.2% of No-CS cases (p=0.586), and the majority of cases in both groups were clean-contaminated (65.6% vs 75.0%, p=0.312). The rates of wound complications were similar in both groups (CS 42.6% vs No-CS 40.7%, p=0.829). There was only 1 mesh infection in the series, in the CS group. The rate of recurrence was also similar between the two groups (4.9% – CS vs 13.1% – No-CS, p=0.114) with similar follow up (16.7±20.8 vs 23.8±24.2months, p=0.074).

Conclusion: The use of CS in the face of contamination is not associated with an increase in wound complications, mesh infections, or recurrence. These findings suggest that CS during preperitoneal ventral hernia repair is safe and effective when used in a contaminated surgical field.
*16. UNEXPECTED COMPLICATED APPENDICITIS IN THE ELDERLY DIAGNOSED WITH ACUTE APPENDICITIS: AVOID NON-OPERATIVE MANAGEMENT
NK Dhillon, G Barmparas, T Lin, RF Alban, N Melo, AR Yang, DR Margulies, EJ Ley
Presenter: Navpreet Dhillon MD | Cedars Sinai Medical Center

Background: Recent studies suggest that nonoperative management (NOM) of acute appendicitis may be feasible in select patients. This study determined the prevalence of complicated appendicitis in elderly patients diagnosed preoperatively with uncomplicated appendicitis.

Method: All patients undergoing an appendectomy with the preoperative diagnosis of acute uncomplicated appendicitis at an academic hospital from 11/2013 to 05/2017 were retrospectively reviewed. Data collection included demographics, preoperative diagnoses, and pathology reports. Patients ≥ 65 years were compared to those who were younger. Pathology reports were categorized as either uncomplicated, which included either nonperforated or suppurative appendicitis, or complicated (COMP), which included either perforated, necrotizing, or gangrenous appendicitis. The primary outcome was the prevalence of COMP appendicitis.

Results: Of the 1,242 patients included median age was 36 years and 53.5% were male. The prevalence of COMP appendicitis increased with age, with an abrupt increase after 65 years. Patients ≥ 65 years were more likely to have COMP appendicitis (15.1% vs. 48.1%; OR: 5.1; p<0.01) and had a higher length of stay (2 vs. 3 days; p<0.01).

Conclusion: Of the patients with a preoperative diagnosis of acute uncomplicated appendicitis, the prevalence of complicated appendicitis in the elderly is high with nearly half having pathologic confirmation of either perforation, necrosis, or gangrene, despite no preoperative clinical or radiographic suspicion for complicated or perforated appendicitis. Our findings indicate that nonoperative management of acute appendicitis in the elderly should be avoided due to the high rate of unexpected complicated appendicitis.
* 17. PROTOCOL DIRECTED MANAGEMENT OF SUSPECTED COMMON DUCT STONES, A SOUTHWESTERN SURGICAL CONGRESS (SWSC) MULTI-CENTER TRIAL (MTC)

_C Hall, JL Regner, T Schroeppel, J Rodriguez, R McIntyre Jr., F Wright, S Dissanaike, R Richmond, A Santos, RC Frazee_

**Presenter:** Chad Hall MD | Baylor Scott and White Healthcare

**Background:** Several options exist for the diagnosis and management of suspected common duct stones. In 2017, the SWSC-MCT group evaluated the different approaches at the member institutions and found significant diversity in management. We hypothesized that a protocol directed approach would shorten length of stay in this patient group.

**Methods:** Four institutions from the MCT group agreed to a protocol-based practice change for patients with suspected common duct stones. Patients with a peak bilirubin < 4 mg/dl underwent laparoscopic cholecystectomy with intraoperative cholangiogram as the initial procedure. Patients with a bilirubin > 4 mg/dl underwent initial endoscopic management. Protocol data from these four institutions was compared to patients from the prior to adoption of the protocol. The primary endpoint was length of stay. Analysis involved chi square and Wilcoxon-Mann-Whitney test with significance at p < 0.05.

**Results:** 273 patients underwent cholecystectomy with clinical indicators of common duct stones during the six-month study period. Sixty-one had protocol violations (endoscopy performed for a bilirubin < 4 mg/dl), leaving 214 patients for analysis. 111 patients (52%) required endoscopy and surgery. Morbidity occurred in 35 patients (16%) and included pancreatitis (12), pulmonary (1), cardiovascular (2), SSI, and deep space infection. Mortality occurred in 3 patients (1.4%). Length of stay and the number of MRCPs performed pre-operatively significantly decreased following protocol implementation (p<0.05).

**Conclusion:** A protocol utilizing a bilirubin < 4 ml/dl for a surgery first approach to patients with suspected choledocholithiasis resulted in a low morbidity and mortality, decreased usage of preoperative MRCP, and significantly reduced length of stay.
18. LAPAROSCOPIC OMENTAL PATCH REDUCES LENGTH OF STAY AND COMPLICATIONS IN PERFORATED PEPTIC ULCER DISEASE: A SWSC MULTICENTER STUDY

A Alhaj Saleh, B Eaton, BR Bruns, G Barmparas, DR Margulies, A Raines, C Bryant, CE Crane, EP Scherer, TJ Schroeppel, E Moskowitz, J Regner, R Frazee, EM Campion, M Bartley, JR Mortus, J Ward, S Dissanaike

Presenter: Adel Alhaj Saleh MD | Texas Tech University Health Sciences

Background: Randomized studies have shown benefit of Laparoscopic (Lap) repair of perforated peptic ulcer (PPU); however it is unclear how often these procedures are performed in general practice, and whether benefits are consistent across populations. The SWSC Multi-Center Trials Group sought to evaluate whether Lap omental patch repairs compared to open improved outcomes in PPU.

Method: Data from patients who had omental patch repair for PPU at 9 SWSC institutions from 2011-2018 were analyzed. Patients undergoing additional or alternate procedures, such as vagotomy or Bilroth II were excluded. Variables included demographics, Charlson Co-morbidity Index (CCI), operative time, 30-day complications, length of stay (LOS) and mortality. Analysis was performed with SPSS.

Results: Omental patch was performed in 465 patients: Open in 312 (67%) patients, Lap in 132 (28%) with 21(5%) patients converted from Lap to Open, who were excluded from analysis. Groups were similar at baseline, except Lap was more commonly performed in women (35% vs. 26%, p<0.05). Hypertension (45%) and diabetes (17%) were most common comorbidities in both groups, and 24% had a prior history of peptic ulcer disease. There was significant variability between centers in their utilization of Lap (0 – 64%). Operative time was similar (101.5 min Lap vs 97). Complications at 30 days were lower in Lap (18.5% vs. 29.2%, p<0.05) as was unplanned re-operation (4.7% vs 13.4%, p< 0.05). Lap reduced LOS (8.2 vs 14 days, p<0.05) with no significant difference in readmission (4.5% Lap vs 7.2%) or mortality (2.2% Lap vs 5.4%).

Conclusion: Laparoscopic surgery was utilized in less than a third of PPU patients. When successful it significantly reduced 30-day complications and nearly halved length of stay, with similar operative time. These results suggest Lap should be considered a first-line option in suitable PPU patients requiring omental patch repair.
**19. EVALUATION OF A WATER-SOLUBLE CONTRAST PROTOCOL IN SMALL BOWEL OBSTRUCTION: A SOUTHWESTERN SURGICAL MULTICENTER TRIAL**

*EE Moskowitz, RC McIntyre, C Cothren Burlew, LJ Helmkamp, ED Peltz, J Coleman, A Kovar, M Truitt, V Agrawal, E Onkendi, R Dev, JJ Diaz, B Eaton, EM Campion*

**Presenter:** Eliza Moskowitz MD | University of Colorado School of Medicine

**Background:** Differentiation between small bowel obstructions (SBO) that will resolve with supportive measures and those that require surgery remains challenging. Early administration of water-soluble contrast (WSC) may be both diagnostic and therapeutic for this determination. Previous studies demonstrate that implementation of a WSC protocol facilitates early differentiation of partial from complete SBO and may decrease hospital length of stay (LOS). The purpose of this study was to evaluate our institutions’ use of a SBO protocol using a WSC challenge.

**Method:** A standardized protocol was implemented at five tertiary care centers from July 1, 2017-June 30, 2018. Patients were taken to the OR immediately if they had peritonitis on exam or imaging suggesting bowel compromise. Demographics, surgical history, time to operation, postoperative complications, and LOS were analyzed. Statistical analysis was performed using Chi Squared or Fischer’s exact test where appropriate for categorical variables. The Kruskal-Wallis nonparametric test was used to analyze continuous variables. p <0.05 was considered significant.

**Results:** In the one year study period, 283 patients were admitted with a SBO; 13% (n=38) underwent immediate laparotomy. Patients needing immediate surgery (n=38) had a median LOS of 7.5 days. Complication rate was 21%. The remaining 245 were candidates for contrast challenge. Of those, 80% (n=197) received contrast; mean age was 56; 54% were women. 139 (71%) had contrast passage within 24 hours and were treated non-operatively. 65 (29%) had failure of contrast passage within 24 hours and underwent surgery. 8% of patients in whom contrast passage was observed at 24 hours nevertheless subsequently underwent surgery. 4% of patients who failed WSC challenge did not subsequently proceed to surgery. Of the 138 patients who had contrast passage within 12-24 hours, median LOS was 4 days. Complication rate was 3%. Of the 55 who failed WSC challenge and subsequently underwent surgery, median LOS was 9 days. Complication rate was 47.3%.

**Conclusion:** Implementation of a WSC protocol facilitates early recognition of partial from complete obstruction and may decrease LOS.
Background: Use of the robotic-platform for elective cholecystectomy is increasing in popularity, however, the majority of existing literature only describes single-surgeon or single-center data. The aim of this study is to evaluate outcomes including complications, length of stay (LOS), cost, and opiate utilization of patients who underwent a laparoscopic (LC) or robotic cholecystectomy (RC) using a national database.

Method: The Vizient clinical database resource manager (CDB/RM) was queried using ICD-9 and ICD-10 procedure and diagnosis codes for patients who underwent LC and RC from January 2015 – December 2017. Only patients classified as minor or moderate risk severity who underwent elective procedures were included. Severity was defined by a validated clinical algorithm that assesses twenty-nine comorbidities, patient demographics and major diagnosis. Complications, readmissions, mortality, LOS, direct cost, and intra-hospital opiate utilization were analyzed using IBM SPSS v.25.0, \( \alpha = 0.05 \).

Results: 3,030 patients (LC: N=2,852, RC: N=178) were included in this study. Majority were female (LC: 65.7%, RC: 68.0%), Caucasian (LC: 73.9%, RC: 7.4%), and between 31-64 years old (LC: 57.9%, RC: 71.9%). Both approaches had similar rates of overall complications (LC: 3.1%, RC: 1.7%; \( p = 0.370 \)) and post-operative infections (LC: 1.3%, RC: 2.2%; \( p = 1.000 \)). 7-, 14-, and 30-day readmission rates were also similar between groups (all \( p > 0.05 \)). There was no difference in mortality (LC: 0.5%, RC: 0%; \( p = 1.000 \)). Mean LOS was 2.93 ± 3.09 days for LC and 3.10 ± 3.32 days for RC (\( p = 0.478 \)). RC had a significantly higher mean direct cost ($10,355 ± 5,540) compared to LC ($6,901 ± 6,041); \( p < 0.001 \). Almost all patients in both groups were prescribed opiates (LC: 97.9%, RC: 97.6%; \( p = 0.744 \)). Mean opiate use was higher in the LC group, however, no statistical analysis was performed as standard deviation (SD) was not available.

Conclusion: This study demonstrates similar clinical outcomes for patients who underwent elective cholecystectomy via laparoscopic or robotic approach. There was no significant difference in LOS, mortality, overall 30-day complications or readmission rates between approaches.

Both groups also had comparable rates of opiate use. The direct cost of RC was significantly higher than LC with no added benefit. Robotic cholecystectomy should be discouraged until costs are reduced.
21. IDEAL TIMING OF EARLY CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS: AN ACS-NSQIP REVIEW

EA Alore, JL Ward, SR Todd, CT Wilson, SD Gordy, MK Hoffman, JW Suliburk

Presenter: Elizabeth Alore MD, MPH | Baylor College of Medicine

Background: Current recommendations for acute cholecystitis support early cholecystectomy over delayed operation. However, timing of early cholecystectomy is poorly defined, ranging from 3-10 days from admission. Current best practice guidelines fail to specify an optimal time frame for performing cholecystectomy. We hypothesized delaying operation past hospital day (HD) 2 would result in increased 30-day morbidity and mortality.

Method: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried from 2012-2015 for all patients undergoing cholecystectomy with a postoperative diagnosis of acute cholecystitis. Elective surgeries and surgeries performed >7 days from admission were excluded. Kruskal-Wallis, Pearson’s Chi-square, Fisher’s exact and multivariable logistic regression were utilized with p<0.05.

Results: Of 34,151 cholecystectomies performed for acute cholecystitis, 33% occurred on HD1, 37% on HD2, and 30% were delayed to HD3-7. Patients undergoing operation on HD3-7 were older with higher rates of comorbidities (median 58yrs; 66%) than HD1 (48yrs; 51%) or HD2 (51yrs; 55%), p<0.001 for age and p<0.001 for comorbidities. Open operations were more common on HD3-7 (15%) than HD1 (8%) or HD2 (9%), p<0.001. Operations on HD3-7 had a 2-fold increase in 30-day mortality (1.0%) in comparison to HD1 (0.3%) or HD2 (0.5%), p<0.001. Rates of surgical site infection, cardiovascular, pulmonary, and thromboembolic complications were significantly higher in the delayed cohort. Rate of any complication increased to 12% when operation was delayed, in comparison to 7% on HD 1 and 8% on HD 2, p<0.001. Hospital day of operation was an independent predictor of mortality (OR 1.1 per day delayed, p=0.03), but not major complications (p=0.08).

Conclusion: Approximately one-third of cholecystectomies are delayed to HD3-7 nationally. Increased morbidity and mortality were observed when cholecystectomy was delayed to HD3-7. Factors including increased age, decreased health status and/or open operations may contribute to this observation. However, HD remained an independent predictor of 30-day mortality. Therefore, cholecystectomy for acute cholecystitis should be performed within 2 days of admission.
**22. ADDRESSING THE OPIOID CRISIS AT AN URBAN LEVEL 1 TRAUMA CENTER: IMPLEMENTATION OF A MULTI-MODAL PAIN REGIMEN TO DECREASE OPIOID USE**

*S Wei, C Green, J Howell, S Martinez-Ugarte, RP Albarado, EA Taub, DE Meyer, SD Adams, MK McNutt, LJ Moore, BA Cotton, LS Kao, CE Wade, JB Holcomb, JA Harvin*

**Presenter:** Shuyan Wei MD | University of Texas Health Science Center at Houston

**Background:** Drug overdose deaths are now the leading cause of death in the US for those under 50 years of age. Over the last several years, opioid use and abuse in the post-injury and post-operative period have gained increased attention. In 2013, we implemented a pill-based, multi-modal pain regimen (MMPR) in order to decrease opioid use in our trauma center. The MMPR consisted of scheduled non-opioid pain medications as first-line agents, supplemented with opioids as needed. We hypothesized that the MMPR would decrease inpatient morphine milligram equivalents (MME) and decrease opioid prescriptions at discharge.

**Method:** Adult patients admitted to a level-1 trauma center with ≥1 rib fracture from 2010-2017 were included – spanning 3 years before and 4 years after MMPR implementation. Baseline patient demographics were collected by chart review. MME were summarized as medians and interquartile range (IQR) by year of admission. The effect of the MMPR on daily total MME was estimated using a multi-level generalized linear model accounting for clustering due to patient and unit of admission.

**Results:** A total of 6933 patients were admitted over the 7-year study period, of which 37% were pre-MMPR and 63% were post-MMPR. No significant differences between years were observed in Abbreviated Injury Scale (AIS) Chest or Injury Severity Scores (ISS). After introduction of the MMPR, there was a significant reduction in median total MME administered per day from 53 MME/day (IQR 30-90 MME/day) in 2010 to 30 MME/day (IQR 8-55 MME/day) in 2017, p <0.05. Total MME administered per day decreased by 3.93 MME each year during the study period (b=-3.93, 95% CI -4.20 – -3.59). Additionally, there was a significant decrease in the incidence of opioid prescriptions at discharge (80% in 2010 versus 74% in 2017, p<0.05) and an increase in the incidence of prescribing only codeine or tramadol at discharge (2% in 2010 versus 62% in 2017, p<0.05).

**Conclusion:** The introduction of a multi-modal pain regimen resulted in significant reduction in MME administered per day and decreased the need for opioid prescriptions at discharge. This overall reduction in inpatient opioid use was equivalent to 18.5 mg less oxycodone or 27.8 mg less hydrocodone per patient per day. Routine use of a MMPR could reduce inpatient opioid use and opioid prescriptions at discharge in other hospitalized patients.
* + 23. FILLED TO THE BRIM: THE CHARACTERISTICS OF OVER-TRIAGE TO A LEVEL 1 TRAUMA CENTER.

MR Baimas-George, KW Cunningham, SW Ross, A Savell, K Monteruil, AB Christmas, RF Sing

**Presenter:** Maria Baimas-George MD, MPH | Carolinas Medical Center

**Background:** Interfacility trauma transfers are often necessary to provide appropriate care for high acuity patients and are dependent upon the judgment and experience of emergency room physicians. Despite regional guidelines and written agreements, many patients are inappropriately transferred to our level 1 trauma center. We evaluated our over-triage occurrences at our Level I trauma center and identified the common etiologies and risk factors.

**Method:** A retrospective analysis was conducted at our ACS-verified Level I urban trauma center assessing all patients transferred from all regional facilities during 2017. Over-triage was defined as patients who were discharged less than 48 hours following transfer without procedural intervention. Exclusion criteria were leaving against medical advice, death, or lack of outside hospital records.

**Results:** Overall, 2,353 patients met inclusion criteria. Nine hundred thirty (39.5%) were discharged in <48 hours; of these, 498 (53.5%) received no procedural intervention. Appropriate criteria for transfer were met by 484 patients with 49.8% transferred for abnormal neurological exams and 22.0% for intra-abdominal injury. However, 446 patients (48.0%) did not meet defined transfer criteria. Cited reasons for these “inappropriate” transfers included orthopedic consultation for hand injuries (10.1%), supracondylar fractures (16.4%) and extremity injuries (24.2%), neurosurgery consultation (10.5%), rib fractures (5.2%), or no transfer rationale (6.1%). Furthermore, 136 of the inappropriately transferred patients received no procedural intervention (31.0%). Interventions for the remaining 310 inappropriately transferred patients included operative (57.4%), orthopedic splinting (6.5%), neurosurgery bracing (3.8%), and suture repair (1.1%), many of which could have been performed at the referring facility. Of patients discharged in <48 hours, 909 (97.7%) were discharged home without any home assistance.

**Conclusion:** Although interfacility trauma transfers are indisputably necessary, many patients are inappropriately transferred to tertiary care centers without a definitive need for their advanced services or resources. This high rate of over-triage yields increased costs for patients and the healthcare system and creates a significant burden on hospital resources. Additional studies are needed to improve triage criteria without increasing the rate of under-triage.
Background: Numerous in-hospital scoring systems to activate massive transfusion protocols (MTP) have been proposed; however, to date, pre-hospital scoring systems have not been robustly validated. Many trauma centers do not have blood or pre-thawed plasma available in the trauma bay, leading to delays in balanced transfusion. This study aims to assess pre-hospital injury and physiologic parameters to develop a pre-hospital scoring system predictive of need for massive transfusion (MT) prior to patient arrival.

Method: A retrospective review of all adult trauma activations and alerts from July 2014-July 2018 from an urban level 2 trauma center was performed utilizing our trauma registry. Logistic regression model with stepwise regression multivariate analysis was performed to develop a new scoring system, with point totals assigned proportional to the odds ratios of requiring MT for each variable. Internal validation of the EMS-G score was performed using a subset of the data which was not utilized for development of the scoring system, and sensitivity and specificity were compared to previously validated in-hospital scoring systems applied in the pre-hospital setting.

Results: 763 patients were included with 94 patients (12.3%) receiving early MT, defined as 4 units pRBC in 4h or ED death. In-hospital models for predicting MT such as Assessment of Blood Consumption (ABC) or Shock Index (SI) have sensitivities and specificities of 46/85% and 94/79%, respectively for early MTP utilization based on pre-hospital data. Pre-hospital variables found to be predictive of MT were used to develop the EMS-G (Extremity, Mechanism, Shock Index, GCS) score. This system assigns obvious extremity injury – 1 point, penetrating mechanism -2 points, shock index ≥ 0.9 -2 points, GCS ≤ 8 – 3 points. A score of 3 or greater was chosen to maximize sensitivity and specificity for pre-hospital MT activation. The EMS-G score based on pre-hospital report is 89% sensitive, 84% specific, with a PPV of 44% and NPV of 98% for early MT. Using this system, 25% of trauma activations met criteria for pre-hospital MTP activation.

Conclusion: The EMS-G Score has increased sensitivity and specificity compared to the ABC Score in the pre-hospital setting and appears more appropriate than shock index alone at predicting massive transfusion. This scoring system allows trauma centers to activate MTP prior to patient arrival to ensure early and appropriate blood product administration without creating unnecessary blood product waste.
• 25. IMPROVING LENGTH OF STAY ON A TRAUMA SERVICE

_P Schultz, N Schultz, J Wang, K Schaffer, WL Biffl_

**Presenter:** Peter Schultz NP | Scripps Memorial Hospital La Jolla

**Background:** Length of stay (LOS) is a primary driver of healthcare costs. In most areas of surgery, LOS is related directly to the diagnosis and procedure, and is to a large degree predictable. In contrast, the LOS of trauma patients is influenced by many factors beyond the diagnoses, including injury severity (ISS), need for surgical procedures and rehabilitative therapies, and issues surrounding discharge disposition. Understanding the influence of the various factors can help determine optimal resource allocation to decrease LOS. We hypothesized that factors prolonging LOS can be identified and addressed to improve the management of resources and discharge planning efficiency.

**Method:** In a community hospital level II trauma center, a formal trauma service was created in November 2017, with a weekly rounding surgeon responsible for the service. Two advanced practice clinicians (APCs) were assigned to the service daily, with a focus on patient disposition. Based on our LOS data, we emphasized discharges on our “academic day” (Wednesday) and augmented weekend case manager (CM) and social worker (SW) coverage. The trauma registry was utilized to identify patients before (PRE; 10/2016-10/2017; 1486 admissions) and after (POST; 12/2017-6/2018; 938 admissions) implementation of the service. Outcomes were compared using unpaired t test, Chi squared test, and ANOVA tests where appropriate. Statistical significance was defined as p<0.05 and indicated by an asterisk (*).

**Results:** In the POST period, mean LOS was 20% shorter (4.35 vs 5.44 days*), and 16% more patients were discharged within 72 hrs (66% vs 57%*). In the PRE period, only 55% as many patients were discharged on Wednesdays, Saturdays and Sundays compared with the other days. In the POST period, Wednesday and Saturday discharges improved to equal to those on the other weekdays. Disposition of patients under 65 years of age (YOUNG) to home/skilled nursing facility (SNF)/acute rehab unit (ARU) did not change over the periods: 81%/3%/6% PRE and 82%/2%/2% POST. In patients over 65 (OLDER), discharge to home was significantly lower than in the YOUNG but increased from 51% to 57%; discharge to SNF was significantly higher than in the YOUNG but decreased from 34% to 29%. OLDER discharge to ARU was stable at 3%. LOS was loosely related to ISS but varied between OLDER and YOUNG subgroups.

**Conclusion:** Hospital LOS in trauma patients is not simply related to ISS or diagnoses; it is impacted by age, discharge disposition, needs for rehabilitative therapies and durable medical equipment, and other factors. Identifying a responsible rounding surgeon and APCs increased discharges within 72 hours and decreased LOS by 1.1 days. Dedicated trauma service CM and SW facilitate discharges, particularly on the weekends. Sunday staffing will still need to be addressed to improve discharges. An emphasis on LOS led to workflow changes and more discharges on academic days. The fact that so few patients (less than 5%) go to ARU emphasizes the importance of our service providing rehabilitative therapies and medical equipment, to prepare the large majority of patients for discharge to home.
26. PHYSIOLOGIC STRESS AMONG SURGEONS WHO TAKE IN-HOUSE CALL

JJ Coleman, RA Lawless, BL Zarzaur, LR Timsina, GS Rozycki, DV Feliciano

Presenter: Jamie Coleman MD | Denver Health Medical Center

Background: The practice of surgery is known to be stressful. High levels of occupational stress and sleep deprivation are associated with burnout and depression. Burnout and depression levels are higher in trauma surgeons as compared to surgeons in other specialties. A distinguishing feature of clinical practice for many trauma and acute care surgeons is that of in-house call. The amount of stress that occurs due to in-house call is unknown and has not been previously measured. The goal of this study was to quantitate physiologic stress among acute care surgeons who take in-house call.

Method: A prospective study of acute care surgeons with in-house call responsibilities from two Level I trauma centers was performed. Participants wore a fitness and heart rate variability device which measures heart rate and heart rate variability 100 times per second. The device was worn continuously over a 3-month period. Data collected included age, gender, schedule of in-house call, resting heart rate and heart rate variability. Heart rate variability was categorized as normal if 85% of baseline, moderate stress when heart rate variability was < 85% but > 50% of baseline, and high stress was defined as heart rate variability < 50% of baseline.

Results: A total of 1421 nights were recorded amongst 17 acute care surgeons (35.3% Female; ages 37-65, mean of 45.5 years). Excluding nights of in-house call, the mean heart rate variability was 32.23, and 95.63% of days were recorded as consistent with moderate or high stress. Compared to nights before in-house call, post call day 2 was significantly associated with the highest percentage of high stress levels of heart rate variability (65.82%, p = 0.0495). Values of high stress and moderate stress heart rate variability returned to pre-call levels on post call day 3.

Conclusion: Measurements of high and moderate physiologic stress are common among acute care surgeons and persist beyond nights of in-house call. The highest prevalence or high and moderate stress occurred on post-call day 2, with baseline heart rate variability measurements not recovered until post-call day 3. Future study is needed to determine potential health consequences of persistent physiologic stress, identify factors which impact physiologic recovery after in-house call and further elucidate the relationship between stress and burnout.
**PAPER ABSTRACTS (continued)**

* 27. FACTORS ASSOCIATED WITH GENERAL SURGERY RESIDENTS’ DECISIONS REGARDING FELLOWSHIP AND SUBSPECIALTY STRATIFIED BY BURNOUT AND QUALITY OF LIFE

NC McClintock, KE Gray, AL Neville, AH Kaji, MM Wolfe, KE Calhoun, F F Amersi, TR Donahue, TD Arnell, BT Jarman, K Inaba, ML Melcher, JB Morris, BR Smith, ME Reeves, JM Gauvin, ES Salcedo, RA Sidwell, DL Dent, KM Murayama, RB Damewood, VP Poola, CM de Virgilio

**Presenter:** Natalie McClintock MD | Harbor-UCLA Medical Center

**Background:** The vast majority of surgery residents pursue fellowships. Subspecialties vary in competitiveness of training positions, quality of life, and rates of burnout. There are limited data regarding factors that may affect surgery residents’ fellowship decisions. The objective of this study was to describe associations with interest in pursuing fellowship and specific subspecialties grouped by levels of quality of life and burnout.

**Method:** Anonymous surveys were distributed to 607 surgery residents at 19 programs across the United States. Fellowship subspecialties were stratified into low versus high quality of life and burnout. Burnout rates were derived from recent studies that used a standard validated questionnaire. Quality of life was determined from measures of work intensity and controllability including hours, call, and rate of work/home conflict reported in recent studies.

**Results:** Overall, 407 (67%) residents responded and 372 (91.4%) planned to pursue fellowship. The desire to pursue fellowship was lower among residents who attended independent programs (OR 0.08 [0.04-0.17], p<0.0001) or small programs (OR 0.06 [0.03-0.14], p<0.0001), and those who were married (OR 0.5 [0.2-1.0] p=0.04) or had children (OR 0.4 [0.2-0.9], p=0.03). Age, gender, race/ethnicity, foreign graduate, post-graduate year, and student loan debt were not associated with pursuing fellowship. Residents with children were less likely to choose low quality of life subspecialties (trauma, transplant, cardiothoracic) (OR 0.4 [0.2-0.8], p=0.01). Residents who chose high quality of life subspecialties (oncology, breast, plastic) were more likely to anticipate having greater responsibility than their significant other at home (OR 2.0 [1.1-3.8], p=0.03). Residents who received Alpha Omega Alpha (AOA) honors or were married were less likely to choose high burnout subspecialties (trauma, vascular) (OR 0.5 [0.3-1.0], p=0.04 and OR 0.6 [0.3-1.0], p=0.04, respectively).

**Conclusion:** Surgery residents’ decisions to pursue fellowship and specific subspecialties are associated with program type and size, AOA status, marital status, having children, and anticipated responsibilities at home. In the current era of increasing burnout and focus on quality of life, the variability in these issues between subspecialties may affect residents’ decisions. It is important for residency and fellowship program directors to be aware of these associations, which may affect recruitment and workforce planning.
Background: Recreational and medical use of marijuana has become legal in eight states since 2012, most recently in California in November 2016. The purpose of this research is to investigate the impact of marijuana legalization on patients presenting to a level-I trauma center, hypothesizing the incidence of marijuana-positive patients and risk of death has increased post-legalization. We also sought to determine if a pediatric subset of patients also had an increase in use after legalization.

Method: The trauma registry at a single level-I trauma center was queried to identify patients that screened positive for marijuana on urine toxicology testing for tetrahydrocannibinol (THC). Patients presenting to the hospital between 2013-2016 (pre-legalization) and after 2017 (post-legalization) were compared using chi-square and Mann-Whitney U test. A subgroup of pediatric patients (age 12-17-years-old) were also analyzed.

Results: From 21,173 trauma admissions, 2,055 (9.7%) patients screened positive for marijuana on urine toxicology. The incidence of marijuana-positive patients in the pre-legalization cohort was 9.4% and 11.0% in the post-legalization cohort (p=0.001). The most common mechanism of injury was motor vehicle accident (31.5%). Compared to those in the pre-legalization group, patients in the post-legalization group were similar with respect to mechanism of trauma injury, age, injury severity score, concomitant alcohol use, and Glasgow Coma Scale score on admission (p>0.05). Marijuana-positive patients after legalization had higher rates of critical trauma activation (20.0% vs. 15.0%, p=0.01), concomitant cocaine use (8.4% vs. 4.7%, p=0.002), and mortality (2.6% vs. 1.2%, p=0.03). In the pediatric subgroup, the incidence of marijuana-positive patients did not change after legalization (pre: 39.3%, post: 46.4%, p=0.24) but the concurrent use of benzodiazepines/barbiturates increased (pre: 10.1%, post: 30.8%, p=0.002).

Conclusion: The incidence of trauma patients who screened positive for marijuana has increased post-legalization. Adult trauma patients screening positive for marijuana post-legalization were more likely to meet criteria for critical trauma activation and have a higher mortality rate compared to the pre-legalization group. A subgroup of pediatric patients had an alarmingly high incidence of THC found on urine toxicology. Marijuana legalization was associated with an increase in the incidence of concurrent cocaine and benzodiazepine/barbiturate use among adult and pediatric trauma patients, respectively. Thus, there may be a need for more robust drug counseling programs offered to trauma patients which provide education on the dangers of marijuana and other illicit substances, especially in the pediatric population.
* 29. TRENDS IN RESIDENT OPERATIVE TRAUMA: HOW TO TRAIN FUTURE TRAUMA SURGEONS?
T Musonza, SR Todd, BG Scott, MA Davis, JR Potts
Presenter: Tashinga Musonza MD | ACGME

**Background:** The Accreditation Council for Graduate Medical Education (ACGME) outlines requirements for both operative (10 cases) and non-operative trauma (40 cases). The objective of this study was to assess the operative trauma experience by general surgery residents. We hypothesized that the operative trauma experience of general surgery residents has declined over time, including exploratory laparotomies.

**Method:** This was a retrospective review of the past 29 years (1989-1990 through 2017-2018) of ACGME case log reports for completing general surgery residents. Total operative trauma cases performed as surgeon (surgeon junior and surgeon chief) were recorded and analyzed. The number of general surgery residents completing ACGME programs annually over that same period were also recorded and analyzed. A p value < 0.05 was considered significant.

**Results:** Over the 29 year study period, the number of ACGME general surgery residency programs decreased from 279 to 251, while the number of general surgery residents completing residency increased from 981 to 1,198. The total number of operative trauma cases (mean per resident) decreased from 79.6 to 29.9, (p<0.001), while the total number of trauma exploratory laparotomies (open and laparoscopic) was unchanged from 10.0 to 9.4, (p=0.47). Additionally, the total number of gastrointestinal operative trauma cases decreased from 10.6 to 4.0, (p<0.001), the total number of vascular operative trauma cases decreased from 8.6 to 4.5, (p<0.001), and the total number of vascular operative trauma cases (excluding fasciotomies) decreased from 6.9 to 2.4, (p<0.001).

**Conclusion:** As the number of general surgery residents has increased over the past 29 years, the overall operative trauma experience has decreased. Although this is not true for trauma exploratory laparotomies, it is true for both gastrointestinal and vascular operative trauma cases. In addition to the increased number of general surgery residents, the increasing non-operative nature of trauma and the proliferation of trauma centers are most likely to blame. In order to adequately train future trauma surgeons, residency programs cannot solely rely on the operating room. Additional training beyond residency may be required.
30. BLUNT VS. PENETRATING TRAUMA: IS THERE A RESOURCE INTENSITY DISCREPANCY?

*JL Fitch, PT Albini, AY Patel, MS Yanoff, D Scaria, CT Wilson, JW Suliburk, SD Gordy, GD Hall, SR Todd*

**Presenter:** Jamie Fitch MD | Baylor College of Medicine

**Background:** Traumatic injury is a leading cause of morbidity and mortality. Caring for critically injured patients requires significant resources. The rising cost of healthcare makes the responsible allocation of limited resources critical; yet not all trauma centers see the same mechanism of injury distribution. The objective of this study was to compare resource utilization between patients with blunt and penetrating mechanisms of injury. We hypothesized that among patients with equivalent triage, blunt trauma patients would be more resource intensive than penetrating trauma patients throughout their hospital course.

**Method:** This was a retrospective analysis of all Code I (highest level activation) trauma admissions at a busy urban Level I Trauma Center from January 1, 2013 – December 31, 2017, excluding burn patients and those with an unknown mechanism of injury. Data evaluated include patient demographics, injury details, hospital charges, mortality, and specific hospital resource utilization. A p value < 0.05 was considered significant.

**Results:** Over the five year study period, 4,578 patients were identified: 2,037 blunt trauma patients and 2,541 penetrating trauma patients. Blunt trauma patients were older (40.6±16.1 vs. 33.2±12.2, p<0.0001), less frequently male (79.6% vs. 89.1%, p<0.0001), and more severely injured (ISS 18.7±14.4 vs. 12.3±12.7, p<0.0001). Blunt trauma patients required more radiologic studies (20.9±21.6 vs. 11.7±16.9, p<0.0001), more medications (25.3±18.5 vs. 17.3±15.6, p<0.0001), and more consults (2.8±1.9 vs. 2.4±1.8, p=0.0452), resulting in higher mean daily hospital charges ($12,403±$12,971 vs. $10,076+$10,956, p<0.0001). Clinically, blunt trauma patients required more mechanical ventilator days (6.72+10.2 vs 1.5+5.3, p<0.0001), more intensive care unit days (5.8+10.1 vs 2.7+7.4, p<0.0001), and a longer total hospital stay (11.5+16.1 vs 7.7+13.2, p<0.0001). Blunt trauma patients were also significantly less likely to survive to discharge (85.1% vs 88.8%, p=0.0003).

**Conclusion:** Among similarly triaged trauma patients, blunt trauma patients were more severely injured and required significantly more resources than penetrating trauma patients. Understanding this pattern will allow trauma systems to better allocate limited resources based on each center’s mechanism of injury distribution. Given current changes in the healthcare funding climate, efficient resource allocation is more critical than ever before. Trauma centers with a higher proportion of blunt trauma patients may require greater financial support.
31. WHO’S BEING LEFT BEHIND? UNINSURED EMERGENCY GENERAL SURGERY ADMISSIONS AFTER THE ACA
PT Albini, MR Cochran-Yu, LN Godat, TW Costantini, JJ Doucet
Presenter: Paul Albini MD | University of California San Diego

Background: American health insurance underwent a major overhaul with the Affordable Care Act Open Enrollment (ACA-OE) launch in January 2014 with more than 20 million uninsured Americans gaining coverage by 2016. Emergency general surgery cases (EGS) represent surgical cases that must be performed regardless of insurance status. Prior study shows the ACA-OE was associated with decreased EGS cases, an increase in Medicaid EGS cases, and a decrease in uninsured EGS admissions. We hypothesized that during ACA-OE, non-white race groups were less likely to gain coverage for EGS. We also hypothesized that there were more high-risk EGS cases performed after the ACA-OE.

Method: This is a retrospective review using the National Inpatient Sample Database (NIS) from 2012 through quarter 3 of 2015. Non-Medicare patients who were admitted for EGS were identified by ICD-9 codes. Patient demographics, payer type (Medicaid, Private or Self-pay), Charlson Comorbidity Index (CCI), hospital, Zip code-income quartile, hospital and regional characteristics were obtained. Characteristics of uninsured patients after ACA-OE were determined by univariate analysis and multivariate regression analysis. Difference-in-Differences (DID) analyses were used to compare payor-group complications, mortality and NIS-estimated wage index-adjusted costs comparing the pre-ACA (2012-2013) years to the post-ACA years (2014-Q3/2015).

Results: EGS cases fell 9.1% after ACA-OE, from 1,711,940 in 2012-2013, to 1,555,033 NIS-weighted cases. The proportion of EGS appendectomies (37.1 to 33.6%, p<0.0001) and cholecystectomies (20.7 to 14.9 %, p<0.0001) decreased, but emergent hernia repairs (11.5 to 12.3%, p<0.0001) and bowel resections (19.0 to 21.0%, p<0.0001) increased. ACA-OE uninsured admissions were more likely to be in southern states (OR 2.2, CI: 2.0-2.3, p<0.0001), in lower-half Zip-income quartiles (OR 1.49, CI: 1.44-1.53, p<0.0001), be non-White (OR 1.69, CI: 1.66-1.73, p<0.0001), especially Hispanic (OR 2.29, CI: 2.12-2.24, p<0.0001), males (OR 1.36, CI: 1.36, 1.31-1.40, p<0.0001) with fewer comorbidities (OR 0.91, CI 0.90-0.92, p<0.0001). Uninsured EGS cases were more likely transfers from another acute hospital (OR 1.74, CI: 1.41-2.1, p<0.0001). After ACA-OE, there was no difference by DID analysis in risk-adjusted mortality (OR 0.995, CI: 0.88-1.13, p=0.94) for uninsured patients. Complications and costs increased significantly in all payor groups each year despite ACA-OE.

Conclusion: After the ACA-OE, uninsured EGS admissions were more likely in the southern US, from lower income zip codes, to be male and Hispanic. ACA-OE reduced the need for EGS with no significant change in overall risk adjusted mortality, but with increased costs and reported complications. EGS cases now represents higher risk surgeries with higher cost and complications in all payor groups. Opportunities exist for policies to target those at risk for uninsured EGS surgery to obtain coverage and for EGS registries.
32. UTILIZATION OF ENDOVASCULAR AND OPEN SURGICAL REPAIR OF VASCULAR INJURY: A 10-YEAR ANALYSIS OF THE NATIONAL TRAUMA DATABANK (NTDB)

AN Romagnoli, M Zeeshan, ML Brenner

Presenter: Anna Romagnoli MD | University of California Riverside School of Medicine

Background: Endovascular therapy provides a less invasive alternative to open surgery for repair of vascular injury. The purpose of this study was to evaluate recent trends and outcomes of endovascular repair (EVR) versus open surgical repair (OSR) for the treatment of arterial injury.

Method: A 10-year (2004-2014) analysis of ACS-NTDB identified all adult trauma patients with arterial injuries. Data regarding demographics, injury parameters, type of repair, and outcomes were extracted. Cochran-Armitage trend analysis and multivariate logistic regression analysis were performed.

Results: 111,061 patients with arterial injuries were included. Mean age was 39±19y, 82% were male and 79% were white. The most common artery injured was iliac artery followed by brachial artery and thoracic aorta. Overall 7.4% (8,219) patients underwent EVR while 40% (44,495) had OSR. The rate of EVR increased from 3.1% to 8.9% while the incidence of OSR decreased from 47% to 32% over the study period (Figure 1). Patients in EVR group had lower ISS compared to patients in OSR group (15[9-27] vs 22[13-36], p=0.03). Patients who underwent EVR had shorter hospital length of stay (HLOS) (days: 4[2-8] vs 8[4-11], p=0.02) and lower mortality (8% vs 14%, p=0.01) than OSR groups. On multivariate regression analysis after controlling for confounding variables, endovascular repair was independently associated with improved survival (OR: 2.45[1.84-4.26], p=0.01).

Conclusion: The use of endovascular modalities to repair arterial injuries in the setting of acute trauma is increasing in a dramatic fashion. EVR of arterial injuries is associated with shorter HLOS and improved survival compared to OSR.
33. NARROWED PULSE PRESSURE PREDICTS THE NEED FOR MASSIVE TRANSFUSION AND EMERGENT OPERATIVE INTERVENTION FOLLOWING PENETRATING TRAUMA

J Warren, A Moazzez, B Putnam, A Neville, J Smith, G Singer, M Deane, V Chong, DY Kim

Presenter: Jonathan Warren BS | Harbor-UCLA Medical Center

Background: Uncontrolled hemorrhage is the leading cause of preventable deaths in trauma patients. However, the presence and diagnosis of clinically significant bleeding may be elusive. Severity of hemorrhagic shock is often based on the recognition of key physiologic derangements and exam findings, including hypotension, tachycardia, and decreased urine output. Few studies have examined the utility of a narrowed pulse pressure (<30 mmHg) in identifying the need for lifesaving interventions in trauma patients. We hypothesized that a narrowed pulse pressure is associated with the need for a massive transfusion and emergent surgery in patients with penetrating injuries.

Method: We performed a 2.5-year retrospective analysis of adult patients who presented to our Level 1 trauma center with a penetrating mechanism of injury. Patients who were transferred from another facility or presented in traumatic full arrest were excluded from the analysis. Variables analyzed were demographics, mechanism, injury severity, admission vital signs (including shock index [SI]), ED hypotension (defined as SBP <90 mmHg), transfusion requirements, and emergent (direct to OR from ED) surgery. MT was defined as the transfusion of 10 or more units in the first 24 hours post-injury. The main outcome measures were the administration of a massive transfusion or performance of emergent surgery. Multiple logistic regression analyses were performed to identify variables associated with massive transfusion and emergent operative intervention.

Results: A total of 957 patients met inclusion criteria. The majority were male (86%) and 55% presented with gunshot wounds. On bivariate analysis patients with a narrowed pulse pressure were more likely to be transfused (30.9% vs. 10.2%, p 0.7 (p=0.001), and ED GCS (p 0.7 (OR=2.4; 95% CI=1.1-5.2, p=0.03).

Conclusion: In patients with penetrating trauma, the presence of a narrowed pulse pressure should alert providers to the potential for hemorrhagic shock. Early activation of the institutional massive transfusion protocol and expedited management should be considered in patients with this exam finding. Prospective validation of the utility of a narrowed pulse pressure in predicting the need for massive transfusion is potentially warranted.
RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA (REBOA) IS ASSOCIATED WITH IMPROVED SURVIVAL IN SEVERELY INJURED PATIENTS: A PROPENSITY SCORE MATCHING ANALYSIS

R Yamamoto, RF Cestero, M Suzuki, T Funabiki, J Sasaki

Presenter: Ryo Yamamoto MD | University of Texas Health Science Center at San Antonio

Background: Resuscitative endovascular balloon occlusion of the aorta (REBOA) is a technique for temporary control of arterial hemorrhage which maintains cerebral and coronary perfusion while improving hemodynamic stability in trauma victims. Although REBOA may serve a potential role in the management of trauma patients and various investigators have challenged the optimal situation where REBOA can be applied as an effective treatment, there is considerable debate regarding its effectiveness and clinical outcomes. To better assess the utility of REBOA, we evaluated outcomes in trauma patients treated with REBOA compared to those treated without REBOA.

Method: We conducted a retrospective cohort study using the Japan Trauma Data Bank, a nationwide database which includes over 200 major tertiary care centers. We included trauma patients who arrived at participating hospitals from 2004 to 2016 and excluded those with missing survival data. Patient data were divided between REBOA and non-REBOA groups, and a propensity score was developed to predict the allocation to the REBOA group. Survival to discharge was compared between the groups after propensity score matching. Secondary outcomes included survival at 28 days and hospital-free days to day 90. The propensity model included age, injury variables, vital signs, presence of intraabdominal hemorrhage, hemostatic surgical procedure and angiography, transfusion within 24 hours after arrival, Injury Severity Score, Revised Trauma Score, and probability of survival.

Results: Among 88,701 patients who presented to collaborating centers during the study period, 6,330 were excluded due to missing survival data. A total of 82,371 patients were eligible for this study, among whom 385 were treated with REBOA. After propensity score matching, 117 pairs of severely injured patients (mean Injury Severity Score = 35; mean Revised Trauma Score = 5.55) were selected in the REBOA and non-REBOA groups. Survival to discharge was significantly higher among patients treated with REBOA than among those treated without REBOA (53 [45.3%] vs. 38 [32.5%]; odds ratio [OR] = 1.72; 95% confidence interval [CI] = 1.01–2.93; p = 0.04). Survival at 28 days was also significantly higher in patients in the REBOA group (55 [47.0%] vs. 38 [32.5%]; OR = 1.84; 95% CI = 1.08–3.13; p = 0.04), while hospital-free days to day 90 did not significantly differ between the groups.

Conclusion: In severely injured trauma patients who have experienced similar injury severity, REBOA use was associated with improved survival to discharge as well as survival at 28 days after injury. The use of REBOA should therefore be considered in conjunction with standard trauma resuscitation during the management of severely injured trauma patients.
QUICK SHOT ABSTRACTS
Background: Blunt or penetrating trauma can cause a life-threatening tension pneumothorax requiring emergent decompression using needle thoracostomy. Controversy exists surrounding unwarranted use of needle thoracostomy by prehospital personnel in patients with mild clinical signs of tension pneumothorax. Some authors suggest prehospital needle thoracostomy is safe with the potential benefits outweighing risks; others argue few patients benefit from prehospital needle thoracostomy and thus intervention be postponed until hospital arrival. This study aimed to describe prehospital personnel indications for needle thoracostomy, needle placement accuracy, and related complications from needle decompression. Secondary outcome was need for tube thoracostomy following arrival to the trauma center.

Method: This was a retrospective chart review of trauma patients who underwent needle thoracostomy decompression by prehospital personnel and were evaluated at a Level I trauma center between 9/2014 and 9/2018. Patients were identified from a Quality Improvement database in which needle thoracostomy-related information was collected prospectively, specifically the indication for needle decompression. Additional information was obtained from the trauma registry and medical chart review. This included demographics (age, gender, BMI), mechanism of injury, overall and body region specific injury severity, intubation status, prehospital vital signs (SBP, HR, RR, GCS, SpO2) before and after needle decompression, initial ER vital signs, presence or absence of pneumothorax on imaging, intervention required for pneumothorax, location of needle thoracostomy on CT imaging, and complications from needle thoracostomy.

Results: A total of 59 patients were identified for analysis, mechanism of injury was blunt in 47 (82.5%) patients and penetrating in 10 (17.5%). “Reduced or absent breath sounds” was the most commonly recorded indication for prehospital needle decompression (40/58, 70.2%) whereas only 4 (7%) had “hypotension” as an indication. Mean SBP pre-decompression was 116 (SD 28.4), and post decompression was 123 (SD 28.5), p=0.0189. CT imaging with needle thoracostomy remaining in place was obtained in 46 (77.9%) patients. CT identified the thoracostomy needle within the pleural space in 3 (6.8%) patients, and outside the pleural space in 43 (93.2) patients. Needle location was in the subcutaneous tissue in 30 (69.8%) patients. Chest thoracostomy tube was required in 42 (71.2%) patients with only 11 (26.8%) placed prior to any imaging. Six patients underwent delayed thoracostomy tube placement; two of those for...
pneumothorax. One patient developed a pneumothorax after needle removal.

**Conclusion:** This study shows chest thoracostomy tube placement is not universally required in all patients undergoing prehospital needle decompression. Although 48 of 59 patients ultimately required tube thoracostomy, the majority of the patients were stable and underwent tube placement after imaging. Imaging performed prior to tube thoracostomy placement allows for appropriate selection of tube size, location, and sterility. This study also demonstrates that prehospital personnel frequently utilize needle decompression without an appropriate indication; only 8 of 59 patients underwent decompression for hemodynamic instability. When patients did undergo needle decompression, the needle was outside the pleural space in 56 of 59 patients at the time of imaging. Trauma centers should actively engage and educate prehospital personnel on procedures even procedures seen as routine or frequently performed.
**Background:** When to transport pediatric trauma patients directly from scene via helicopter has been a long debated topic, as there is no consensus on appropriate triage criteria for helicopter transport (HT). While some studies suggest severely injured children benefit from HT, most have reported significant overtriage of seemingly low risk patients to HT. However, overtriage is often based on a low injury severity score (ISS), which may not accurately reflect patient needs. This study proposes Need for Surgeon Presence (NSP) as an alternative method to assess appropriate utilization of HT of pediatric trauma patients directly from the scene of injury.

**Method:** We utilized the 2016 National Trauma Quality Improvement Program database. Data were limited to patients age 16 or less transported directly from the scene of injury by helicopter ambulance (N=1972). NSP was defined as having one or more of the following: intubation, transfusion, operation for hemorrhage control/craniotomy, vasopressors, interventional radiology, spinal cord injury, tube thoracostomy, emergency thoracotomy, intracranial pressure monitor, or pericardiocentesis. The outcome of interest was the presence (NSP+) or absence (NSP-) of a NSP indicator. Covariates included age group (1-13), sex, race, length-of-stay (LOS), blunt/penetrating, emergency department disposition, hospital disposition (HD), ISS, pediatric adjusted shock index (SIPA), and a GCS<14. Bivariate associations were assessed using Chi-Square and Wilcoxon Ranked-Sum tests. A multivariable logistic regression model was fit using covariates that could potentially predict NSP.

**Results:** There were 614 (31%) NSP+ and 1358 (69%) NSP- patients. The NSP+ patients had longer LOS, more often had a GCS =16 and 16.4% of patients with an ISS>=16 were NSP-. Among patient with an ISS>=16, mortality for those also NSP+ was 18.8% compared to 1.4% among the NSP-. Moreover, mean LOS for patients with both ISS>=16 and NSP+ was 16.2 days compared to 6.4 days among those with only ISS>=16. Upon multivariable adjustment, SIPA (OR 2.12; 95%CI 1.63-2.76), older age group (OR 1.3; 95%CI 1.04-1.71), penetrating injury (OR 6.73; 95%CI 4.04-11.21), and low GCS (14.56; 95%CI 10.90-19.30) were independent predictors of NSP.

**Conclusion:** HT is a scarce, expensive resource. Over-utilization results in burdensome costs for patients that could have been safely transported by ground. Our findings demonstrate the utility of NSP as a metric for patient severity and provides further evidence of over-utilization of HT. The disparity between
NSP and traditional ISS thresholds also supports NSP as an additional metric to validate pre-hospital triage criteria against and may be a better indicator of overall hospital resource utilization. Also, ISS is entirely retrospective whereas NSP indicators would be known shortly after arrival and could provide a means for more timely feedback for EMS providers. Further evaluation of pre-hospital factors as well as details of final diagnoses for NSP+ and NSP- patients may aid in refinement of prehospital triage decisions.
QS 3. SURVIVING TRAUMATIC ARREST: WHO ARE THE TOP 1%?
F Bokhari, C Fu, F Bajani, CC Burlew, L Tatebe, C Butler, A Dennis,
F Starr, M Kaminsky, T Messer, S Poulakidas
Presenter: Faran Bokhari MD | Cook County Health System

Background: Resuscitation termination after traumatic death often varies between institutions and even between practitioners. This study examines survival rates in torso trauma patients without vital signs upon arrival to the emergency department (ED).

Method: The National Trauma Data Bank (NTDB) was analyzed from 2007-2015. Inclusion criteria included blunt and penetrating torso trauma patients without vital signs in the ED (Pulse=0, SBP=0, Respiratory rate=0, GCS=3). Transferred patients or those missing key values were excluded. Survivor characteristics were evaluated.

Results: 24,191 torso trauma patients had no vitals in the ED. 23,379 died on arrival (DOA) without response to resuscitation. 812 patients responded to resuscitation; 246 (30.3%) survived and 73 had a routine discharge (9%). Survivors had more penetrating trauma (54.1% vs. 31.3%, p<0.001), shorter ED (73.8 vs. 430.3 minutes, p<0.05), and transportation timed (63.2 vs. 105 minutes, p<0.05), lower injury severity scores (29.0 vs. 34.6, p<0.001), higher exploratory thoracotomy (30.9% vs. 18%, p<0.001) and definitive surgery rates (69.5% vs. 47.3%, p<0.001). Independent survival factors included penetrating trauma (2.12 times blunt trauma), ED time (10 minutes decreases survival by 2%) and receiving definitive surgery (1.69 times increased survival). Survival in blunt trauma is affected by ED time but not in penetrating trauma. Survival in penetrating trauma is affected by ISS only. Penetrating trauma patients are statistically significantly different only in being younger than blunt trauma patients (29.4 vs. 41.4 years p<0.05).

Conclusion: An exceedingly small 1% of torso trauma patients with no vitals survive, but 28% of those who survive go home. For patients presenting with no vital signs upon arrival to the ED, aggressive treatment if undertaken should be focused on younger penetrating trauma patients. Aggressive treatment for older blunt trauma victims should not be abandoned if resources permit.
QS 4. COMPARISON OF NON-OPERATIVE AND OPERATIVE MANAGEMENT OF TRAUMATIC PENETRATING INTERNAL JUGULAR VEIN INJURY

S Maithel, A Grigorian, N Kabutey, M Dolich, A Kong, S Gambhir, B Sheehan, J Nahmias

Presenter: Shelley Maithel MD | University of California Irvine Medical Center

Background: Previous reports have estimated an incidence of 3-9% for internal jugular vein (IJV) injuries in penetrating neck trauma. Small prior case series have suggested that selective non-operative management (NOM) of penetrating IJV injuries is safe and feasible in hemodynamically stable patients without classically described “hard signs” mandating exploration. Therefore, we sought to compare NOM to operative treatment of penetrating IJV injury, hypothesizing that the two treatment strategies have similar patient outcomes and mortality when used in appropriately selected patients.

Method: The Trauma Quality Improvement Program (2015-2016) was queried for patients with penetrating traumatic injury to the IJV with an abbreviated injury scale score of the neck >2. Demographics and patient outcomes were compared between patients undergoing NOM versus patients undergoing operative management. A multivariable logistic regression model was used for analysis of risk of mortality.

Results: A penetrating IJV injury was identified in 149 patients with 69 (46.3%) from stab wounds and 41 (27.5%) from gunshot wounds. Operative exploration was performed in 101 (67.8%) patients while 48 (32.2%) patients underwent NOM. No differences in patient demographics existed between the groups (p>0.05). Concomitant injuries were similar between the NOM and operative management groups, including carotid artery (54.2% vs 37.6%, p=0.06), cervical spine (12.5% vs 13.9%, p=0.82), esophageal (0.0% vs 2.0%, p=0.33), and tracheal (10.4% vs 9.9%, p=0.92) injury. No differences in length of stay, ventilator days, unplanned intubation, wound infection, and stroke rates were seen between the groups (p>0.05). Mortality difference between the NOM and operative group was not statistically significant (18.8% vs 8.9%, p=0.09). After controlling for covariates, operative treatment of IJV injury did not reduce risk of mortality (OR 0.63, CI 0.20-2.02, p=0.44).

Conclusion: NOM of traumatic penetrating severe IJV injury is associated with similar patient outcomes and mortality compared to operative management suggesting that NOM may be utilized in appropriately selected patients. Future research is needed to determine the ideal patients suited for NOM and to identify risk factors and outcomes associated with failure of NOM.
Background: Blunt aortic transection is often encountered at the ligamentum arteriosum in patients who have sustained significant blunt trauma, particularly with high-velocity deceleration injuries. Management of these injuries has changed significantly over the last 15 years with implementation of endovascular techniques. Long-term follow-up of these patients, including imaging recommendations, is often based on recommendations for patients who have undergone a similar procedure due to chronic aneurysmal disease. Our study aimed to examine the factors that are predictive of appropriate follow-up in patients undergoing aortic repair due to acute traumatic injuries.

Method: Our study was designed as a retrospective analysis including all patients from January 1, 2003 to June 1, 2018 at the University of Oklahoma Health Sciences Center who presented with traumatic aortic injury. Penetrating injuries were excluded from analysis. Once this patient population was identified, the database was searched to identify patients that underwent operative repair for their aortic injury. Ninety-two patients were identified that met the above inclusion criteria. Demographic and clinical information was collected for each patient including age, sex, race, and insurance status as well as operative information including graft size, type and open versus endoscopic repair. Patients were stratified based on follow-up computed tomography (CT) status (Y/N) for analysis. Demographic and clinical characteristics were then compared between these two groups.

Results: Of the 92 patients who met inclusion criteria, 28 patients underwent open repair. Four patients expired intra-operatively, all of which were undergoing open repair. Our current institutional protocol recommends CT imaging at 1 month, 3 months, and 1 year after repair of aortic transection. Within our cohort, 56 (60.9%) patients received a repeat CT scan within 1 month, 48 (52.2%) received a repeat CT scan at 3 months, and 21 (22.8%) received a CT scan at 1 year. No significant differences (p >0.05) were identified in rates of follow-up based on patient age, gender, race, insurance status, or location of injury. Of patients that did receive follow-up computed tomography (CT) imaging, they were significantly (p <0.05) more likely to have undergone an endovascular repair. In addition, patients discharged to rehab facilities were significantly more likely to receive follow-up CT imaging than those discharged to home.

Conclusion: We examined the data at our institution of traumatic aortic injuries
over a 15-year period and found that patient demographic factors did not affect the rate of follow up imaging up to 1 year postoperatively. Approximately half of patients received follow up imaging after operative repair with decreasing patient numbers over the following year. However, in patients with appropriate follow up imaging, a small number of postoperative complications were noted and none required reoperation. Our study demonstrates the low rates of follow up within this cohort; however, it is unclear what imaging is required in this specific patient population to prevent long-term adverse outcomes.
QS 6. TRAUMATIC RENAL INJURIES: ANGIOGRAPHY & ANGIOINTERVENTIONS AT A LEVEL I VERIFIED ADULT & PEDIATRIC TRAUMA CENTER


Presenter: Elizabeth Scherer MD, MPH | University of Texas Health Science Center at San Antonio

Background: Management of renal injuries has evolved over the past decades, like that of other solid organ injuries, with a trend towards non-operative management (NOM) due to a more comprehensive understanding of the natural history of these injuries as well as advances in angioembolization technology. There remains a paucity of data to substantiate NOM management algorithms in patients with traumatic renal injuries, specifically relating to identifying patients requiring observation versus diagnostic and potentially therapeutic angiography. The purpose of this study was to determine the clinical characteristics of patients with renal injury in order delineate appropriate selection criteria for these approaches.

Method: The study was conducted as a retrospective analysis of adult (ACS definition of ≥ 16 years old) and pediatric patients (ACS definition of <16 years old) with blunt and penetrating renal injuries at a level I trauma center from January 2011 to December 2017. Patients who were moribund and died in the Trauma Resuscitation Unit or the OR during resuscitative surgery were excluded. Patient demographics, clinical characteristics, imaging, management including indication for angiography and embolization (blush, pseudoaneurysm or potential for future bleeding) and type of embolization performed as well as follow-up data was obtained using chart review and information from our internal trauma database.

Results: A total of 282 adult and 41 pediatric trauma patients with renal injuries were identified, the majority from blunt mechanism (87% and 98%, respectively). Renal angiography was performed on 67 adult (24%) and 3 pediatric (7%) patients, of which 16 adult and 1 child had embolization (24% and 33%, respectively). Embolization was performed significantly (p < 0.05) more frequently for adults with American Association for the Surgery of Trauma (AAST) Grade 3-5 injuries (n=16) than Grades 1-2 (n=3). Of patients with renal injuries, 14 adults and 1 child underwent angiography for evaluation of other solid organ or pelvic injuries, without selective renal angiography indicating that presence of renal injury alone was not sufficient indication for angiographic interrogation. Angioembolization failure defined as the need for further surgical intervention or re-embolization, occurred in 3 patients (2 adults and 1 child). Two procedural complications were identified, both were adult patients with femoral pseudoaneurysms.

Conclusion: Our study demonstrated that angiography, with the potential to perform therapeutic embolization was useful and safe for patients with higher grade renal injuries. Our sample size of pediatric patients was insufficient to reach statistical significance; however, this study highlighted that angioembolization can be safely performed in the pediatric population.
**Background:** Trauma centers were created to provide immediate life-saving interventions, specifically hemorrhage control by a trauma surgeon. With the aging population, many trauma centers are experiencing increasing elderly fall patient volumes. It is unclear whether immediate trauma surgeon availability benefits this patient population. We hypothesize that patients 55 years of age and older experiencing a ground level fall do not require a bedside trauma surgeon for initial evaluation.

**Method:** A retrospective registry review of patients aged 55 and older sustaining a fall <6ft from 2016 to 2017 was undertaken. Demographic, physiologic and emergency intervention data were collected. Chi Square and multivariable regression analyses were performed to identify predictors of emergency intervention.

**Results:** A total of 1,029 patients met inclusion criteria. Systolic blood pressure less than 90 mmHg, GCS < 14, anticoagulant use, sex, and ISS were significant predictors of intervention. Age and heart rate were not predictive of intervention. Of the 230 patients requiring operative intervention, only 20 occurred in <4 hours including 9 craniotomies, 4 globe repairs, 1 orthopedic operation and 1 vascular repair. Only two operations were performed by a general surgeon in <4 hours.

**Conclusion:** Elderly patients who suffer ground level falls and present without hypotension or depressed consciousness rarely require urgent intervention. Immediate trauma surgeon presence is likely not warranted for this population. System factors may be responsible for the improved outcomes at level 1 trauma centers seen in previous studies. Further investigation to identify key resources that contribute to optimal outcomes for this patient group are necessary.
**Background:** Injury Severity Score (ISS) is the primary metric by which triage has been evaluated in trauma activations. It was originally described in adults, however, ISS based triage assessment has been applied to pediatric trauma without validation. We compared ISS to a previously described set of criteria defined as Need for Surgical Presence (NSP). ISS is retrospective in nature, and may be calculated hours to days after the patient is injured, whereas NSP is near real time. We hypothesize that NSP may serve as an alternative to ISS in predicting mortality and assessing triage in pediatric trauma patients.

**Method:** A total of 19,139 pediatric trauma patients in the 2016 National Trauma Quality Improvement Program Database (excluding transfers) had complete data for mortality, mode of transport, age, injury type, ISS, and NSP factors. NSP was defined as having one or more of the following: intubation, transfusion, operation for hemorrhage control/craniotomy, vasopressors, interventional radiology, spinal cord injury, tube thoracostomy, emergency thoracotomy, intracranial pressure monitor, or pericardiocentesis. Means and proportions were used to summarize the data by NSP status. Area Under the Curve (AUC) was used to compare NSP and ISS in predicting mortality while adjusting for other independent predictors.

**Results:** The average age was 8.6 (SD 4.7) and 36.6% were female. Overall mortality was 1.3% and 96% of all patients suffered blunt injury. A total of 2787 (14.6%) patients had an NSP indicator compared to 2036 (10.8%) with an ISS >=16. After controlling for age group, mode of transport, and injury type, NSP was non-inferior to ISS in predicting mortality with the AUC of 0.91 (95% CI 0.89-0.92) and 0.90 (95% CI 0.88-0.92) respectively (P-value=0.67). In addition, the sensitivity and specificity in differentiating mortality status was 95% and 86.4% for NSP and 91% and 90% for ISS ≥16.

**Conclusion:** NSP predicts mortality in pediatric trauma patients as well as ISS. NSP has multiple advantages over ISS as a metric for assessing over/undertriage in pediatric trauma. NSP can be calculated shortly after a patient arrives. This is a significant advantage of using NSP criteria as a metric of assessing appropriate triage. Not only is NSP near real-time, NSP is also pediatric specific. Proper assessment of over and under triage allows for optimal resource utilization by the medical facility and ultimately benefits the hospital, physician and patient. Additionally, the acceptable rates of over and undertriage calculated using ISS have not been validated prospectively. Prospective validation of NSP as a tool to assess triage is currently underway at our institution.
QS 9. FATAL AGRICULTURAL ACCIDENTS IN KANSAS: A THIRTY-NINE YEAR FOLLOW-UP STUDY
W Keller, SD Helmer, J Reyes, D Hauschild, JM Haan
Presenter: Weston Keller MD | University of Kansas School of Medicine – Wichita

Background: The purpose of this study was to evaluate the trends in agricultural mortality before and after implementation of safety initiatives.

Method: A retrospective review of Kansas mortality data from agriculture-related injuries from 1979 to 2018 was conducted. The 39-year period was stratified to compare efficacy and safety of interventions. Demographics and injury patterns were evaluated by mechanism (vehicle, farm equipment, livestock and other).

Results: There were 780 agricultural-related deaths during the 39-year period. Mean age significantly increased between study Period I (1979 to 1989) to IV (2010 to 2018) from 46.4 to 55.3 (P=0.013). The majority of deaths occurred in individuals greater than age 55 (61.7%). Deaths per year decreased from 24.7 in Period I to 12.8 in Period IV. Tractors remain the primary cause of mortality overall. However, tractor-related deaths significantly decreased during the study periods from 75.6% to 47.1% (P<0.001). Tractor rollover mortality also decreased from 50.8% to 24.4% (P=0.023). There was a continued decrease in mortality related to “caught in equipment” from 83.3% to 10% (P<0.001). An increase from 2.1% to 13.9% was noted in those killed by “fall” (P<0.001). ATV-related deaths significantly increased from study Period II (1990 to 1999) to III (5.1% to 24.3%, P<0.001), but decreased from Period III (2000 to 2009) to IV (24.3% to 18.2%, P=0.243).

Conclusion: Tractors remain the most dangerous piece of farm equipment. Rollover protection structures may contribute to the significant decrease in tractor rollover mortalities. Although an increase in ATV injuries was noted in our prior review, these injuries have decreased since the time of that review.
QS 10. THE METABOLIC TIME LINE OF PANCREATIC CANCER: OPPORTUNITIES TO IMPROVE EARLY DETECTION OF DUCTAL ADENOCARCINOMA

HB Moore, S Gebrke, PJ Lawson, RJ Torphy, A Paniccia, RD Schulick, BH Edil, TL Nydam, A Sauaia, EE Moore, KC Hansen, A D’Alessandro

Presenter: Hunter Moore MD, PhD | University of Colorado School of Medicine

**Background:** The search for a reliable biomarker to detect early pancreatic ductal adenocarcinoma (PDAC) continues to be elusive. Current laboratory prediction of malignancy is based on a single biomarker, CA19-9. The Warburg-like metabolic reprogramming towards glycolysis with alteration in the citric acid cycle (TCA) and KRas-dependent drive towards glutaminolysis is described in pancreatic cancer models. Despite known metabolic reprogramming in advanced PDAC, the transition from pre-malignant to malignant is poorly defined in humans using systemic blood. With the utilization of highly sensitive metabolomics we hypothesize that a more global analysis of a patient’s blood can differentiate different stages of PDAC.

**Method:** Patients undergoing pancreatic resection from 2016- 2018 were prospectively enrolled in an observational study to bank plasma samples paired pathology specimen. Patients plasma samples were grouped by diagnosis and assayed with mass spectrometry to measure metabolic differences. Localized pancreatic neuroendocrine tumors (PNET) patients were used as a controls group for non PDAC patients undergoing pancreatic resection. Final groups (10 per group) included PNET, intraductal papillary mucinous neoplasm (IPMN), localized PDAC, local regional PDAC, and metastatic PDAC. Metabolites were correlated to final histologic diagnosis and contrasted to convention CA19-9 levels with receiver operating characteristic (ROC) curves area under the curve (AUC). Principal components analysis was then performed to assess if different metabolite combination could improve delineation of different cancer stages.

**Results:** Of the 215 metabolites only four had a stronger Spearman’s Rho correlation to disease burden compared to CA19-9 (0.450 p=0.002). Three were associated with fatty acid metabolism [dodecanedio acid (DDDA) 0.488 p<0.001, propionylcarnitine (acyl-3) -0.485 p<0.001, and acyl-C5 -0.457 p=0.001] and one related to protein metabolism (lysine -0.485 p<0.001). All of these biomarkers were significantly elevated in patients with PDAC vs non (IPMN+ PNET) and performed well (ROCAUC lysine, 0.834; acyl-3, 0.792; DDDDA 0.789; CA19-9, 0.757; acyl-3, 0.745; angle, 0.723). However, none of these variables could differentiate each stepwise progression in malignancy (IPMN vs local PDA vs local regional PDAC vs metastatic). Principal component analysis identified 5 unique metabolic changes that cluster with unique metabolic derangements that differentiate each stage of pancreatic cancer. Glutamine and amino acids are increased in IPMN lesions but subsequent depletion and succinate and TCA metabolite build up are not appreciated until advanced metastatic disease.
Conclusion: Enhanced metabolic analysis has identified unique metabolic pathways that differentiate different stages of pancreatic cancer, that do not occur in a linear stepwise progression. Like a CA19-9, known metabolic derangements from previous studies were only appreciated in the peripheral blood of patients in advanced disease. Using a combination of metabolite levels, rather than relying on solitary biomarkers is an appealing strategy to enhance cancer staging for known pancreatic lesions and monitoring for progression to malignant disease.
QS 11. OPTIMAL PERFUSION CHEMOTHERAPY: MITOMYCIN VS OXALIPLATION FOR HYPERThERMIC INTRAPERITONEAL CHEMOTHERAPY REGIMEN IN METASTATIC COLON CANCER
M Woeste, M Egger, P Philips, CR Scoggins, RCG Martin II
Presenter: Matt Woeste MD | University of Louisville

Background: Peritoneal carcinomatosis (PC) of colorectal origin is common and is the second-most frequent cause of death in colorectal cancer. There is known survival benefit to surgical resection plus hyperthermic intraperitoneal chemotherapy (HIPEC) for patients with metastatic colon and rectal adenocarcinoma. However, there is a lack of standardization in the delivery of this treatment option. There remains controversy between Oxaliplatin and Mitomycin C (MMC), as the agent of choice. The Aim of this study was to compare the Safety and Progression Free Survival in patients undergoing HIPEC.

Method: A review of our 285 prospective HIPEC database from 7/2007 to 5/2018 identified 42 patients who underwent cytoreductive surgery plus HIPEC with MMC or Oxaliplatin. Patients were stratified based on preoperative and postoperative peritoneal cancer indices. Outcomes examined included length of stay, readmission, survival, recurrence, time to recurrence, complications, and cytotoxicity.

Results: A total of 25 pts were treated with Oxaliplatin and 18 with Mitomycin. All (100%) of the Oxaliplatin pts had Pre-HIPEC FOLFOX and 14 (78%) of the Mitomycin had Pre-HIPEC chemotherapy. The groups were similar for Pre-HIPEC PCI count (6.4 vs 6.1), prior colectomy (44% vs 47%), CEA, Pre-HIPEC response to chemotherapy, and Charlston Co-Morbidity Index. Intra-operative findings were similar for EBL, Total Organs resected (5 Mito vx 4 Oxli), PCI indec intra-op (9.2 mito vs 8.3 oxali), and post-op PCI (1.6 Mito vs 0.75 Oxli). Overall complications were higher in the Oxali patients (35%) versus the Mitomycin (26%, p=0.08). With a median follow up of 3.5 years the median overall survival was 3.4 years for the entire group. Multivariate analysis identified, Pre-PCI, Pre-response to chemotherapy, Post-op PCI was predictive for overall survival (p=0.001). Type of HIPEC chemotherapy was not found to be predictive of overall outcomes.

Conclusion: Mitomycin or Oxaliplatin HIPEC based chemotherapy are both safe and effective the management of peritoneal only metastatic colorectal cancer. Both perfusion therapies can be considered, but shifting toward more modern based chemotherapy may become more of the standard of care.
**Background:** DCIS with microinvasion (DCISMI) is an uncommon diagnosis with a fairly low rate of recurrence or metastasis. Controversy regarding adjuvant treatment of DCISMI exists among clinicians. Some clinicians maintain that the clinical behavior of these tumors is similar to that of pure DCIS while others believe adjuvant treatment in more aggressive presentations of this disease process. Here we present our institution’s experience with the treatment and clinical course of patients with DCISMI.

**Method:** We conducted a retrospective observational investigation of Sammons Oncology Clinical Research Database (SOCRD) at BUMC to evaluate our institution’s experience with treatment of DCISMI. 101 patients with DCISMI were treated from 1998-2017. Prognostic factors including tumor grade, ER, PR, HER2 status, proliferation indices, as well as treatment modalities including chemotherapy, hormonal therapy, radiation and surgical intervention were also compared. Patients had variable treatments with overall excellent outcomes. 4 patients underwent chemotherapy, 27 received hormonal therapy, 30 received radiation, and 40 received no adjuvant treatment. 2 patients were found to have local recurrences. Both initially underwent lumpectomy followed by adjuvant radiation.

**Results:** 4 patients underwent chemotherapy, 27 received hormonal therapy, 30 received radiation, and 40 received no adjuvant treatment. 2 patients were found to have local recurrences. Both initially underwent lumpectomy followed by adjuvant radiation. LR occurred at 40 and 56 months. All patients who underwent systemic treatment were found to have high grade tumors (3) with high proliferation indices. One patient was found to have ER-PR-HER2+ tumor. Another was found to have ER+PR-HER2+ tumor. Two patients were found to have ER-PR- tumors and HER2 not done. 27/65 Patients with ER+ tumors underwent treatment with hormonal therapy. Those undergoing hormone therapy were noted to more often have higher grade tumors (grade 2 23%, grade 3 70%). 31/40 patients who underwent breast conservation underwent treatment with radiation. 9 patients underwent surgical intervention only.

**Conclusion:** DCISMI is a rare pathologic finding with excellent overall outcomes. Based on our institution’s experience there is no apparent benefit in treatment beyond surgical intervention in patients with this disease process. Adjuvant treatments should be decided on in multidisciplinary fashion and saved for histologically aggressive tumors.
QS 13. BREAST CANCER TREATMENT IN THE ELDERLY: IS NONCOMPLIANCE ASSOCIATED WITH INCREASED RATE OF BREAST CANCER-RELATED DEATH?

O Agborbesong, SD Helmer, J Reyes, LA Strader, PL Tenofsky

**Presenter:** Obi Agborbesong MD | University of Kansas School of Medicine – Wichita

**Background:** Aging remains one of the single greatest risk factors for the development of new breast cancer, with approximately one-half of all cases of breast cancer occurring in women older than 65 years of age, and more than 30% of breast cancers occurring after the age of 75. Elderly women who underwent breast surgery have been found to be noncompliant with radiation and hormonal therapy, with noncompliance being even higher in women aged 80 years and older. The purpose of this study was to compare outcomes of elderly breast cancer patients who were either compliant or noncompliant with their treatment recommendations.

**Method:** A retrospective chart review was conducted of patients over the age of 70 who underwent treatment for newly diagnosed breast cancer between 2006 and 2013. Comparisons were made between patients who were either compliant or noncompliant with NCCN treatment recommendations with regards to surgery, radiation therapy, chemotherapy and hormonal treatment. Patients were specifically evaluated with regards to recurrence, metastatic disease, and breast cancer related deaths.

**Results:** During the study period, 186 patients were treated for breast cancer. Of those, 7 were excluded due to the presence of metastatic disease at the time of diagnosis, leaving 179 patients for inclusion in analysis. Noncompliant patients (n=69) were older than their compliant (n=110) counterparts by approximately 2 years (80.4 vs. 77.8 years, P=0.003). No significant difference was seen between compliant and noncompliant women with regards to tumor size (12mm vs. 12mm, P=0.887), breast cancer type (DCIS or invasive) or nodal status; however more noncompliant women were ER/PR positive (89.7% vs. 76.4%, P=0.026). In comparing compliant to noncompliant women, there was also no significant difference in breast cancer recurrence (1.8% vs. 2.9%, P=0.640), metastatic disease (1.8% vs. 4.3%, P=0.375), or breast cancer related deaths (23.3% vs 26.7%, P=0.766). All-cause mortality rates were significantly higher in the noncompliant patients (45.5% vs. 28.6%, P=0.024).

**Conclusion:** Based upon these findings, noncompliance with breast cancer treatment recommendations in elderly patients is not associated with increased rates of recurrence, metastasis or breast cancer related mortality. However, larger studies are needed to confirm these findings.
QS 14. IN SEARCH OF THE ROOTS OF THE OPIOID EPIDEMIC: RESIDENT VERSUS ADVANCED PRACTICE PROVIDER PRESCRIBING PATTERNS  

LB O’Meara, JP Clark, IW Howley, BC Eaton, JP Mather  

Presenter: Lindsay O’Meara CRNP | University of Maryland Medical Center  

Background: Opioid use in the post-operative setting is thought to be a major contributor to the current opioid epidemic. As overdose deaths rise, increasing attention is being paid to opiate prescribing patterns. Multimodal analgesia and prescription drug monitoring programs (PDMPs) have been recommended to minimize narcotic use, and with it the potential for abuse and diversion. In teaching hospitals, most discharge prescriptions are written by residents and advance practice providers (APPs), who have different training and perspectives on patient care. This study was performed to test the hypothesis that APPs and residents have different prescribing patterns for post-operative following surgical procedures.  

Method: All patients undergoing common general surgery operations (appendectomy; cholecystectomy; umbilical, inguinal, or incisional herniorrhaphy) at a tertiary academic hospital in 2017 were retrospectively identified via CPT codes. Data were collected regarding demographics, length of stay, type of provider (APP vs. resident) performing hospital discharge, and both narcotic and non-narcotic analgesic prescriptions. Narcotic doses were tabulated using morphine equivalents. The state PDMP was queried for additional narcotic prescriptions within 30 days of discharge. Prescribing patterns were compared between APPs and residents.  

Results: A total of 225 patients were enrolled, 95% (N = 213) of whom received an opiate prescription at the time of discharge. Median age was similar between the groups (50 vs 52, p = 0.467), however median hospital LOS was longer in the APP group (3 vs 1 days, p= <0.001). Sixty-one (29%) prescriptions were written by APPs, versus 152 (71%) by residents. APPs wrote for fewer morphine equivalents per 24-hour period (30 vs 25, p = <0.001); however, the median quantity of narcotic tablets prescribed was 30 for both groups. APPs were more likely to prescribe adjunctive analgesics (66% vs 34%, p = <0.001), specifically acetaminophen (39% vs 25%, p = 0.010) and non-steroidal anti-inflammatories (p = 0.002). There was no difference between the APP and resident groups in the number of patients who received additional pain medication within 30 days of discharge (10 vs 23, p=.893).  

Conclusion: APPs prescribed lower doses of narcotics and were more likely to prescribe non-narcotic analgesics compared to residents, without a concomitant increase in additional post-discharge narcotic prescriptions. Non-narcotic analgesics were not consistently prescribed by either group. Discharge analgesic prescribing patterns for both narcotics and non-narcotics presents an opportunity for quality improvement and education in analgesic management in post-operative patients. Moreover, it provides an important impetus to perform larger evaluations on the prescribing patterns of different types of healthcare practitioners.
QS 15. AUTO-DIURESIS PREDICTS RETURN OF BOWEL FUNCTION
MI Goldblatt, JM Kaiser, MC Helm, RM Higgings, AS Kastenmeier
Presenter: Matthew Goldblatt MD | Medical College of Wisconsin

Background: Ventral hernia repairs (VHR) are common general surgery procedures and can bear significant morbidity. While many surgeons utilize enhanced recovery pathways to decrease length of stay, feeding a patient before their gastrointestinal (GI) track is ready can lead to distention and emesis, which can be particularly detrimental to hernia repairs. Many patients start to spontaneously diurese 1-2 days before traditional signs of return of bowel function (ROBF), such as flatus or bowel movement. We hypothesized that this auto-diuresis would signal GI track recovery and therefore discharge prior to ROBF.

Method: A total of 395 patients underwent open (162 patients), laparoscopic (170 patients), or mixed (11 patients) VHR was evaluated for temporal correlation between post-operative fluid status and ROBF or discharge. Those who received post-operative diuretic medications (50 patients) were excluded. Mean age was 56.4 years; mean body mass index was 34.02 kg/m². Patients remained an average 3.59 days after surgery in the hospital and the average ROBF was on day 2.99. ROBF within 24 hours, discharge within 24 hours, and discharge within 48 hours were used as outcome measures. Descriptive parameters of fluid status included: maximum quantity of input or output per 8-hr nursing shift, net change in fluid, and average input/output/net fluid over 24 and 48 hours post-operatively.

Results: The first shift of ≥ 700 mL of urine predicted ROBF (p=0.03) and discharge (p=0.04) within 24 hours. The first shift output of ≥ 500 mL predicted discharge within 48 hours (p=0.02). The following fluid parameters differed significantly between those who were versus were not discharged within 24 hours: average output (96.2 vs 68.4 mL), and net fluids (25.0 vs 66.9 mL) over the last 24 hours, and average input (136.8 vs 170.9 mL), output (68.6 vs 58.3 mL) and net fluids (68.8 vs 114.1 mL) over the last 48 hours (p<0.05). The following differed significantly between those who were versus were not discharged within 48 hours: average input (124.2 vs 139.1 mL), output (81.3 vs 63.7 mL), and net fluids (40.5 vs 76.4 mL) within the last 24 hours, and average input (147.5 vs 179.3 mL) and net fluids (84.7 vs 124.7 mL) within the last 48 hours (p<0.05).

Conclusion: Auto-diuresis after surgical insult is temporally correlated to ROBF and discharge. The first 8-hour nursing shift with at least 700 mL of urine is a useful indicator of discharge readiness within 24 hours. Likewise, the shift during which the 500 mL urine output threshold is met supports discharge readiness within 48 hours and could be used to advance oral intake ahead of ROBF. Exceptions likely include patients in whom bowel function is not the limiting factor in hospital stay (other comorbid conditions, post-hospitalization placement), as well as those who received postoperative diuretics.
QS 16. ANALYSIS OF EMERGENT COLECTOMY OUTCOMES FOLLOWING IMPLEMENTATION OF ENHANCED RECOVERY AFTER SURGERY PATHWAY

Aj Malek, BD Robinson, MM Mrdutt, AT Manning, JS Thomas, HT Papaconstantiou, CL Isbell

Presenter: Bobby D. Robinson MD | Baylor Scott and White Healthcare

Background: Enhanced recovery after surgery (ERAS) pathways have been successful at improving hospital duration, patient outcomes, and patient satisfaction in the elective surgical setting. Patients requiring emergent colorectal surgery may similarly benefit from ERAS pathways. Our aim was to compare post-operative outcomes in patients requiring emergent colectomy in the pre-ERAS versus post-ERAS setting.

Method: A retrospective analysis was performed on all emergent colectomies at our academic tertiary referral center from January 2014 through August 2018. The pre-ERAS cohort included patients undergoing emergent colectomy prior to our institutional ERAS rollout in October 2016 while the post-ERAS cohort included emergent colectomy patients on or after October 2016. ERAS protocol compliance was sampled from patients enrolled during August 2017 to March 2018 by tracking 23 protocol elements. Primary outcomes included length of stay (LOS), readmission rate, surgical site infection (SSI), and narcotic administration. Outcome data was captured through our National Surgical Quality Improvement Project (NSQIP) database and chart review. Mann-Whitney and Chi-Square analysis were primarily used for comparative data analysis.

Results: 155 emergent colectomy cases were reviewed: 73 occurred in the pre-ERAS setting and 82 occurred in the post-ERAS setting. There was an 81% compliance rate to the ERAS protocol. Post-ERAS patients had a shorter length of stay when compared to pre-ERAS patients (median 8 days versus 10 days, respectively, p=0.1719). There was no significant difference in readmission rate, SSI, or narcotic use (all p>0.05) between both groups.

Conclusion: Implementing an ERAS pathway following emergent surgery can be beneficial. The decrease in length of stay could be attributed to the ERAS pathway and may prove to be valuable for patient satisfaction and hospital finances alike. Additionally, enhanced recovery can be used as a safe and effective tool with no adverse risks, especially at a large academic center with existing enhanced recovery pathways in place for elective cases.
Background: Enhanced or Early Recovery after Surgery (ERAS) is a growing movement in Bariatric Surgery. The protocols include elements such as multi-modal pain relief, multi-modal nausea relief, carbohydrate loading and complication prevention. By maximizing prehabilitation, perioperative protocols and education the goal is to decrease Length of Stay (LOS) without increasing readmissions (RA). With the LOS, improvements it is hypothesized that the direct costs (DC) related to direct patient care will go down.

Method: The Bariatric Center at the University of Nebraska Medical Center enrolled in the ASMBS Enhanced Recovery Program in Dec/16. There was a ramp up phase to work on improved prehabilitation, patient education materials and peri-operative protocol alterations. We compared a random sampling of the first 4 mo. of the ERAS patients with the previous 2 years of patients. We specifically looked at compliance with metrics from the pre-surgical (smoking cessation, chlorhexidine bathing, VTE prophylaxis and multimodal pain and nausea medication), the intra-op (glucose monitoring, use of Exparel TAP blocks, medications) and the post op (Catheter/drain use, non-narcotic pain regimen, mobilization, early feeding) phases. Outcomes included average pain scores at 24 and 48 hours, LOS, DC.

Results: Smoking cessation went from 94% to 100%. Chlorhexidine Bathing improved from 48% to 100%. Multimodal medication administration pre op went from 6% to 100%. Early removal of OG/NG went from 81% to 100%. Foley catheters and JP drains were eliminated from routine use. Walking on the Day of Surgery improved from 77% to 83%. Clear liquid diet initiation increased from 48% to 100% with nutrition advancement on POD#1 to 100%. The Average pain scores at 24 hours dropped from 4.7 to 2.8 and at 48 hours from 4.4 to 2.0. The Median LOS for both cohorts was 2 days, however the mean dropped from 3.22 days to 1.83 days. DC went from $10,500 to $7,235. The readmission rate at baseline was 6% and for the 4 mo. of the ERAS was 0%. There were no mortalities, no NHSN events and no post op respiratory failure in either time period.

Conclusion: Enhanced or Early Recovery after surgery when done in a systematic way that results in prehabilitation, patient education, perioperative and post-operative protocols that stress early mobilization and feeding, minimizing tubes and drains and multi-modal pain and nausea prevention and treatment can results in a measurable length of stay decrease and a cost savings of $3265/case.
QS 18. PREDICTIVE PRE-OPERATIVE AND INTRA-OPERATIVE FACTORS OF ANASTOMOTIC LEAK IN GASTRECTOMY PATIENTS: OPTIMIZING ENHANCED RECOVERY AND JEJUNAL TUBE MANAGEMENT

T Palmer, P Philips, M Egger, CR Scoggins, KM McMasters, RCG Martin II

Presenter: Tripp Palmer MD | University of Louisville

Background: The negative impact of postoperative complications (POCs), especially anastomotic leak is well documented for many cancer types, but has not been well described in gastric cancer. Here, we evaluate the pre-operative and intra-operative factors that could predict a higher risk of anastomotic leak for gastric cancer patients.

Method: Patients who underwent surgery with curative intent for gastric adenocarcinoma between 2002-2018 were evaluated from a single prospective database. Ninety-day postoperative complication data were collected. Survival probabilities were estimated by Kaplan-Meier analysis and compared using the log-rank test.

Results: A total of 195 patients were evaluated with an overall complication rate of 40%. Anastomotic leak occurred in 13%, with 4% undergoing reoperation during the same hospitalization. Significant risk factors affecting postoperative complications were identified in the patients including number of comorbidities (≥2) (HR, 5.30; 95% CI, 1.1–15.3; P = 0.037), operation type (Total vs Distal) (HR, 2.5; CI 1.08–8.5; p=0.048). Five year overall survival (OS) for patients without perioperative complications was 74%, compared with 49% for patients with POCs (p 0.001). Disease free survival (DFS) at five years was 58% for patients without POCs compared to 46% in patients with POCs (p 0.002). Patients without POCs were significantly more likely to receive adjuvant therapy (55% vs 42%; p 0.001).

Conclusion: In a large single institutional study, POCs were associated with decreased survival in patients undergoing surgery for gastric adenocarcinoma. Optimizing these patients post-operatively with limited anastomotic stress and enteral feeding tube may allow for less complicated course. Efforts aimed at reducing perioperative morbidity are important not only for short-term surgical outcomes, but also for enhancing long-term oncologic outcomes in patients with gastric cancer.
QS 19. LEUKEMOID REACTION ASSOCIATED WITH INCREASED MORTALITY IN TRAUMA PATIENTS
A Grigorian, L Swentek, B Sun, B Hasjim, S Stopenski, J Livingston, B Williams, F Nastanki, J Nahmias
Presenter: Bima Hasjim, BS, BA | University of California Irvine Medical Center

**Background:** Leukemoid reaction (LR) is characterized by a white blood cell (WBC) count > 25.0×10^9 leukocytes/μL. In trauma patients, a higher injury severity score (ISS) is associated with a higher WBC count. We hypothesized trauma patients with severe-LR (>40.0×10^9 leukocytes/μL) have a higher mortality rate than those with moderate-LR (25.0-39×10^9 leukocytes/μL).

**Method:** We performed a single-center retrospective study (2010-2017) for patients developing LR. Patients with moderate and severe-LR were compared using a Mann-Whitney-U and chi-square analysis.

**Results:** From 15,807 trauma admissions, 332 (2.1%) had LR. Of these, 308 (92.8%) had moderate-LR and 24 (7.2%) severe-LR. There was no difference in the median age, ISS, systolic blood pressure on arrival and comorbidities including malignancy (p>0.05). There was no difference in the mechanism of injury, length of stay and rate of operative intervention (p>0.05). The severe-LR cohort had a higher rate of vasopressor requirement (62.5% vs. 25.0%, p<0.001) with more patients initiating vasopressors before WBC peak (78.6% vs. 50.0%, p=0.04). The mortality rate in patients without LR was 3.3% (p<0.001). Compared to those with moderate-LR, patients with severe-LR had higher overall mortality (29.2% vs. 13.3%, p=0.03).

**Conclusion:** The incidence of LR in trauma is rare. Although patients with moderate and severe-LR have similar injury severity and comorbidities, the mortality rate is over 2x higher in patients with severe-LR and 10x higher compared to those without LR. Additionally, severe LR is associated with higher rates of ARDS and AKI. Future research regarding this high-risk population with severe-LR appears warranted.
QS 20. THE DETRIMENTAL EFFECT OF FLUID BALANCE IN HEMORRHAGIC SHOCK: IN WHOM SHOULD WE CONSIDER DIURESIS?

S Reynolds, JF Barletta, ST Hall, JF Sucher, JK Dzandu, AJ Mangram

Presenter: Jeffrey Barletta PharmD | HonorHealth John C. Lincoln Medical Center

Background: Excess cumulative fluid balance (CFB) has been associated with deleterious effects in some ICU populations but data specific to trauma patients is sparse. The objectives of this study are to examine the relationship between day 3 CFB in patients who have been resuscitated following hemorrhagic shock and identify the threshold for CFB where length of mechanical ventilation was prolonged.

Method: This retrospective cohort study evaluated critically ill trauma patients with hemorrhagic shock and a length of stay of at least 72 hours. Daily intakes and outputs were reviewed from the electronic medical record and CFB on day 3 was the primary variable of interest. The primary outcome was length of mechanical ventilation. Classification and regression tree (CART) analysis was used to identify the threshold for CFB where mechanical ventilation was prolonged. This value was then included in a linear regression model along with other identified confounding variables. Adjusted length of mechanical ventilation was reported. A p-value <0.05 defined statistical significance.

Results: There were 92 patients included. The mean age was 33±17 years, ISS Score was 33±12, initial pH was 7.19±0.13 and base deficit was 9.8±5.6 mmol/L. Transfusion requirements for the first 24 hours was 14±7 units. CART analysis identified 8,480 mL as the threshold for CFB where mechanical ventilation was prolonged (12 ± 7.8 vs. 5.9 ± 4.3 days, p=0.003). Upon controlling for ISS score, severe TBI, age, initial pH, blunt trauma and CFB >8,480 ml through linear regression, factors associated with a longer duration of mechanical ventilation were CFB >8,480 mL (B=0.545, p =0.003) and age (B=0.014, p=0.004). The adjusted length of mechanical ventilation according to this model was 9.2 ± 1.4 vs. 4.5 ± 1.4 days when day 3 CFB was >8,480 mL and ≤8,480 ml, respectively.

Conclusion: A CFB of >8,480 mL by day 3 of hospitalization is associated with a longer duration of mechanical ventilation in patients with hemorrhagic shock. There may be a role for expedited de-resuscitation in these patients with loop diuretics if they are hemodynamically stable. The role for diuresis in this population will require further study.
QS 21. PARADOXICAL DERANGEMENTS IN COAGULATION ASSOCIATED WITH ELEVATED CONCENTRATIONS OF BILE ACID CONSTITUENTS
RA Choudhury, HB Moore, CD Barrett, MB Yaffe, SE Byerly, TL Nydam
Presenter: Rashikh Choudhury MD | University of Colorado School of Medicine

Background: The underlying processes which drive paradoxical coagulation derangements and bleeding complications in patients with liver disease and acute biliary obstruction remain unclear. The individual effects of bile acid constituents on clot formation dynamics remains unclear in whole blood assessment, but have previously been demonstrated to cause platelet dysfunction and degrade fibrin glue. Our aim was to explore the effect of elevated concentrations of bile acid constituents on clot formation using thromboelastography (TEG).

Method: Whole blood samples were drawn from four healthy volunteers and 15 liver transplant patients. Blood in healthy volunteers was assayed with standard TEG protocol with tissue plasminogen activator (t-PA) to replicate ischemic tissue, and standard TEG in liver transplant recipients during the perioperative period. In healthy subjects, seven bile acid constituents (conjugated, unconjugated bile acid, taurocholic acid, taurochenodeoxycholate, glycochenodeoxycholate, glycholate (GC), glycocholic acid(GCA)) at were used at concentrations two standard deviations above normal human blood levels to simulate conditions during acute and chronic liver disease. Stock bile salt reagents were diluted utilizing dimethyl sulfoxide (DMSO). Transplant recipients underwent mass spectrometry to assess for changes in bile acid concentrations during surgery to assess for peak levels. TEG variables were analyzed with summary statistics and Student’s t-test.

Results: In healthy individuals, R (reaction) time to clot formation in controls was decreased with addition of GC (9.8m vs 4.3m, p<0.01) and with addition of GCA (9.8m vs. 5.0m, p<0.01). K (kinetics~ fibrinogen function) value also decreased with addition of GC (3.3m vs 1.7m, p<0.05) and GCA (3.3m vs. 1.9m, p<0.05). Additionally, fibrinolysis as measured by LY30 was increased for samples with GC (20.4% vs. 38.8%, p<0.05) and GCA (20.4% vs. 37.8%, p<0.05) compared to controls. All other bile acid constituents (CBA, UBA, TA, TC, GCD) did not demonstrate statistically significant changes to TEG clot formation indices. In transplant recipients, GC concentrations peaked 4-fold higher than baseline levels 30 min after graft reperfusion (p<0.001) and remaining at more than two-fold higher on post-operative day one (P=0.001).

Conclusion: The bile acids GC and GCA are associated with coagulation derangements as measured with TEG when added in elevated concentrations to healthy whole blood samples. Although GC and GCA blood samples demonstrated more rapid clot formation, they also had poor resistance to fibrinolysis induced by t-PA suggesting alterations in clot structure or fibrinolysis regulation. In liver transplant recipients, GC can be acutely elevated four-fold in concentration compared to baseline levels during early graft reperfusion, when systemic levels of t-PA are known to be elevated. Unlike standard measurements of total and fractioned bilirubin, GC (glycholate) and GCA (glycholic acid) may predict coagulation abnormalities for patients with acute and chronic liver disease.

QS 22. PRE-INJURY SUBSTANCE ABUSE IS PREDICTIVE
OF DELIRIUM AND CLINICAL OUTCOMES IN THE ICU

V Agrawal, CY Dhoble, T Mustafa, J Blasingame, C Pearcy, A Aramoonie, D Amos, MS Truitt

Presenter: Christopher Pearcy MD | Methodist Dallas Medical Center

**Background:** ICU delirium has been recognized as a risk factor for mortality in trauma patients. However, the impact of pre-injury substance abuse on ICU delirium and clinical outcomes has not been evaluated.

**Method:** From Jan 2015 to Jan 2018, a retrospective analysis was conducted of all trauma ICU admits > 18 y/o. Patients were administered the Confusion Assessment Method (CAM) – ICU screening tool from ICU admission until discharge. A total of 63 data points including demographic information, procedures, and clinical outcomes were collected. Persistent delirium was defined as delirium lasting two or more consecutive days. Student- t-test was employed for assessing the impact of pre-hospital substance abuse on delirium and outcomes.

**Results:** Out of 6,535 trauma admits, 14% (940) patients met the inclusion criteria. The patient age was 48 + 22 y/o with 31% female and ISS of 14 + 10. The overall incidence of delirium was 8% (73/940) with 8% (6/73) having > 1 episode and 14% (10/73) with persistent delirium. Drug positive patients were 2x as likely to develop delirium compared to drug negative patients (OR 2.0x, p: 0.03). In addition, drug positive patients who developed delirium had significantly more hospital days (p: 0.003), ICU days (p < 0.001), and days on the ventilator (p: 0.001) compared to those who were drug/delirium negative.

**Conclusion:** The COT mandates drug screening in trauma patients for injury prevention. Here we present data demonstrating drug positivity as a risk factor for the development of delirium (2.0x). In addition, the coexistence of delirium and drug use results in worse clinical outcomes.
Background: Resuscitation strategies after severe trauma have evolved over the past decade to include decreased crystalloid resuscitation, balanced transfusions of blood components, and permissive hypotension. It is unknown whether a significant proportion of severely injured trauma patients still receive significant fluid resuscitation and whether more fluid administration is associated with an increased risk of acute kidney injury (AKI). We hypothesized that a positive 48-hour fluid balance is associated with AKI in severely injured trauma patients.

Method: A retrospective cohort study was conducted at a single, level 1 trauma center. Adult (≥16 years) trauma patients requiring intensive care unit (ICU) admission between January and June of 2017 were included. Patients were excluded who died within 48-hours, developed rhabdomyolysis, or who had a prior history of end-stage renal disease or congestive heart failure. The primary outcome of interest, AKI within 7 days of admission, was defined according to Kidney Disease Improving Global Outcomes (KDIGO) creatinine-based criteria using the lowest creatinine from the first hospital day as the reference. Univariate and multivariate analyses were performed to evaluate the association of positive 48-hour fluid balance with AKI. Euvolemia (-2L to +2L) was defined as the reference for the multivariate analyses.

Results: Of 365 patients, 74% were male and 44% were Caucasian. The median age was 41 years (IQR 27-59) and the median injury severity score (ISS) 18 (IQR 10-29). Positive fluid balance (>2L) was observed in 49% of patients while negative fluid balance (<-2L) was observed in 2%. AKI was diagnosed in 105 (29%) patients. Patients with AKI were older, with a higher ISS, higher arrival base deficit, increased 48-hour fluid balance, and lower arrival systolic blood pressure. After adjusting for age and base excess, there was an increased odds of AKI for increasingly positive fluid balances: >2L (OR 2.3, 95% CI 1.4-3.7); >4L (OR 2.9, 95% CI 1.6-5.3), >6L (OR 4.6, 95% CI 2.1-9.9), and >8L (OR 9.5, 95% 2.6-34.2). A negative fluid balance (<-2L) was not associated with AKI. Mortality occurred in 13% of patients with AKI versus 2% of patients without AKI (p<0.001).

Conclusion: Positive fluid balance in excess of 2L at 48-hours occurs in half of severely injured trauma patients and is an independent risk factor for AKI. As fluid balance increases, the odds of AKI also increase. This may be related to residual confounding despite adjusting for injury severity and physiologic status or to pathologic consequences of excess fluid administration such as kidney edema and tissue damage. A better understanding of the drivers of fluid administration is needed to determine whether a restrictive resuscitation strategy should be
**QUICK SHOT ABSTRACTS (continued)**

**QS 24. POSITIVE FLUID BALANCE: A RISK FACTOR FOR ICU BOUNCEBACKS IN GERIATRIC TRAUMA PATIENTS**  
*BM Motz, AB Sorah, BW Thomas, JT Morgan, KW Cunningham, LJ Gottlieb, AB Christmas, RF Sing*  
**Presenter:** Benjamin Motz MD | Carolinas Medical Center

**Background:** Cardiopulmonary comorbidities such as atrial fibrillation, congestive heart failure, and chronic obstructive pulmonary disease are common in the geriatric population and contribute significantly to in-hospital morbidity. Fluid overload may exacerbate these conditions, further complicating the management of these patients. This study examined the link between fluid balance and unplanned readmissions to the intensive care unit (ICU) of a Level I trauma center.

**Method:** Using our institutional trauma database, records for geriatric (age ≥65 years) trauma patients presenting to a Level I Trauma Center from January 1, 2013 through December 31, 2017 were retrospectively reviewed after IRB approval. Patients who were initially admitted to the ICU and who had an unplanned readmission to the ICU after transfer to the floor were included. Reasons for readmission were captured from review of the electronic medical records (EMRs) which were then queried for total fluid balance for the first seven days of their admission as well as the fluid balance for the 72 hours prior to readmission to the ICU. Additionally, radiology reports were searched for diagnoses of pleural effusion or pulmonary edema on chest x-ray or computed tomography.

**Results:** 177 geriatric trauma patients were admitted during the study period who experienced an unplanned admission or readmission to the ICU. Average age was 77 years. Within this cohort, median fluid balance within 72-hours prior to ICU transfer was +1.7 L, with hypoxia as the reason for ICU transfer in 66 patients (37.2%). Further, 77 patients (43.5%) demonstrated greater than +2.0 L fluid balance within 72-hours prior to ICU transfer. Within this sub-population, median fluid balance within 72-hours prior to ICU transfer was +3.7 L. Again, the most common presentation leading to re-admission within this sub-population was hypoxia, occurring in 39 patients (50.6%). Imaging data showed pleural effusion or pulmonary edema in 36 patients (20.3%) requiring ICU readmission.

**Conclusion:** This retrospective review suggests that fluid overload plays a significant role in increasing morbidity in geriatric patients, emphasizing the need for judicious fluid management in this population. In evaluating whether geriatric trauma patients located in the ICU are physiologically prepared for transfer to step-down care, overall fluid balance should be carefully assessed.
QS 25. SURGICALLY INACCESSIBLE PENETRATING CEREBROVASCULAR INJURY: HIGHER GRADE THAN BLUNT BUT SIMILAR MANAGEMENT
JJ Sumislawski, ML Swope, EE Moore, MJ Cohen, KB Platnick, CJ Fox, FM Pieracci, JJ Coleman, EM Campion, RA Lawless, CC Burlew
Presenter: Joshua Sumislawski MD | University of Colorado School of Medicine

Background: Screening and treatment for cerebrovascular injury has become standard practice after high-risk blunt trauma. However, penetrating cerebrovascular injuries (PCVIs) occur less frequently, and while most require emergent operative repair, the optimal management of surgically inaccessible lesions remains unknown. The purpose of this study was to describe the diagnosis and management of surgically inaccessible PCVI and determine the efficacy of utilized therapies. We hypothesized that, like blunt cerebrovascular injuries (BCVIs), these lesions can be managed appropriately with antithrombotic therapy and selective use of endovascular interventions.

Method: All patients with carotid and vertebral artery injuries managed at an urban Level I trauma center from 2016 to 2018 were reviewed. Patients were excluded if they had hard signs of hemorrhage and required emergent operative repair. PCVIs were classified using the Denver BCVI grading scale.

Results: Cerebrovascular injury was identified by computed tomography angiogram (CTA) in 99 patients and attributed to penetrating mechanism in five patients (5%; ISS range 12–45). Indications for screening CTA were transcervical gunshot wound (n=4) and stab wound to zone III of the neck with stable hematoma (n=1). All patients with surgically inaccessible PCVI arrived without neurologic deficits or infarction on concurrent intracranial imaging. There were three carotid (one grade I, one grade II, one grade IV) and three vertebral (one grade I, one grade III, one grade IV) injuries in the five patients; four injuries (67%) were higher than grade I. Antithrombotic therapy with low-dose heparin infusion (n=2) or aspirin (n=3) was initiated in all patients within 48 hours, and one patient underwent endovascular stenting for an internal carotid artery pseudoaneurysm that was recognized on subsequent imaging and continued to expand. No patient experienced bleeding complications, suffered delayed stroke, or died.

Conclusion: Although less common than BCVI, surgically inaccessible PCVI is frequently high-grade. Prompt diagnosis, early initiation of antithrombotic therapy, repeat imaging, and selective use of endovascular interventions are key to safe, effective management of surgically inaccessible cerebrovascular injuries regardless of mechanism.
**Background:** Accidental hypothermia (defined as an unintentional core body temperature of <35°C) remains uncommon, but when severe (<32°C), it is linked to relatively high rates of mortality. Literature suggests that therapeutic hypothermia impairs immunomodulatory responses and predisposes to infection. However, the association between accidental hypothermia and infection is unknown. The aim of this study is to describe infection rates in patients who undergo invasive rewarming for accidental hypothermia. We hypothesize that internal rewarming techniques have higher infection and sepsis rates than Alsius or ECMO rewarming methods.

**Method:** A retrospective chart review was conducted of patients presenting to the emergency department at an urban, level-1 trauma center between 2006 and 2015. Inclusion criteria were nonpregnant, nonprisoner adult (≥18 years) patients who presented to the emergency department with accidental hypothermia and were admitted for invasive rewarming. Invasive rewarming included internal rewarming (bladder lavage, warmed IVFs, gastric lavage, and/or chest tube lavage), rewarming via Alsius catheter and rewarming via extracorporeal rewarming (ECMO). Demographic, injury and shock characteristics were examined, in addition to rewarming strategies and clinical outcomes such as infectious complications (sepsis, pneumonia, and urinary tract infection [UTI]).

**Results:** A total of 77 patients were included. The average age was 53, the majority (87%) were male, and the average initial body temperature was 28.4°C. After admission, 48 (62%) underwent internal rewarming, 29 (38%) underwent Alsius rewarming and 14 (18%) underwent ECMO rewarming. The average time to normothermia was 6.1 hours. 10 patients (13%) developed sepsis; of those, seven underwent internal rewarming and three underwent Alsius rewarming. One of the ten patients who developed sepsis died from overwhelming septic shock. We then compared infectious complications in internal rewarming and Alsius rewarming only. When comparing patients who underwent internal rewarming versus Alsius rewarming, there was no difference in rates of pneumonia (15% vs 24%, p=0.36), UTI (6% vs 3%, p=0.42), or sepsis (15% vs 10%, p=0.73) between groups. There was no difference in initial body temperature between patients who developed infectious complication (28.7°C) and patients who did not (28.4°C) (p=0.82).

**Conclusion:** In vitro and animal studies have shown that hypothermia affects the immune system and increases risk of infection. However, there is a paucity of data describing infection as an outcome of accidental hypothermia in humans. Our findings describe a relatively high incidence of infectious complications and sepsis rate of 13% in hypothermic patients admitted for invasive rewarming. However, these complications do not appear to be correlative with type of rewarming strategy or initial body temperature. Larger, multi-center studies are merited in order to investigate this association.
Background: Massive Transfusion Protocols (MTPs) are pivotal in ensuring timely delivery of blood products in optimal ratios for patients in hemorrhagic shock. Success in trauma (TRA) has led to use in obstetrics (OB), cardiac (CARD: medical or cardiothoracic surgery), and other (OTH: medical or other surgical) patients at our institution. The purpose of this study was to compare MTP outcomes between service lines to identify successes and opportunities.

Method: Our trauma center is also a tertiary CARD, ECMO, OB, and stroke referral center. We also receive complex critical care patients including patients with gastro-intestinal bleeding. MTP was created for trauma in 2014 and subsequently rolled out hospital-wide. Starting 1/2017, one trauma performance improvement (PI) nurse prospectively evaluates every MTP activation and trauma cases with massive transfusion but no MTP activation. Data from 01/2017-09/2018 was reviewed and summarized to include demographics, MTP use, blood product ratios (out of ratio as more than 2:1), product wastage, CPR status immediately before or after MTP activation and mortality.

Results: MTP was activated for 80 patients (44% male, mean age 52). OB MTP (N=12, activated for hypotension after 2U PRBCs) had 100% survival and least (33%) wastage but highest out of ratio in 42%. CARD cases (N=14, activated without specific criteria) had 57% mortality, highest wastage (57%), highest CPR status at time of MTP (36%) and 47% had minimal product usage, still the lowest out of ratio at 25%; some MTPs were activated to expedite delivery. The OTH group (N=20) was a mixed population and had the highest mortality of 60%, with out of ratio and wastage at 33% and 45% respectively. CPR patients at time of MTP had 100% mortality. TRA cases (N=34) had 46% mortality, 38% wastage and 29% out of ratio. 7 trauma patients received massive transfusion without MTP activation; they had similar ISS and mortality to MTP trauma patients but higher out of ratio transfusions.

Conclusion: At our institution, MTP process and outcomes vary by service line. Patient selection appears to be critical; MTP after CPR or when the patient is already in severe demise offers no survival and results in high wastage. Wastage may also be related to misuse of the MTP process and re-education has been successful when we compared earlier versus later cases during the study period. On the other hand, “Optimal” ratios may not be necessary for survival in all subsets as becoming more evident in OB patients but close to 1:1 ratio is better achieved if TRA MTP activations are called in a timely fashion. House-wide trauma service involvement and concurrent PI review allowed for the identification of opportunities for improvement and successful trends.
Background: Transcatheter arterial embolization facilitates minimally invasive control of solid visceral organ bleeding after injury. Appropriate selection of patients with blunt splenic injury is associated with success of non-operative management. The goal of this study was to determine the impact of a dedicated hybrid operating room (OR) on the process of splenic injury management and splenic salvage.

Method: We conducted a retrospective analysis of adult trauma patients at a Level 1 Trauma Center with splenic injury between 01/01/11-4/13/14 before hybrid OR (PRE) and 04/14/14-12/31/17 after hybrid OR implementation (POST). Data collected included: demographics, vitals, laboratory values, angiography results and time, open surgical procedures, transfusions, organ injury grade, and mortality.

Results: Chart review demonstrated 924 patients with spleen injury (423 PRE and 501 POST). Of this cohort, 159 patients had angiography (81 PRE and 78 POST). Median time from activation to endovascular intervention decreased from 118 minutes PRE to 42 minutes POST (P 0.9 compared to the respective PRE groups values of 31/81 (38.2%) and 14/39 (35.9%). The post embolization splenic salvage rate for grade IV/V injuries was not statistically different.

Conclusion: Access to a dedicated hybrid OR suite decreased the time to endovascular control of hemorrhage from 118 to 42 minutes, allowing the potential to manage a more hemodynamically compromised splenic injury population nonoperatively. This study highlights the value of dedicated interventional radiology resources to extend the spectrum of non-operative management of solid organ injuries.
QS 29. GROUND LEVEL FALLS: INJURY SEVERITY WORSE THAN EXPECTED?
A Mangram, AW Holloway, J Dzandu, J Barletta, J Sucher, F Ali-Osman, G Shirah, R Rasadi
Presenter: Ann Holloway DO | HonorHealth John C. Lincoln Medical Center

**Background:** Ground level falls (GLFs) in many states have become the #1 mechanism of injury. GLFs represent a significant cause of death and serious injury despite the known low mechanism of injury. We hypothesize that GLFs are associated with significant injury patterns that require appropriate levels of trauma activation to minimize adverse patient outcomes.

**Method:** This retrospective cohort study identified trauma patients with GLFs using ICD-10: W01.0XXA from 2016-2017. Data collected included age, injury pattern, injury severity score (ISS), level of trauma activation and discharge disposition. The primary patient outcome evaluated was death/discharge to hospice. Associations between patient-specific demographics and injury patterns were compared. Multivariate analysis was performed to identify significant independent predictors of death/hospice after GLF.

**Results:** There were 1208 patients evaluated. The mean age was 74±17 years, median ISS was 5 (interquartile 4-9) and 31% were admitted to the ICU. Trauma activation levels were level one 2.4%, level two 21% and consult, 76%. The injury patterns observed were: head/neck 39%; face 51%, chest 40%, abdomen/pelvic contents 9.6%, extremity or pelvic girdle 15% and external injuries 17%. Total mortality/discharge to hospice rate was 5.1% which varied by level of trauma activation (26%, 7.9%, 3.7%; p<.001). Multivariate analysis [(OR(95% CI)] revealed age [1.043(1.023-1.063), p<0.001]; ISS [1.034 (1.001-1.069), p=0.044, ICU admission [5.309 (2.94-9.586) and trauma level 1 activation [6.07 (2.41-15.287), p<.001] were independently associated with death/hospice after a GLF.

**Conclusion:** GLFs are associated with serious injuries (head, neck, face, chest) and death. Careful triage and appropriate trauma activation should be addressed to mitigate undesirable outcomes.
QS 30. THE UTILITY OF GLASGOW COMA SCALE IN PREDICTING MORTALITY IN OPERATIVE GERIATRIC TRAUMATIC BRAIN INJURY

GT Tominaga, K Yoo, IS Dandan, K Elamparo, T Dandan, KB Schaffer, W Biffl
Presenter: Gail Tominaga MD | Scripps Memorial Hospital La Jolla

**Background:** Mortality rates of 24-89% have been reported in geriatric traumatic brain injury (TBI). Previous studies have reported GCS scores in predicting outcome in TBI patients with better prediction with very low or very high GCS scores. Lower admission Glasgow Coma Score (GCS), older age, preinjury anticoagulant medication use have been associated with higher mortality following acute TBI. In order to clarify the interaction of risk factors, we reviewed acute TBI craniotomy patients. We hypothesized that older patients with TBI requiring craniotomy would have significantly increased risk of death with decreasing GCS and with preinjury use of Anticoagulants.

**Method:** We reviewed all patients undergoing craniotomy for acute TBI from November 2014 through December 2017. Patients were divided into age groups: Group A < 55 years, Group B 55-64 years, and Group C 65 years or greater. Each group was subdivided into groups based on initial GCS: mild TBI (GCS 13-15), moderate TBI (GCS 9-12), and severe TBI (GCS 3-8). Demographic data including admission GCS, prehospital use of Anticoagulants, type of intracranial bleed, outcome data and in-hospital mortality were analyzed. Data was compared between groups and between survivors and nonsurvivors in each group. Continuous variables were analyzed using a two-tailed t-test and categorical variables were analyzed using the Fisher’s test. Statistical significance was defined as p 0.05 or less.

**Results:** There were 91 craniotomy patients. Group A: 51 patients, mean age 32, mean GCS 8, mortality 18%; all deaths had severe TBI (33% mortality). Group B: 22 patients, mean age 59, mean GCS 9, mortality 36% (60% with severe TBI, 33% with moderate TBI, 11% with mild TBI). Group C: 18 patients, mean age 81, mean GCS 12, mortality 36% (100% with severe TBI, 33% with moderate TBI, 30% with mild TBI). Survivors within each group was associated with higher GCS; group B survivors were associated with younger age (57 vs. 61 yrs, p=.0077); group C survivors were associated with male gender (72% vs. 20%, p=0.0209). Mean GCS for survivors was higher in Group C (C-14 v. B-11, p=0.0046; C-14 v. A-9, p=0.0001) and higher in non-survivors in Group C (C-12 v. B-6, p=0.007; C-12 v. A-4, p=0.0001). Anticoagulant use was similar between survivors and non-survivors in all groups.

**Conclusion:** Among all patients, lower GCS correlated with higher mortality following craniotomy for acute TBI. In our study, all patients over 65 years of age with admission GCS less than 8 expired in-hospital and 60% of those 55-64 years of age expired in-hospital. Older patients (65 years or older) with a higher GCS on presentation had a higher mortality rate compared to younger patients. No patients younger than 55 with GCS of 13-15 died but 30% of those with GCS 13-15 in patients older than 65 expired in the hospital. The value of a GCS greater than 8 in predicting outcome in older TBI patients should be questioned.
**QS 31. MEAN ARTERIAL PRESSURE (MAP) THERAPY IS NOT ASSOCIATED WITH IMPROVED OUTCOMES FOLLOWING SPINAL CORD INJURY**

*L Maginot, A Moazzez, I Yang, B Putnam, R Everson, DY Kim*

**Presenter:** Lisa Maginot BS | Harbor-UCLA Medical Center

**Background:** Spinal cord injuries (SCIs) are potentially devastating injuries associated with significant morbidity, mortality, and resource utilization. Following initial stabilization and delineation of the level and severity of SCI, patients are typically admitted to the intensive care unit for mean arterial pressure (MAP) therapy, which involves induced hypertension using a combination of crystalloid administration and vasopressor support in order to augment spinal cord perfusion. Data supporting the benefits of MAP therapy are limited. We hypothesized that MAP therapy is not associated with improved neurologic outcomes in adult patients with SCI.

**Method:** We performed a 4-year retrospective cohort analysis of adult patients admitted to a Level 1 trauma center with cervical and thoracic SCIs. Exclusion criteria included patients ≤85 mmHg for 7 days.

**Results:** Of 97 patients meeting the inclusion criteria, 21 patients underwent MAP therapy. Patients undergoing MAP therapy were more likely to be older (51 vs. 39 years, p=0.02) and had a higher incidence of central cord syndrome (62% vs. 29%, p 0.05). Although MAP therapy was associated with an increased length of stay in the ICU (18 +/- 23 vs. 12 +/- 20 days, p<0.05), overall ventilator and hospital days were not significantly different.

**Conclusion:** In this single center analysis, MAP therapy was not associated with improved motor function in patients with cervical and thoracic spinal cord injuries. Patients undergoing MAP therapy had a longer LOS with no significant increase in the incidence of complications. Larger, multi-center randomized studies powered to detect a clinically meaningful improvement in patient outcomes are needed to determine the role and efficacy of MAP therapy in patients with SCI.
QS 32. BILIARY COMPLICATIONS FOLLOWING HIGH GRADE LIVER INJURIES

AT Kamrouz, A Moazzez, DY Kim

Presenter: Andrew Kamrouz MD, MPH | Harbor-UCLA Medical Center

Background: High-grade liver injuries are associated with significant morbidity, complications, and mortality. Successful management of these injuries requires an organized multidisciplinary approach that incorporates a combination of invasive operative and minimally invasive angiographic and endoscopic techniques, particularly in the setting of bleeding and biliary complications. The objective of this study was to examine the incidence, timing, and management of biliary complications in trauma patients with Grade III-V liver injuries.

Method: We performed a 4-year retrospective case control analysis of adult patients with high-grade liver injuries (III-V) admitted to our Level 1 trauma center. Patients <16 years of age and those who did not survive beyond 48 hours were excluded. Variables analyzed were demographics, mechanism, injury severity, transfusion requirements, operative interventions (laparotomy, angioembolization, ERCP), and time to intervention. The primary outcome measure was the development and timing of a biliary complication (biloma, leak, hemobilia, biliary fistula, or bile peritonitis).

Results: During the study period, 117 patients were diagnosed with high-grade liver injuries (III [n=62]; IV [n=43]; V [n=12]). The median age was 27, 29 were female (25%), and the median ISS was 26+-12. A total of 57 patients (49%) underwent emergent laparotomy, 11 (9%) underwent angioembolization, and 4 required both interventions. Compared to patients managed non-operatively, patients undergoing laparotomy had a higher ISS (30 vs. 23, p<0.001), required MTP activation more commonly, and were transfused more blood products during the first 24 hours (p=0.003). ERCP was performed more frequently in patients undergoing laparotomy (21% vs. 2%, p<0.001). Thirteen patients (11%) developed biliary complications. The median time to diagnosis was 5 days post-admission (IQR, 3-7) and all underwent ERCP at a median of 9 days (IQR, 6-12). On multivariate analysis, grade V injury was the only variable associated with development of a biliary complication or undergoing ERCP (OR=3.7; 95% CI=1.39-9.66, p=0.01).

Conclusion: Despite the increasing role of non-operative management in patients with liver injuries, nearly half of the patients in this series underwent laparotomy and 1 in 10 patients developed a biliary complication. Although the role of ERCP in treating these complications is well established, further studies are required to determine the effect of time to ERCP on outcomes.
QS 33. SOLID ORGAN INJURY AFTER PEDIATRIC TRAUMA. WHERE DO WE STAND?
M Khan, J Con, F Jehan, A Azim, G Lambardo, P Anderson, R Latifi
Presenter: Muhammad Khan MD | Westchester Medical Center

**Background:** Conservative management of solid organ injury after trauma has been the gold standard. The aim of our study was to evaluate the trends of utilization of angiographic or operative intervention in achieving hemostasis in solid organ injury in pediatric trauma population.

**Method:** A 2-year analysis of all pediatric patients (age ≤ 18 years) with blunt solid organ injury (liver, kidney and spleen) in the pediatric TQIP. Data were reviewed on injury type and grade, injury severity score, intensive care unit (ICU) and mortality. Aim was to measure conservative management of solid organ injury and to identify factors associated with angiography. Regression analysis was performed.

**Results:** A total of 7182 patients with blunt solid organ injury were identified. Mean age was 11±5 years, 66% were males, median ISS was 16 [9-24] and mortality rate was 4.6%. Overall, 49.2% of patient had liver injury, 47% splenic and 25.1% renal injuries. Most common grade of injury was grade 2 in all solid organ injuries (liver 22.9%, spleen 17.5%, kidney 9.5%). ICU admission rate was 52.6%. Rate of conservative management was 85.5%. Overall rate of angiography was 2.1%, angioembolization rate was 0.9%, while only 11.5% of the patients received blood products. Most frequent organ embolized was spleen (0.7%) followed by liver (0.3%). Median time to angiography was 3.2hrs [1.7-5.2]. On regression analysis, independent predictors of angiography were >30cc/kg transfusion in 1st 4 hours was independently associated with angiography. 14.5% of the patients went directly to the OR from ED, of which, only 2.8% had solid organ specific procedure done.

**Conclusion:** Conservative management for blunt solid organ injury is the gold standard after trauma. Over half of the patient with solid organ injury are admitted to ICU. Transfusion over 30cc/kg in 1st 4 hours was independently associated with angiography.
QS 34. OPEN VERSUS LAPAROSCOPIC DIAPHRAGM REPAIR FOR ISOLATED PENETRATING DIAPHRAGM INJURY IN TRAUMA
HH Chaudhry, A Grigorian, M Lekawa, MO Dolich, NT Nguyen, BR Smith, SD Schubl, J Nahmias
Presenter: Areg Grigorian MD | University of California Irvine Medical Center

**Background:** Isolated diaphragm injury (IDI) occurs in up to 30% of penetrating left thoracoabdominal injuries. Laparoscopic abdominal procedures have demonstrated improved outcomes including decreased length of stay (LOS) and complications when compared to open surgery. However, there is little data regarding laparoscopic repair in patients with penetrating IDI. The aim of this study was to compare laparoscopic diaphragm repair (LDR) to open diaphragm repair (ODR), hypothesizing decreased LOS with LDR.

**Method:** The Trauma Quality Improvement Program (2010-2016) was queried for patients with IDI. This was defined by patients without a severe grade (>3) for the abbreviated injury scale of the head and thorax, as well as no injuries to the liver, spleen, kidney, small intestine, colon, rectum, pancreas and stomach. Two groups were compared: ODR vs. LDR. A bivariate analysis using Pearson chi-square and Mann-Whitney-U test was performed to evaluate LOS and outcomes between the two groups.

**Results:** From 2,039 patients with diaphragm injuries, 368 (18.0%) had IDI. Of these, 281 patients (76.4%) underwent ODR and 87 (23.6%) underwent LDR. Compared to the LDR cohort, patients undergoing ODR were older (median, 31 vs. 25 years, p<0.001) with a higher injury severity score (mean, 11.2 vs. 9.6, p=0.03) but had similar rates of smokers (30.2% vs. 31.0%, p=0.88), diabetes (2.5% vs. 3.4%, p=0.63) and chronic obstructive pulmonary disease (3.2% vs. 3.4%, p=0.91). Patients undergoing ODR had a longer hospital LOS (median, 5 vs. 4 days, p=0.01). However, both groups had similar intensive care unit (ICU) LOS (median, 2 days, p=0.43), as well as complications including, unplanned ICU admission (0.7% vs. 0%, p=0.43), unplanned return to the operating room (0.7% vs. 0%, p=0.43), and pneumonia (2.5% vs. 1.1%, p=0.45). There were no deaths in either group.

**Conclusion:** Trauma patients with penetrating IDI undergoing ODR had a longer hospital LOS compared to patients undergoing LDR with no difference in complications or mortality. Therefore, in appropriately selected patients, LDR may be used safely and is associated with a decrease in hospital LOS. Further prospective research is needed to determine the ideal patient population for LDR and examine the long-term durability of LDR, as well as other potential benefits of laparoscopy including decreased cost, postoperative pain and time to return to normal activity.
**QS 35. TRENDS IN HEMATOLOGIC MARKERS AFTER BLUNT SPLENIC TRAUMA: RISK FACTOR OR EPIPHENOMENON?**

_E Moskowitz, A Sauaia, EE Moore, KB Platnick, JJ Coleman, EM Campion, RA Lawless, MJ Cohen, CD Fox, CC Burlew_

**Presenter:** Eliza Moskowitz MD | University of Colorado School of Medicine

**Background:** Currently, nearly 70% of blunt splenic injuries (BSI) are treated with either nonoperative management (NOM) or splenic embolization (EMBO). However, little is known about the hematologic changes associated with these management strategies. Our purpose was to assess differences in the temporal evolution of hematologic markers, namely, white blood cell count (WBC), platelet count (PLT), and hematocrit (HCT) among trauma patients who underwent splenectomy (SPL), splenic packing and splenorrhaphy (P/R), EMBO, or NOM. We hypothesize that significant differences exist in the aforementioned hematologic markers in patients undergoing an intervention (EMBO or SPL), as compared to those managed with NOM.

**Method:** We performed an 8-year (2010-2018) review of adult patients who underwent SPL, EMBO, P/R, or NOM. WBC, HCT and PLT at presentation and for 14 days post-procedure were analyzed; post-procedural complications (infections, venous thromboembolism (VTE) and death) were reviewed in survivors to avoid survivor bias. Temporal trends were compared using piecewise linear mixed-effects models.

**Results:** During the 8-year study period, 583 patients sustained BSI. 309 (55%) underwent NOM, 154 (27%) SPL, 56 (10%) P/R, and 42 (8%) EMBO. The majority (71%) were men with a median age of 32 and ISS of 19. ISS was higher in the SPL group (29, 7-41) compared to P/R (25,14-38), EMBO (20, 16-29), and NOM (17, 12-27) (p<0.0001). After adjustment for ISS and splenic injury grade, the WBC temporal trend in SPL patients was significantly different before HD 4 but not after compared to the trend in the other 3 patient groups (Figure, p<0.05 for all pairwise comparisons pre-day 4). Although the slopes after day 4 weren’t different, SPL patients reached higher WBC than the other groups (p<0.0001). Similar patterns were observed for PLT with an inflection point at day 2 (p<0.05 for all pairwise comparisons pre-day 2). In contrast, no significant differences in HCT temporal trends were observed.

**Conclusion:** Among survivors, patients undergoing NOM or EMBO were significantly less likely than patients who required SPL to develop infections after adjustment for age, splenic injury grade, injury mechanism, and ISS (aOR: 0.27; 95% CI: 0.12-0.60; aOR:0.08; 95% CI:0.01-0.66). SPL was associated with most (56%) of the VTE episodes in survivors. WBC trends on days 0-4 were not different between those with and without infection. Platelet count from days 0-4 were not associated with thrombotic complications. Conclusions: We observed distinct patterns of hematologic markers following splenic injuries managed with SPL, EMBO, P/R, and NOM. SPL was associated with more complications and steeper trends of WBC and PLT, but not of HCT.
QS 36. EFFECT OF ADDITIONAL BOOSTER POST-SPLENECTOMY VACCINATION PROGRAM ON VACCINATION COMPLIANCE IN TRAUMA PATIENTS

R Gonzalez, J Robbins, T Garwe, Z Sarwar, A Cross, A Celiì, RM Albrecht

Presenter: Robert Gonzalez BS | University of Oklahoma Health Sciences Center

Background: Post-splenectomy vaccination recommendations by the CDC Advisory council on Immunization Practice for prevention of S. pneumoniae and meningococcus changed in 2012 to include additional vaccinations (boosters) at 8 weeks following the initial vaccination. We hypothesized that these additional boosters would result in low compliance in trauma patients in spite of additional educational material, pocket cards and medical alert bracelets provided to patients. Secondarily, we sought to identify factors associated with low compliance with the booster vaccinations in this patient population in hopes to allow addition of steps to improve compliance.

Method: A retrospective review of a performance improvement (PI) database of trauma patients who were eligible for post-splenectomy vaccination between 2007 and 2018 at the only Level 1 trauma center in a rural state. Patients who died in the hospital were excluded. Compliance with post splenectomy vaccination was compared before and after the change to the addition of booster vaccinations and provision of educational material. Because of the low compliance rate in the post-booster period, patients not complying with the vaccination protocol were compared to compliers. Covariates of interest for comparison included patient demographics, injury etiology, injury severity, insurance status and hospital discharge destination. Distance from the patient’s residence to the Level I trauma center was calculated using Google Maps®.

Results: A total of 277 patients were considered for analysis, 139 in the pre-booster period and 138 in the post-booster period. After excluding deaths (n=20) the pre-booster period had 127 patients and the compliance rate for post-splenectomy vaccination (PSV) was 98.4%; the post-booster period had 130 patients and the compliance rate for PSV was 43.8 %. No significant (p>0.05) differences were noted in the distribution of gender, injury etiology and severity between compliers and non-compliers. Compared to compliers, non-compliers lived farther from the Level I trauma center (80 vs 51 miles, p=0.046) and were generally older (40.1 vs 34.8, p=0.072). Additionally, there was a trend towards non-compliers being disproportionately more likely to be privately insured (48 vs 41%, p=0.4261) and more likely to be discharged to a rehabilitation facility (28 vs 17%, p=0.3434).

Conclusion: Among trauma patients, the rate of compliance with the currently recommended optimal post-splenectomy vaccination is low despite multi-modal strategies to inform and educate patients and families of the risks from lack of
compliance. Our results suggest that older patients and living farther from the trauma center are significant contributory factors to the observed low compliance. Additional approaches to improve vaccination compliance needs to be devised, including partnering with primary care physicians, physicians local to the place of patients residence, referral centers, pharmacies and rehabilitation centers. We have developed a document to send to the patients physician and rehabilitation centers regarding the recommended follow up and timing for the booster vaccinations.
QS 37. DEPLOYMENT OF OPERATING ROOM TEAM (ORT) AND RESOURCE MOBILIZATION FOR COMPLEX PROCEDURES IN THE SURGICAL INTENSIVE CARE UNIT (SICU)

CS Kuppler, BW Thomas, RF Sing

Presenter: Ronald Sing DO | Carolinas Medical Center

Background: Basic procedures such as tracheostomy, endoscopic percutaneous gastrostomy insertion, and IVC filters are common in the Intensive Care Unit (ICU). Patients with advanced modes of ventilation, hemodynamic instability, and high vasopressor requirements have increased risk transporting out of the ICU. At our hospital, a system was designed to provide for the mobilization of an Operating room team (ORT) that has allowed us to perform advanced surgical procedures in select cases. The ORT includes an anesthesiologist, scrub technician, circulating nurse, and OR instrument trays as well as disposables which are brought to the bedside and allow the performance of advanced procedures.

Method: We performed a retrospective chart review of patients who underwent complex operative procedures requiring the mobilization of an ORT to the surgical intensive care unit. Descriptive data was collected and included age, the procedure performed, and lab values at the time of the procedure.

Results: 7 patients who underwent an advanced operative procedure in the ICU were identified. Indications for ORT mobilization included: three or more vasopressors (N=6 patients), and/or on high flow oscillatory ventilation (N=4 patients). Lactic acidosis was seen ranging from 3-16 mm/L. N=4 patients had a leukocytosis ranging from 18.1-36 x10^9/L. pH ranged from 7.20 to 7.33 with a base deficit range of 1-13. Our case study includes patients undergoing the following procedures: Decompressive laparotomy on 29 M; Graham patch repair of perforated gastric ulcer on 59 F; Open cholecystectomy on 37 M; Total abdominal colectomy on 63 M; Total abdominal colectomy on 53 M; Terminal ileal resection on 70 F; Partial colectomy and end colostomy creation on a 50 F.

Conclusion: Deployment of an ORT facilitated the ability to perform complex life-saving surgical procedures in an ICU. By mobilizing the appropriate OR resources that include the staff and instrument trays necessary, relatively advanced surgical procedures were safely performed in the ICU on unstable, critically ill patients who had increased risk of transport to and from the operating room.
QS 38. INDOCYANINE GREEN (ICG) USE FOR REVISIONAL BARIATRIC SURGERY
CL McBride, V Kothari, T Tanner
Presenter: Dmitry Oleynikov MD | University of Nebraska Medical Center

Background: Indocyanine Green has been used with multiple fluorescent technologies to demonstrate perfusion of the gastrointestinal tract. During revisional Bariatric Surgery there is significant scar tissue and the adhesiolysis can result in ischemia of the tissues. In particular in Roux-en-Y Gastric Bypass procedures, it is important to preserve the left Gastric Artery as it is the primary blood supply to the pouch. Sometimes the pulsations can be seen but not in all cases therefore we hypothesized that ICG would allow good visualization of the vessels and the pouch perfusion.

Method: This is a video presentation of two bariatric surgery patients who were undergoing a revisional bariatric surgery. Both had significant adhesions of their gastric pouch, Roux limb, excluded stomach and retroperitoneum. Patient #1 had already had a revision for a gastric gastric fistula in the past but now had an ischemic anastomotic ulcer that required resection and reconstruction with a new gastrojejunostomy. Patient #2 the patient had a mass in the excluded stomach post op and required dissection and then resection of the fundus. In both cases 2 mg of ICG was injected rapidly when visualization of the left gastric artery was needed. The dye persisted up to 45 min which allowed repeated re-evaluation of tissue perfusion. It can also be repeated during the case.

Results: In both cases the ICG and fluorescent camera allowed visualization of the left gastric artery, as well as demonstrated good perfusion of the tissues. This allowed for careful dissection and preservation of the left gastric artery despite extensive adhesions that were distorting the anatomy. At this time neither patient has had an ischemic ulcer or gastrojejunal stricture (which is also believed to be caused by ischemic).

Conclusion: ICG and fluorescent visualization can be a useful addition to revisional bariatric surgery. The dye allows visualization and therefore preservation of the the left gastric. You can also see the staple lines and pouch to make sure it is perfused.
Background: Traumatic Abdominal Wall Hernias (TAWH) and Morel-Lavallee lesions are a rare consequence of blunt force abdominal trauma. They are described as disrupted musculature and fascia with or without abdominal organ herniation following trauma with no evidence of skin penetration or pre-existing hernia at injury site. The limited number of studies and case reports in the literature has prevented the development of a protocol for the best imaging and treatment modalities. We discuss four cases of traumatic abdominal wall injuries and their management.

Method: Data was collected on the mechanism of injury, patient presentation and surgical management via retrospective chart review. Four cases of traumatic abdominal wall hernias presented to our level 1 trauma center. Three were result of a high-speed MVC and one was due to an explosion/blunt force. One patient was taken emergently to the OR without CT imaging and in the other 3 patients, CT of the Abdomen and Pelvis was imaging modality of choice. All four hernias were lateral to the rectus muscle and required exploratory laparotomy. Hernias were repaired with biologic, absorbable mesh in all four instances on the initial exploratory laparotomy. All four hernias had other associated intra-abdominal injuries. ABRA Dynamic Tissue System was used in three patients for definitive abdominal closure.

Results: All four hernias were associated with intra-abdominal injuries requiring exploratory laparotomy. Three patients had a repair augmented with synthetic mesh. There were no surgical site infections and to date no recurrence of hernias. In this small case series, additional TAWHs were identified in 100% of patients when imaging was retrospectively reviewed.

Conclusion: TAWHs secondary to blunt trauma may be more common that literature suggests, is in large part due to the lack of physical exam findings and lack of recognition on imaging studies. It is generally agreed that CT is the best imaging modality due to its high sensitivity to detect traumatic abdominal wall defects. TAWHs are typically associated with multisystem trauma and initial focus must address life threatening injuries. It is important that TAWHs continue to be investigated until there is empirical evidence supporting standard protocols in regard to the timing and type of repair. To better quantitate the incidence of TAWHs, we will be retrospectively re-examining all imaging modalities for concurrence of the presence or absence of a hernia in patients with blunt force trauma.
Background: Traumatic rib fractures are associated with severe pain, leading to physical disability, morbidity, and mortality. Intercostal cryoneurolysis (IC) induces temporary Wallerian degeneration of the intercostal nerve which produces numbness to the distal innervated dermatome. Presented is a case of successful analgesia for pain associated with severely displaced rib fractures by surgical stabilization of rib fractures (SSRF) combined with IC. The patient is a 35-year-old female who presented following a motorcycle crash where she sustained a moderate right pneumothorax and right rib fractures 1-6, including a flail segment from ribs 2-6. Other injuries included left distal radius and malleolar fractures.

Method: Patient was admitted for right chest tube placement and started on multi-modal oral and IV medications following our institution’s rib fracture analgesia protocol. Despite medical management, her pain level remained >7/10 and she was unable to cough or move out of bed on hospital day 2. Thus on hospital day 3, she was taken to the OR and underwent SSRF with IC. A two-port video-assisted thoracoscopy was performed. Intercostal nerves 3-7 were cryoablated approximately 4 cm lateral to the spine by applying the cryoprobe directly to the neurovascular bundles at -60 C for 120 seconds per nerve. Fractures of right ribs 3 through 6 were then reduced and fixated with titanium plates. A 24F chest tube was placed at the conclusion of the case.

Results: On post-operative day (POD) 1, patient reported minimal chest wall pain. She was switched to oral narcotics on POD2 for left upper and lower extremity fractures. She reported complete numbness to touch in the right chest wall in the dermatomal distribution of T3-T7 lateral to the mid scapula wrapping anteriorly the sternum. She was discharged on postoperative day 10 following orthopedic surgical management of her other fractures and removal of chest tube. At her 3 week post-operative appointment, she reported continued numbness to the chest wall with excellent thoracic pain control. At 6 weeks, she reported no chest wall pain and some return of cutaneous sensation in the right chest, approximately 40% compared with the unaffected side. She experienced occasional mild shooting pain to the T3-7 dermatome which was well controlled with gabapentin. At three-month follow-up she was off all pain medications with continued partial numbness to her chest wall.

Conclusion: The use of IC for pain control after traumatic rib fracture was found to be both safe and effective with our patient having no long-term adverse outcomes. IC augmentation of SSRF was technically successful in that our patient had a rapid relief of pain, timely de-escalation of intravenous narcotics.
and regained the ability to fully participate in pulmonary hygiene and physical therapy. Finally, IC added no significant increase in the number or magnitude of invasive procedures to our patient’s treatment course as it was an extension of an already indicated procedure. Further investigation, including prospective comparative trials, can further establish the indications and roles of IC in the management of traumatic rib fracture pain.
QS 41. LIVER TRANSPLANTATION AS A TREATMENT FOR GRADE V LIVER LACERATION

KA Arnim, ZP Asher, TL Nydam, RC McIntyre

Presenter: Katherine Ann Arnim PA-C | University of Colorado School of Medicine

Background: The liver is the most frequently injured organ by blunt trauma, with non-operative management being the mainstay of treatment in hemodynamically stable patients. However, interventional radiology or surgical intervention frequently plays a role in the severely injured, grade V, liver. Even when the injury necessitates an operation, transplant for hepatic trauma remains a rarity. We report a patient who underwent liver transplantation for sub-acute hepatic failure from a veno-veno shunt after sustaining a grade V liver laceration.

Method: Patient is a 17 year old male who sustained rib fractures, C1-2 atlantoaxial dislocation, and a grade V liver laceration after a vehicle collision. The liver laceration was initially treated by percutaneous artery embolization after stabilization in the trauma bay. Patient was initially doing well, but at one month post trauma, patient acutely decompensated. His injury resulted in a high flow fistula shunt, from the right portal vein to the right and middle hepatic veins resulting in minimal flow to the left liver. He was transferred to a higher level of care for hepatobiliary specialties. The patient then underwent a series of explorations with the intent to ligate the right portal, taking down the veno-veno shunt and increasing portal flow to the functional left liver.

Results: Despite multiple surgical interventions, imaging studies revealed the previously unaffected left liver had developed a large necrotic collection. The necrosis, as well as the initial injury, led to a bile leak that was treated with an endoscopic retrograde cholangiopancreatography and stent placement. The patient’s course was further complicated by polymicrobial bacteremia, worsening renal failure requiring renal replacement therapy and persistent hyperbilirubinemia. The exhaustive efforts to salvage the remaining functional portions were unsuccessful and the patient was then listed for liver transplantation. On post trauma day 53, patient underwent liver transplantation with complex arterial reconstruction with an aortic jump graft. The patient was left with an open abdomen due to his operative complexity with a planned return to the operating room for biliary reconstruction occurring on post trauma day 57.

Conclusion: Despite a lengthy hospital course, the patient was discharged to rehab and eventually home. His liver is well functioning with normal enzymes. He is maintained on immunosuppressive therapy. While the indications for liver transplantation remain very limited, it can be utilized following severe hepatic trauma. Timely referral to a transplant center with hepatobiliary specialist should be considered in the treatment algorithm for severe liver injury. If the gravity of this patient’s shunt and impending liver failure had been identified earlier, he may have been spared the subsequent transplant. However, given the circumstances, hepatic transplantation was a life saving modality for this patient.
QS 42. GIANT INGUINOSCROTAL HERNIA REPAIR AND ABDOMINAL WALL RECONSTRUCTION WITH INTERLAY VICRYL MESH TO PROTECT FULLY EXPOSED HOLLOW VISCERA

EC Howell, CM Tom, SR Klein

Presenter: Erin Howell MD | Harbor-UCLA Medical Center

Background: In complex ventral and inguinal hernia repair, a multitude of reconstructive options and mesh types are available. Vicryl mesh is used in breast surgery and neurosurgery, along with intermittent use in abdominal wall reconstruction. We present a case report of a chronically incarcerated giant inguinoscrotal hernia that extended to the ground and contained bladder with nearly all the small and large bowel. This was repaired using an interlay multilayered Vicryl mesh synthetic directly opposed to abdominal viscera. The multilayered Vicryl mesh was then covered in an on-lay fashion with polypropylene mesh via a staged approach.

Method: 59-year-old man with history of benign prostatic hypertrophy, severe malnutrition, scoliosis, and giant right inguinoscrotal hernia extending to the ground presented to our institution with severe sepsis, methicillin-sensitive Staphylococcus aureus bacteremia, Clostridium difficile infection, urosepsis, atrial fibrillation with rapid ventricular rate, and acute renal failure with obstructive uropathy. The patient’s hernia had been present since 1982 and was progressively growing in size, such that he could no longer ambulate secondary to hernia extending to the floor. He also had difficulty urinating and needed to lift the hernia to void. CT imaging revealed that the hernia contained bladder and nearly all his small and large bowel. Duplex US showed a right femoral DVT likely secondary to compression by the hernia.

Results: Hernia repair and abdominal wall reconstruction were performed via staged approach. The patient underwent exploratory laparotomy with reduction of hernia contents into the abdomen and temporary abdominal wound-vac placement. The inguinal floor was reconstructed using Ventralight-ST mesh. The fascia had a 12-inch loss of domain. The following day, three layers of Vicryl mesh were stapled together used as an interlay between the fascial edges, and a right-sided on-lay polypropylene mesh placed. Due to the risk of compartment syndrome, the left-sided on-lay polypropylene mesh was completed the following day. A subcutaneous wound vac was placed due to the skin defect. After several wound vac changes, advancement of abdominal wall subcutaneous flaps, and A-cell applications, the Plastic Surgery service primarily closed the patient’s skin and the Urology service performed a scrotoplasty. The patient was discharged to a rehabilitation facility 32 days after his initial operation. He was tolerating a diet and ambulatory.

Conclusion: Interlay multilayered Vicryl mesh provides temporary durable strength. It may be placed juxtaposed to hollow viscera in conjunction with on-lay polypropylene mesh in a staged approach, and is a viable option for repair of a complex giant inguinoscrotal hernia.
QS 43. CHRONIC PELVIC PAIN SECONDARY TO AN INTRAPERITONEAL FOREIGN BODY: A CASE REPORT

B Pokala, SJ Langenfeld

Presenter: Bhavani Pokala MD | University of Nebraska Medical Center

**Background:** Accidental foreign body ingestion is common. Thankfully, these objects typically pass with observation alone, and surgical intervention is required less than one percent of the time. When foreign bodies erode through the bowel wall, subsequent complications include peritonitis, intestinal obstruction, and hepatic abscess. Chronic pelvic pain is difficult to diagnose and treat, and surgical intervention is inconsistent in alleviating symptoms. We present an interesting case of a healthy young man with severe pelvic pain which was eliminated after a foreign body was extracted from his abdominal cavity.

**Method:** A 30 year old man underwent workup at an outside hospital for possible appendicitis. Computed Tomography discovered an intraperitoneal foreign body resting in the rectovesical pouch. A small, curved wire was seen that was morphologically consistent with a bonded orthodontic retainer. The patient reported “losing” his retainer two years earlier, with concern that he may have swallowed it in his sleep. He also reported a two year history of severe pelvic pain, sharp and shooting in nature, which occurred 4-6 times per day. The patient was an accomplished athlete, but had limited physical activities in an effort to reduce episodes of pain. He had previously undergone an extensive workup at an outside hospital including a detailed anorectal exam and colonoscopy, both of which were normal.

**Results:** Our colorectal surgery team performed an outpatient diagnostic laparoscopy which discovered a thin metal wire within the peritoneal cavity. The wire was lying anterior to the rectum just above the peritoneal reflection with the tip poking the rectovesical pouch. The remainder of the exam was normal, and there was no evidence to suggest which area of the bowel had initially perforated to allow passage of the wire into the abdominal cavity. The retainer was removed without difficulty. After the procedure, the patient experienced immediate and complete resolution of his pelvic pain. He has remained pain free for more than 2 years.

**Conclusion:** To our knowledge, this is the first case of an ingested retainer migrating into the peritoneal cavity and causing chronic pelvic pain. In retrospect, pelvic imaging would have been helpful earlier in his presentation. Since removal of the retainer, the patient has been completely pain-free, and thus he has been able to return to his active lifestyle.
QS 44. WHEN PLUG AND PATCH HERNIA REPAIR FAILS: A MULTIDISCIPLINARY APPROACH FOR THE MANAGEMENT OF BLADDER EROSION

KM Jogerst, D Das, JA Madura

Presenter: Kristen Jogerst MD MPH | Mayo Clinic Arizona

Background: Mesh is commonly used in inguinal hernia repairs to decrease the overall recurrence rate. A relatively rare complication of mesh is erosion into the bladder or adjacent viscera. Erosion is a slow process culminating in dense adhesions & fibrosis. The interval between repair & symptom presentation can range from 6 months to 16 years. Bladder mesh erosion can present as recurrent UTIs, hematuria, vesico-cutaneous fistula, or mimic an intravesical stone. Both malignant pelvic tumors & bladder mesh erosion can present as recurrent hematuria. Cystoscopy and biopsy should be completed during the workup, as imaging alone cannot establish a definitive diagnosis.

Method: A 56 year-old gentleman underwent open left inguinal hernia repair with mesh “plug and patch” technique in 2011. A mesh plug was inserted into the preperitoneal fascial defect, & mesh patch placed around the cord above. In 2013, he began experiencing gross hematuria, pain with voiding, & penile pain at rest. He began passing stones in 2014. Hematuria workup, including ultrasound, was completed in 2017 & revealed a 1-cm echogenic focus in the bladder. Outside hospital cystoscopy & transurethral biopsy of the mass showed no evidence of dysplasia. An area of protruding propylene mesh with calculus formation was identified & complete resection deferred. In September 2018, he underwent open excision of the eroding mesh plug, partial cystectomy, & primary bladder repair, in conjunction with Urology.

Results: With the patient in supine position, a lower midline incision was made and the preperitoneal space entered. After developing the space of Retzius, the mesh plug was freed from the undersurface of the abdominal wall near the medial portion of the myopectineal orifice. A tissue repair was completed to close a potential hernia space within the femoral canal. The epigastric vessels were ligated & the area of erosion into the bladder brought into the operative field of view for our Urology colleagues. They completed an open partial cystectomy, excised the mesh plug, and repaired the bladder defect primarily with running chromic gut suture. A small peritoneal defect that occurred during excision was repaired with running Vicryl suture. A bladder leak test was performed and negative. Intra-operative photos were obtained throughout the case. Fascia was closed. A foley catheter remained in place. Patient convalesced from the procedure.

Conclusion: The patient had his foley catheter discontinued on postoperative day 9 after a negative cystogram, & has had no further complications, including no evidence of hernia recurrence. On postoperative follow up, he has returned to his
baseline health status & was pleased with his excision & repair results. Using a multidisciplinary team approach, we demonstrate that mesh erosion complications can be surgically repaired without compromising the integrity of the original hernia repair. To better understand the pathophysiology behind the development of mesh erosion complications & to develop management pathways for this subset of mesh complications, further multidisciplinary & multi-institutional reviews are warranted.
QS 45. A CASE OF STRANGULATED AYMAND HERNIA MANAGED BY TOTAL EXTRAPERITONEAL REPAIR FOLLOWED BY LAPAROSCOPIC APPENDECTOMY
S Liu, VB Bachkarev
Presenter: Shuyang Liu MS3 | Hilo Medical Center

**Background:** Amyand hernia is defined as an inguinal hernia containing the vermiform appendix. It was first described by Claudius Amyand, a French surgeon, in the 1700’s. It has classically been diagnosed intra-operatively during the open repair of an inguinal hernia. However, recently, there have been more cases diagnosed pre-operatively and an increasing number of laparoscopic approaches have been used to manage Amyand hernias.

**Method:** We present a case of a strangulated Amyand hernia with appendix ischemia that was diagnosed pre-operatively using contrast-enhanced CT. The hernia was subsequently managed using a total extraperitoneal (TEP) repair with mesh followed by a laparoscopic appendectomy. The operation was uncomplicated, and the patient was discharged on post-operative day one.

**Results:** The patient recovered promptly and was discharged home the next day. Final pathology showed a strangulated appendix with ischemic changes at the tip. The patient returned to normal activities and was back to work in one week after discharge. He had no complaints at a 2-week follow up visit.

**Conclusion:** The pre-operative diagnosis helped optimize surgical planning and aided in the choosing of a TEP approach. The usage of the TEP technique allowed for hernia reduction and mesh repair in the pre-peritoneal space to remain clean (wound class I) and subsequent laparoscopic appendectomy (wound class II) to be performed separately. To our knowledge, this is the first time this approach has been used in the management of a strangulated Amyand hernia.
M Panshin, R Washam, T Schroeppe, M Metzler, J Dunn

Presenter: Maclean Panshin BS | University of Colorado Health North

Background: There is currently no consensus on the optimal duration of antibiotic treatment following complicated appendicitis (grades 2-5). We compared two facilities in our system that have differing durations of antibiotic use following operative intervention for grades 2-5 appendicitis to determine if a recommendation could be made regarding length of antibiotic use.

Method: Patients who underwent an appendectomy from 2015 to 2017 were included in this study. Patients whose procedures were incidental, interval, or delayed were excluded from analysis. Length of antibiotic use was recorded and an average intent-to-treat (ITT) by operative grade was analyzed. Occult perforation rate was also calculated defined as a pathologic grade 3 or greater compared to an operative grade recorded as 0-2. Readmission rates related to acute appendicitis were recorded and compared across grades and broken down by ITT. Averages and student T-Tests (2-tailed, alpha of .05 used to determine significance) were calculated using Microsoft Excel (Microsoft, Redmond, Washington).

Results: A total of 1191 patients were enrolled between the two institutions. Seventy-seven percent (919) of patients had grade 0 or 1 disease. We found an 8.7% occult perforation rate (86 patients). There were 272 (23%) patients with complicated appendicitis (grades 2-5): 130 at Institution A and 142 at Institution B. Average intent-to-treat (ITT) for Institution B was significantly greater than Institution A (P < 0.001) with an average of 8.27 ITT and 5.35 ITT, respectively. There was no significant difference in readmissions between the two institutions (P=0.39), Institution A having 11 total readmissions (readmission rate of 7.7%) and Institution B with a total of 14 readmissions (readmission rate of 10.8%). Readmission rates for grades 0 and 1 disease was not different between institutions 3.3% (A) and 3.2% (B).

Conclusion: A longer ITT (ITT>8 days) did not reduce the incidence of readmission due to complications of grades 2-5 appendicitis. We conclude that administration of 5 days of antibiotics post-appendectomy to be sufficient therapy. There is a baseline complication rate of 3.2 to 3.3% for grades 0 and 1 appendicitis and may be a function of incorrect grading or related to choice of preoperative antibiotic. A multi-institutional study with a larger patient population may help clarify these issues.
QS 47. RATES OF HYPERCALCERMIA AND HYPERPARATHYROIDISM AMONG PATIENTS WITH PORCELAIN GALLBLADDER

MG Berger, ML Lyden, BM Dy

Presenter: Megan Berger MD | Mayo Clinic Rochester

Background: Porcelain gallbladder is characterized by calcification of the gallbladder wall. The calcification is thought to result from chronic inflammation associated with cholelithiasis. It is unknown whether porcelain gallbladder is associated with higher rates of hypercalcemia and/or hyperparathyroidism compared to cholelithiasis without porcelain gallbladder.

Method: We performed a search of our patient database for patients with evidence of porcelain gallbladder on radiology studies and a separate search for patients with a diagnosis of cholelithiasis with or without cholecystitis. We collected data on patient age, gender, calcium levels, parathyroid hormone (PTH) levels, operative intervention, and presence or absence of gallbladder cancer in diagnosis codes or pathology reports.

Results: A total of 1,000 patients within our database had radiographic evidence of porcelain gallbladder. Of these, 661 (245 male) had at least one serum calcium value for analysis. These patients were matched by age and gender in a 10:1 ratio with 6610 patients with a diagnosis of cholelithiasis who had at least one serum calcium value. For patients with multiple calcium values, the highest value was selected for analysis. Rates of hypercalcemia (total serum calcium >10.2 mg/dl) were higher among patients with porcelain gallbladder at 19.2% versus 16% (p=0.03). Rates of hyperparathyroidism (serum PTH >65 pg/ml) were also higher among porcelain gallbladder patients at 11.2% versus 6.1% (p<0.0001). Rates of gallbladder cancer were also higher among porcelain gallbladder patients at 3.03% vs. 0.47% among patients with cholelithiasis alone (p<0.0001). Patients with porcelain gallbladder were less likely than those with cholelithiasis to undergo cholecystectomy (17.1% versus 38.7%, p<0.0001).

Conclusion: Patients with porcelain gallbladder show higher rates of hypercalcemia and hyperparathyroidism than patients with cholelithiasis alone. While most patients in both groups are normocalcemic, it may be practical to test serum calcium in these patients followed by PTH if serum calcium is elevated. The rate of gallbladder cancer among patients with porcelain gallbladder, while low at 3.01%, is 6-fold that of patients with cholelithiasis alone.
Background: Routine intraoperative cholangiogram (IOC) at the time of cholecystectomy in patients with gallstone pancreatitis is controversial. The goal of this study is to compare the outcomes of cholecystectomy with and without intraoperative cholangiogram in patients with gallstone pancreatitis treated at the Kaiser Permanente Southern California hospitals.

Method: Patients admitted to KP Southern California hospitals for gallstone pancreatitis between 2013 and 2015 were included. Those with no surgical intervention, concomitant cholangitis or cancer diagnosis were excluded. The remaining patients were divided into two groups based on whether IOC was performed or not. Information about imaging modalities including MRCP, US, CT scan and ERCP were collected. Positive IOC included the presence of a stone or limited flow through the CBD with or without CBD dilatation. Retained stone was defined as readmission for CBD stone 1 year after the initial duct clearance. Hospital length of stay, 30-day complications, readmission, and retained stone rates were compared between the two groups. Those with IOC were stratified by positive IOC results to identify predictors of positive IOC.

Results: Of 197 patients who met the inclusion criteria, 94 (48%) patients had no IOC. Among those: 45 patients had preoperative MRCP; 14 had ERCP without MRCP; one had failed IOC and refused further care despite elevated LFT; and 34 patients had no IOC, ERCP or MRCP. The latter group had normal liver function panel preoperatively. Patients with no IOC were more likely to have preoperative MRCP (47% vs. 24%, p=0.002) or ERCP (24% vs. 9%, p=0.029) and less likely to have postoperative ERCP (4% vs. 27%, p 0.01). Patients who had IOC were subdivided into patients with positive or negative IOC to identify predictors of positive IOC. Clinical characteristics and lab values were not significantly associated with IOC findings. 15% of patients with positive IOC had normal preoperative liver function panel.

Conclusion: Routine IOC in patients with gallstone pancreatitis is not associated with reduced rate of retained stones or readmissions, particularly in those with normalized preoperative LFT. Normal preoperative LFT does not always rule out the presence of CBD stones.
QS 49. OLDER PATIENT AGE AND LONGER DURATION OF SYMPTOMS SIGNIFICANTLY INCREASES PERFORATION RISK IN APPENDICITIS; TIME TO OPERATION AND ANTIBIOTICS DO NOT

K. Hanson, D. Jacob, A. Alhaj Saleh, S. Dissanaike

Presenter: Keith Hanson BA| Texas Tech University Health Sciences

**Background:** Controversy exists regarding how quickly an adult with appendicitis requires surgery to prevent perforation and a higher risk of post-operative complication; the recent literature on antibiotic use as definitive treatment has complicated this question further. We hypothesized that longer time to surgery would be associated with an increased incidence of perforation in patients with an initial diagnosis of non-perforated appendicitis, regardless of timing of antibiotics.

**Method:** A retrospective review of adult patients with acute appendicitis from 2012-2017 with initial CT read of non-perforated appendicitis. We measured reported time of symptom onset, presentation to ER, antibiotic administration and surgery to evaluate association with intra-operative diagnosis of perforation. A logistic regression model was used to test the relationship between risk factors and perforation.

**Results:** A total of 700 adult patients met inclusion criteria. Mean time from onset of symptoms to ER presentation of 26.2 hours (1-96). 84 (12%) patients had a perforation diagnosed intraoperatively, despite a report of non-perforated appendicitis on initial CT scan. Mean time to operation was 6.7 hours (1.72-24.5) and mean time from antibiotic administration to appendectomy was 2.5 hours (0 -23), neither was related to risk of perforation. However, the perforated group had longer mean duration of symptoms (DOS), 36.5 versus 25.5 hours (p<0.01). Patients older than 45 years old had a 3-fold increase in intra-operative diagnosis of perforated appendicitis (OR=3.10, 95% CL (1.08, 8.90) p= <0 .01)

**Conclusion:** In a cohort of patients undergoing appendectomy within 27 hours of presentation, time to operation did not increase the rate of in-hospital perforation. However, older age and longer DOS were both significant risk factors. Our results indicate a benefit from expedient surgery in older patients, and those presenting with a longer DOS.
**Background:** Surgical techniques such as Nissen Fundoplication and Magnetic Sphincter Augmentation (MSA) can be used to surgically treat severe cases of gastroesophageal reflux disease (GERD). Objective measures including DeMeester score, LES Pressure, acid exposure time, and BMI are used to determine GERD severity and eligibility for surgery. The GERDHRQL survey is widely used to evaluate patients’ subjective severity of symptoms and GERD-related quality of life. The purpose of this project was to identify whether or not the subjective measure (GERDHRQL) correlated with objective measures (DeMeester score, LES, acid exposure, BMI) of GERD severity.

**Method:** A retrospective review of the medical records of patients who underwent Nissen Fundoplication, MSA, or hiatal hernia repair for GERD from October 2013 to June 2018 was completed. Patients’ GERD severity was measured preoperatively and postoperatively on a one to five scale using the GERDHRQL. Statistical analysis included Spearman correlation and chi square tests.

**Results:** 166 patients were included in the study; 65% were female. MSA was performed in 41%. The mean age and BMI were 55.0±14.5 years and 30.6±5.1 kg/m², respectively. The mean preoperative DeMeester score was 43.1±36.1, LES pressure was 20.1±18.6mmHg and acid exposure time was 11.4±9.6. Postoperative dysphagia was noted in 46 (28%) patients, vomiting in 9 (5%), and gas-bloat syndrome in 1 (1%). Four (2%) patients required dilation, and 2/68 patients had their MSA device removed. Mean GERDHRQL scores decreased from 28.0±10.3 preoperative to 5.7±4.9 postoperative; P<0.0001. Preoperative GERDHRQL scores were not correlated with DeMeester score (r=0.11; P=0.389), LES pressure (r=-0.018; P=0.127), acid exposure time (r=0.05; P=0.755), BMI (r=0.11; P=0.255), or age (r=-0.14; P=0.179).

**Conclusion:** A significant decrease in total GERDHRQL scores was observed from pre to postoperative. There was no correlation between subjective and objective GERD scoring. These data indicate the need for both physiologic evaluation and subjective assessment of patient symptoms during preoperative work-up.
QS 51. PEDIATRIC WEIGHT LOSS SURGERY PATIENTS VARY BY PROCEDURE: PREOPERATIVE CHARACTERISTICS OF 402 ADOLESCENTS WITH MORBID OBESITY
DL Tamburrini, GJ Slotman
Presenter: Danielle Tamburrini DO | Inspira Health Network

Background: Bariatric surgery has improved the quality of life for many adolescents with morbid obesity. Pediatric and bariatric surgery organization guidelines for weight loss procedures in this age group are well established. The objective of this study was to identify preoperative demographics, weight and weight-related medical problems of adolescents undergoing bariatric operations at SRC Centers of Excellence in Bariatric Surgery (COEBS).

Method: Data from 402 adolescents in the SRC BOLD database who were preoperative for bariatric surgery at SRC COEBS between June 2001 and February 25, 2018 were analyzed retrospectively. Data included demographics, age, weight, BMI and obesity related comorbidities including Type II diabetes, hypertension (HTN), dyslipidemia, GERD, asthma, obstructive sleep apnea (OSA), obesity hypoventilation syndrome (OHS), impaired ambulation, back pain, depression, and alcohol/tobacco use. Statistical analysis consisted of continuous variables that were analyzed using ANOVA with treatment in the model. Pair-wise comparisons were performed on the least squares means of the treatments calculated from the ANOVA model. Categorical variables were examined by a general linear model with treatment and modified for binomial distribution.

Results: 301 females (75%) and 101 males (25%) with median age 17 years. Race: 9% African American, 56% Caucasian, 13% Hispanic, 1.2% Asian, 1.5% Native American/Alaskan/Hawaiian/Pacific, 19% other (or >1 race). Procedures: laparoscopic gastric bypass (LRYGB) 142 (35%), adjustable gastric band (AGB) 152 (38%), sleeve gastrectomy (SLEEVE) 101 (25%), duodenal switch 2 (0.5%), other 5 (1.2%). Countries: USA 341 (85%), Romania 29 (7%), UAE 14 (3.5%), Saudi Arabia 13 (3.2%), India 3 (0.8%), Qatar 2 (0.5%). Health insurance: Private/Government 198 (49%), Self-Pay 133 (33%), Medicaid 24 (6%), Medicare 5 (1.2%), charity 2 (0.5%), unknown 40 (10%). Female LRYGB/SLEEVE/AGB (77/67/79%; p<0.05), weight (311+-79/154+-128/274+-57; p<0.001) and BMI (50+-10/45+-10/45+-7; p<0.001) varied but age did not (16.8+-1.6/16.6+-1.2/16.5+-1.6). LRYGB/SLEEVE/AGB hypertension (42/68/39%; p<0.0001), back pain (66/86/72%; p<0.0001), medicated back pain (19/3/11%; p<0.05), OSA (66/81/81; p<0.01), CPAP (18/5/6%; p<0.01), medicated asthma (20/12/8; p<0.05), private insurance (74/90/84%; p<0.05), Caucasian (55/27/74; p<0.001), USA (99/45/99%; p<0.0001) and tobacco (2/9/2%; p<0.05) varied.

Conclusion: Late adolescence (16-17 years) is the dominant age for pediatric
bariatric operations. Pediatric LRYGB and AGB are more commonly selected than SLEEVE, in contrast to adult bariatric surgery. AGB is the most common pediatric bariatric procedure, which may reflect preference of a reversible procedure for adolescents. BMI, weight and female sex are higher within LRYGB/AGB. Hypertension, back pain, private insurance and OSA were higher in preoperative SLEEVE in spite of lower weight/BMI. Caucasian race and USA location were lowest among preoperative SLEEVE possibly due to international influences. CPAP use and medicated asthma were highest in LRYGB. Rationales for operation choice and whether or not preoperative clinical variation by procedure influences outcomes is not clear from the data and will require further BOLD analysis.
**QUICK SHOT ABSTRACTS (continued)**

**QS 52. DIFFERENCES BETWEEN MALE AND FEMALE SEX IN OUTCOMES OF APPENDECTOMY**  
*H Park, CM. Tom, EC Howell, R Sakai-Bizmark, CM de Virgilio, SL Lee*  
**Presenter:** Hayoung Park MD | Harbor-UCLA Medical Center

**Background:** Recent literature has highlighted the importance of sex differences in the outcomes of both medical interventions and surgical outcomes. The objective of this study is to evaluate the role of sex on outcomes and cost of appendectomy in both the pediatric and adult populations.

**Method:** We reviewed the National Inpatient Sample (NIS) database for all patients aged 0 to 90 years who underwent appendectomy between the years 2001-2012 for presumed appendicitis. Patient demographics including age, race/ethnicity, and sex, and surgical outcomes including the use of laparoscopy, negative appendectomy rate, complications within 30 days, length of stay (LOS), and cost were collected. Bivariate and multivariate logistic regression analyses were performed.

**Results:** There were a total of 622,065 patients, representing a weighted estimate of 2,954,223 pediatric and adult patients, who underwent appendectomy from 2001 to 2012. Of these patients, 44.0% were female and 66.6% were over the age of 19 years. There was an overall complication rate of 5.2%. In multivariate analysis, female sex was significantly associated with fewer complications (OR 0.75, 95% CI 0.73-0.77), lower risk of perforation (OR 0.88, 95% CI 0.87-0.89), shorter length of stay (OR 0.88, 95% CI 0.87-0.88), and more laparoscopy utilization (OR 1.24, 95% CI 1.23-1.26), but were more likely to have negative appendectomy (OR 2.19, 95% CI 2.13-2.24). Being a female patient was associated with higher cost (OR log 0.10, 95% CI 0.11 -0.10); though this finding was likely not clinically relevant.

**Conclusion:** There were significant differences in disease severity, operative approach, and outcomes in male and female patients with appendicitis. Female patients were associated with higher laparoscopy utilization and negative appendectomy than male patients. Further studies are needed to determine why such differences exist to develop targeted treatment strategies for both females and males with appendicitis.
QS 53. OUTCOME OF ROBOTIC COLORECTAL PROCEDURES: DOES MORNING START TIME MAKE A DIFFERENCE?  
*YY Nasseri, R Zhu, C Sutanto, A Lee, J Ellenhorn, J Cohen*

**Presenter:** Ruoyan Zhu BS | Cedars Sinai Medical Center

**Background:** Robotic colorectal operations are made possible by the successful collaboration of skilled surgical, anesthesia and nursing staff and utilization of both laparoscopic and highly technical robotic instrumentation. With much attention given to robotic surgery outcomes, we sought to evaluate whether morning versus afternoon start time matters.

**Method:** We conducted a retrospective review of a prospective database of robotic colorectal surgery between January 2014 and October 2018. We categorized them into morning (before 12pm) versus afternoon (after 12 pm) cases. Preoperative comorbidities were assessed using American Society of Anesthesiologists (ASA) score and conglomerate of relevant risk factors: obesity, diabetes, renal failure, pulmonary, and cardiac diseases. Intraoperative variables evaluated included operative time, time on the console, estimated blood loss (EBL) and complications. Postoperative outcomes compared were overall and gastrointestinal (GI) specific complications (superficial or deep wound infection, abdominal/pelvic abscess, anastomotic leak, small bowel obstruction), postoperative stay, and 30-day readmission rate. Two sample t-test was used and p< 0.05 was considered statistically significant.

**Results:** We compared 58 morning cases with 53 afternoon cases. Morning group had younger patients (59 vs 68 years, p = 0.0031), but no difference in BMI (26.8 vs 26.9 p = 0.91), ASA score (2.38 vs 2.49, p = 0.27), or number of risk factors (1.7 vs 2.0, p =0.22 ). Operative time (230 vs 235 minutes, p = 0.73), console time (131 vs 149 minutes, p= 0.22), operative complications (3 vs 5, p=0.48), and readmission rate ( 8.6% vs 7.6%, p =1.0) were similar. Morning cases had significantly shorter mean (5 vs 12 days, p=0.023) and median (4 vs 5 days, p=0.0063) postoperative stay and a trend towards lower overall (36.2% vs 52.8 %, p=0.088 ) and GI complication rates (20.7% vs 35.8%, p =0.092).

**Conclusion:** In our experience, morning robotic colorectal cases had shorter postoperative stays and a trend towards lower complications. If these conclusions are validated, future studies should focus on improving quality measures for afternoon cases.
QUICK SHOT ABSTRACTS (continued)

QS 54. RETROSPECTIVE COMPARISON OF OPEN VERSUS LAPAROSCOPIC JEJUNOSTOMY TUBE PLACEMENT WITH UTILIZATION OF T-FASTENERS
SJ Deb, JR Conner, JM Reinersman, A Landmann, A Weiss
Presenter: Jesse Conner MD | University of Oklahoma Health Sciences Center

**Background:** Feeding tubes are an effective way to improve the nutritional status of malnourished patients. Push percutaneous endoscopic gastrostomy (PEG) tubes show the effectiveness of using T-fastener bolsters to tack the viscera to the abdominal wall. Patients that are unable to obtain a PEG tube secondary to their specific disease process require jejunostomy catheters for enteral access. This study aims to compare outcomes of open jejunostomy tube placement to laparoscopic jejunostomy tube placement with the utilization of T-fasteners to secure the intestine to the abdominal wall.

**Method:** A retrospective review was performed of all jejunostomy tubes placed by 2 surgeons at a tertiary care center from August 2013 to June 2017. Prior to 2015, all jejunostomy tubes were routinely placed in an open fashion. After 2015, a change in technique allowed for placement of jejunostomy catheters laparoscopically with the use of T-fasteners. Laparoscopic technique entails placement of a posterior T-fastener to hold the jejunum to the abdominal wall. A jejunostomy tube is then placed using a laparoscopic assisted Seldinger technique. Several T-fasteners are then used to tack the jejunum circumferentially around the jejunostomy tube to the abdominal wall. Outcomes of the two techniques were compared.

**Results:** One hundred and eighteen patients underwent jejunostomy tube placement in the study period with 57 placed open and 61 placed laparoscopically. There was no significant difference in age, BMI, or comorbidities between the two groups. Indications for jejunostomy tube placement in the open group included 57% esophageal cancer, 12% gastric cancer, and 31% benign esophageal disease. Indications for laparoscopic jejunostomy tube placement were 85% esophageal cancer, 2% gastric cancer, and 13% benign esophageal disease. There was no significant difference in jejunostomy tube specific complications between the two groups with 2 complications in the open cohort and 5 in the laparoscopic cohort (p=0.309). Complications in the open cohort included enterocutaneous fistula and small bowel volvulus around jejunostomy tube. Complications in the laparoscopic group included site infection, skin break down, and small bowel perforation secondary to grasper use.

**Conclusion:** Placement of laparoscopic jejunostomy appears to be a safe and effective method when compared to the traditional open technique. Laparoscopy decreases pain and shortens recovery; the use of T-fasteners makes the laparoscopic approach more accessible as it does not require advanced laparoscopic skills.
QS 55. COMPARISON OF EARLY VERSUS DELAYED COMPLEX DEFINITIVE ABDOMINAL RECONSTRUCTION WITH BIOLOGIC MESH POST DAMAGE CONTROL SURGERY
S Gogna, R Latifi R, Dj Samson, G George, K Prabhakaran, J Con, P Anderson, A Policastro
Presenter: Shekhar Gogna MD, MS | Westchester Medical Center

Background: Open abdomen management (OAM) following damage control surgery (DCS) for trauma or abdominal catastrophe, while potentially life-saving, is associated with significant morbidity and cost. Definitive abdominal wall reconstruction (DAWR) is usually performed months to years later. Since August 2017, in order to avoid consequences of OAM, we have started performing definitive abdominal wall reconstruction (DAWR) with biologic mesh in the acute phase of the same hospital admission. The aim of this study is to compare the preliminary results of patients undergoing DAWR in acute setting versus patients undergoing delayed DAWR.

Method: We analyzed 26 patients who underwent DAWR after trauma or emergency surgery at our academic tertiary medical center. We defined early, as DAWR completed at the index admission, and delayed when the DAWR was done in the subsequent admission. Patient demographics, sex, age, index operation, hospital and ICU length of stay, Modified Frailty Index (mFi) andperioperative complications were analyzed. All the patients underwent DAWR using biologic mesh (StratticeTM). Statistical analysis was performed using StatView 5.0 (SAS Institute Inc., Cary, NC). Student’s t-test and Fisher’s exact test were applied to compare the groups and p <0.05 was considered significant

Results: Seventeen patients underwent DAWR in acute settings (DAWR-AS) and 9 patients underwent delayed DAWR (DAWR-D). Mean age, height, weight and BMI were 55.8 years, 169 cm, 84.5 kg and 29.1 kg/m2, respectively. The proportion of mFi scores ≥3 (frail) were 17% in the DAWR-AS group and 9% in the DAWR-D group (p=0.87). The cumulative mean hospital length of stay, in days, was 29.4±15.1 in DAWR-AS vs 94.6±88.8 in DAWR-D (p=0.0079). Mean ICU length of stay was significantly shorter in patients who underwent DAWR-AS 13.2±10.7 vs 39±30.8 days (p=0.004). Total number of surgeries were also significantly less in DAWR-AS group 2.8±1.3 vs 6.3±2.8 (p= 0.0003). There were no between-group differences in post-operative complications, such as superficial or deep surgical site infection, pneumonia, acute kidney injury and C. difficile colitis. Regarding disposition, more patients in DAWR-D group went home as compared to DAWR-AS, but the result was nonsignificant.

Conclusion: Definitive abdominal wall reconstruction, using biologic mesh during the acute phase for patients who undergo DCS, should be attempted early and during the same hospitalization to avoid consequences of OAM.
QS 56. PREDICTORS OF 30-DAY READMISSION FOLLOWING COMPLEX ABDOMINAL WALL RECONSTRUCTION

AL Shover, H Park, ED Dubina, C de Virgilio, DY Kim, A Moazzez

Presenter: Andrew Shover MD | Harbor-UCLA Medical Center

Background: Despite an increase in the number of abdominal wall reconstructions (AWR) being performed for large or complex abdominal wall hernias, there is a paucity of data regarding the rates and predictors of readmission following these procedures. In addition to directly impacting patient satisfaction, healthcare costs, and hospital reimbursement, unplanned readmission is an important quality of care and performance metric. We sought to determine risk factors associated with 30-day readmission, and to identify the at-risk patient population following complex AWR.

Method: All adult patients with a primary diagnosis of a ventral hernia who underwent an open ventral hernia repair and a concomitant component separation, were extracted from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) 2011-2016 database. Bivariate analysis was performed to identify risk factors associated with 30-day readmission. Those risk factors with p<0.1 were entered into a multivariate logistic regression model to identify variables independently associated with 30-day readmission.

Results: There were 10,368 patients who met inclusion criteria [45% male, mean age (SD): 57(13)], of which 11.6% had at least one readmission. Fifty percent of readmissions occurred prior to post-discharge day 9 (IQR: 11), and 99.7% were unplanned. Bivariate analysis demonstrated that patients who were readmitted had a greater likelihood of having experienced a post-operative complication (66.9% versus 12.5%; p<.001). On multivariate regression analysis the following infectious complications were independently associated with readmission: superficial surgical site infection (SSI), (OR: 10.1; 95% C.I.=8.3-12.3), deep SSI (OR: 24.8; 95% C.I.=19-32), organ SSI (OR: 19.3; 95% C.I.=13.9-26.8), dehiscence (OR:3.9; 95% C.I.=2.4-6.3), and post-operative sepsis (OR:2.3; 95% C.I.=1.7-3.2) (all with p<0.001). Other major complications including renal insufficiency, stroke, myocardial infarction, and VTE were also associated with readmission, as was discharge to home. Readmission was not associated with increased mortality.

Conclusion: SSIs, post-operative sepsis and other major post-operative complications were found to be independently associated with readmission after complex AWR. Future studies are needed to determine whether the 30-day readmission can be reduced via efforts to reduce and to identify postoperative complications in more timely fashion, including preoperative optimization, thorough pre-discharge instructions, and earlier postoperative follow-up visit to allow for earlier interventions.
QS 57. FASCIAL DEHISCENCE FOLLOWING TRAUMA LAPAROTOMY: INTERRUPTED SUTURE CLOSURE MAY REDUCE THE RISK

MZ Shehada, KM Chapple, M Raffetto, A Sajjadi, N Al-Dohan, JV Jacobs, TL Gillespie, JN Bogert, JA Weinberg

Presenter: Jordan Weinberg MD | St. Joseph’s Hospital and Medical Center

Background: Ventral hernia repair has become more complex over the last decade secondary to recurrences after mesh repair combined with the national obesity epidemic. The pros and cons of open versus laparoscopic repair of abdominal wall hernias have been extensively debated. More recently, a hybrid approach utilizing a combination of both surgical techniques has been recommended as a means of reaping the benefits of each technique while avoiding the technical disadvantages of each type of repair. This four-year study describes the clinical results of the hybrid technique for repair of small to moderately-sized abdominal wall hernias (<15 cm in length).

Method: Patient data were prospectively collected and retrospectively reviewed and analyzed. From 9/11/13 to 11/8/17, 103 consecutive patients underwent an attempted hybrid repair of their abdominal wall hernia by one surgeon. Three patients had their hybrid repair aborted for: persistent intraoperative hypotension (1); and a “frozen” abdomen secondary to extensive, dense adhesions (2). 100 study patients (M/F: 37/63), mean age of 47 years (range 21-85 yrs) underwent an open excision of hernia sac, reduction of hernia contents into abdomen, placement of a 5mm trocar in LLQ, insertion of a lightweight, synthetic mesh into the abdomen, fascial closure, insufflation, placement of 3 more 5mm trocars, followed by positioning and tacking of mesh in place (5cm beyond fascial defect on all four sides).

Results: 82 patients had 170 co-morbidities and 82 patients were considered to be: overweight (21), obese (27), or morbidly obese (34). The fascial defects were: umbilical (10), umbilical + supraumbilical ventral (9), umbilical + incisional (23), incisional (51), and multiple incisional defects (7). Mean fascial defect was 48 sq cm (range 9-150) and mean size of the underlay, lightweight mesh was 281 sq cm (range 150-500). Mean OR time was 163 min (range 92-366), mean hospital stay was 3.7 days (range 1-12), with no post-operative mortality. Three morbidly obese, diabetic patients developed superficial wound infections requiring OR debridement, and healing by secondary intention. Mesh did not get infected and fascial repair remained intact in all three patients. Mean follow-up was 40.4 months (range 62.9 – 12.9). One diabetic patient developed a recurrent hernia at three months post-op. One patient required removal of intact mesh at one year for chronic pain.

Conclusion: Compared to the open technique alone, the hybrid approach allows broad-based fixation of a larger piece of mesh without the need to raise large flaps. Compared to the laparoscopic technique alone, the hybrid approach prevents the development of a seroma-filled hernia sac and the technical advantage of closing the fascial defect. Based on the results of this study, the hybrid hernia technique for small to moderately sized ( 40) diabetics are at risk for developing SSIs. Preoperative weight loss prior to herniorrhaphy is mandatory in these patients.
QS 58. THE IMPACT OF ANXIETY ON OUTCOMES AFTER VENTRAL HERNIA REPAIR (VHR)
KA Schlosser, SR Maloney, T Prasad, RF Sing, BT Heniford, VA Augenstein
Presenter: Kathryn Schlosser MD | Carolinas Medical Center

Background: Recent publications have suggested that a diagnosis of anxiety is associated with adverse outcomes after surgical intervention, including open ventral hernia repair (OVHR). While the interaction of psychological diagnosis and surgical outcomes is not fully understood some clinical data suggest an association. Furthermore, patient gender, obesity, depression and chronic pain may confound this association. This study examines the interaction of multiple comorbidities, including anxiety, depression, chronic pain, and hernia characteristics, on outcomes after OVHR.

Method: OVHR with preoperative CT scans (2007-2017) were identified. A patient with a documented diagnosis or preoperative prescription for anxiolytics, anti-depressants, or narcotics, was considered to have anxiety, depression, or chronic pain, respectively. 3-D volumetric software was used to analyze hernia characteristics. Given the high degree of multicollinearity between markers of hernia dimensions, adiposity distribution, and the complexity of OVHR, a principal component analysis was performed to create new component variables (PC1, PC2, PC3) for multivariate analysis. Variables included BMI, defect area, hernia volume (HV), subcutaneous fat (SQFV), advancement flaps, and component separation. PC1 consisted primarily of HV (47.7% correlation), BMI (47%), and defect area (43.7%). PC2 consisted primarily of SQFV (62.8%), and BMI (51.3%). PC3 consisted primarily of advancement flaps (54.7%) and component separation (59.7%).

Results: A total of 1,103 patients (58.1% female) were identified. 24.6% of patients had anxiety, and 70.1% of those patients were female. Anxious patients were more comorbid than non-anxious patients, with depression (57.9% vs 18.3%, p<0.0001), chronic pain (48.0% vs 24.8%, p<0.0001), asthma (22.9% vs 15.8%, p=0.007), COPD (14.4% vs 7.0%, p=0.0002), history of MRSA (12.9% vs 5.8%, p=0.0001), arrhythmia (7.0% vs 3.5%, p=0.02), more previous surgeries (3.2±1.6 vs 2.9±1.6, p=0.0007), and larger hernias (HV 1126.5±1536.0 cm³ vs 871.2±1185.8 cm³, p=0.03). Patients with anxiety had higher rates of component separation (55.0% vs 45.6%, p=0.007), and advancement flaps (70.1% vs 62.6%, p=0.03), and more of postoperative wound complications (39.3% vs 32.5%, p=0.04). Multivariate analysis was performed to control for potentially confounding factors including PC1, PC2, PC3, anxiety, gender, asthma, arrhythmia, COPD, depression, history of MRSA, chronic pain, number of previous surgeries, and wound class. Upon multivariate analysis, anxiety, depression, and chronic pain were not associated with any measured outcomes, including length of stay, readmission, recurrence, reoperation, operative time, total hospital charges, and wound complications.
Conclusion: The association of anxiety, depression, and chronic pain with outcomes after surgery is not fully understood. This study demonstrates the association of these diagnoses with patient comorbidity and operative complexity. However, when comorbidities and operative procedures are controlled for, anxiety is not independently associated with adverse outcomes after ventral hernia repair. The diagnosis of anxiety should thus be considered as markers of patient complexity, but not independent predictors of adverse outcomes.
Background: Inguinal and femoral hernia repairs are performed utilizing open and minimally invasive surgery (MIS) approaches. Robotic-assisted surgery (RAS) has been utilized recently for repair of these groin hernias. The purpose of this study was to evaluate trends of Groin Hernia Repair (GHR) in the United States and current patterns of hernia repair for unilateral and bilateral groin hernia.

Method: A retrospective analysis of the Nationwide Inpatient Sample from 2009-2016 (HCUP-NIS) was performed. Patients 18 years of age and older who underwent a principal procedure of inguinal or femoral hernia repair were included for analysis. Patient demographic factors, unilateral or bilateral repair, surgical approach (open, laparoscopic, or robotic), and elective versus emergent admission were evaluated. The trends of unilateral and bilateral repair approaches for GHR were evaluated. Lengths of stay and total charges for surgical approaches were compared. Total charges below the 0.1 percentile or above the 99.9 percentile were considered outliers and excluded (N=74).

Results: 37,131 patients (mean age 66.8±17.2 years, 77.1% male) were analyzed. The principal procedure was inguinal hernia repair in 33,316 (89.7%) and femoral hernia repair in 3,815 (10.3%). 33,625 (90.6%) underwent unilateral and 3,506 (9.4%) had bilateral repair. Open approach was utilized in 32,906 (88.6%), laparoscopic in 3,999 (10.8%), and robotic in 226 (0.6%). Laparoscopic unilateral repair rates were stable from 2009-2015 and increased to 11.5% for unilateral and 41.6% for bilateral repair by 2016. RAS increased to 2.6% for unilateral and 9.9% for bilateral repair over the study period. Male patients had higher rates of MIS repair than female patients (12% vs 9.3%, P<0.001). Elective cases had higher rates of MIS repair (18.3% vs 9%, P<0.001). Total charges (IQR) were $27,700 (26,000), $31,200 (27,200), and $50,500 (49,700) for open, laparoscopic, and RAS repairs (P<0.001).

Conclusion: The majority of inpatient GHR’s are performed using an open approach. Rates of laparoscopic repair have recently increased for both unilateral and bilateral GHR. The greatest increase in MIS approaches for GHR occurred in patients undergoing laparoscopic and RAS bilateral inguinal hernia repair. Total charges are highest for RAS, followed by laparoscopic, and then open repair. Additional prospective studies and evaluation of long-term outcomes would be helpful to evaluate what additional value of benefit is gained from RAS in a nation-wide cohort. Additional studies are needed to assess best practices and ensure value oriented outcomes in the management of inguinal and femoral hernias.
QS 60. OPEN ABDOMEN FOLLOWING EMERGENT LAPAROTOMY IS ASSOCIATED WITH HERNIA FORMATION
SR Maloney, AM Kao, MR Baimas-George, T Prasad, RF Sing, BT Heniford, BR Davis, VA Augenstein, KR Kasten
Presenter: Sean Maloney MD | Carolinas Medical Center

Background: Incisional hernias are a common complication following open abdominal procedures. In emergent operations, the use of an open abdomen (OA) can allow the unstable patient to undergo resuscitation in an ICU setting with subsequent return to the operating room for other indicated procedures before final abdominal wall closure. While the use of this technique is becoming more accepted in non-trauma patients, the long-term complications of OA is not well understood. The aim of this study was to examine risk factors and incidence of incisional hernia in patients undergoing emergency surgery and OA management.

Method: A retrospective cohort study was performed examining non-trauma patients undergoing urgent exploratory laparotomy at a tertiary referral center from 2012-2016. Patients were identified based on closure techniques during their index surgical intervention and grouped into primary closure (PC) and OA. Development of an incisional hernia was analyzed as the primary outcome. A propensity score matching algorithm was used to perform a case control comparison. Patients were matched using indication for surgery, need for vasopressors, Mannheim Peritonitis Index, and lactate.

Results: A total of 534 exploratory laparotomies were performed during the study period. With a median follow up for the cohort of 14 months (IQR 2-32 months), 83 (16.9%) incisional hernias identified. We identified a significantly higher rate of hernia formation in OA patients (25.6% vs 12.2%,p<0.01). In OA patients, there was no difference in the time to closure between patients developing a hernia and those who did not (45.4±63.1 vs 64.0±92.3 hours,p=0.52). Risk factors associated with hernia formation included skin and soft tissue complication (30.3% with complication developed hernia vs 15.9% without complication,p=0.03), and discharge to facility or home with services (73.5% – hernia group vs 58.7%,p=0.02). While factors such as DM, frailty, surgical indication and others were not associated with hernia formation. Using the propensity matching algorithm, 97 matched pairs were created for comparison. After matching, the incisional hernia rate remained higher in the OA group (31.4% vs 13.0%,p<0.01).

Conclusion: The use of OA in damage control surgery continues in both emergency general surgery and trauma surgery. Currently the long-term outcomes of OA are poorly understood. This study demonstrates higher rate of incisional hernia occurrence in OA patients versus those closed at initial exploratory surgery. Following propensity matching for disease-severity factors, OA is still associated with higher rates of incisional hernia formation. Duration of open abdomen does not influence incidence of hernia formation but development of skin and soft tissue infections as well as needing assistance at discharge were associated with an increased risk of hernia formation. Further study to identify strategies to optimize results in OA is warranted.
QS 61. IMPACT OF SELF-AWARENESS OF HERNIAS ON ABDOMINAL WALL QUALITY OF LIFE

OA Olavarria, K Bernardi, JL Holihan, A Milton, D Cherla, TC Ko, MK Liang

Presenter: Oscar Olavarria MD | University of Texas Health Science Center at Houston

Background: Clinically apparent ventral and groin hernias affect abdominal wall quality of life (AW-QOL). However, it is unclear how patient self-reported presence of a ventral or groin hernia impact AW-QOL. We sought to determine the impact of hernia self-awareness on the AW-QOL among patients undergoing CT abdomen/pelvis scans.

Method: Consecutive patients undergoing elective CT scans of abdomen/pelvis were enrolled. History and standardized physical examination were performed by trained surgeons. CT scans were reviewed for the presence of ventral and groin hernias by three surgeons blinded to the results of the physical examination. AW-QOL was measured through the modified Activities Assessment Scale, a validated, hernia-specific survey. On this scale, 1 is poor QoL, 80 is normal, and 100 is perfect; a change of 7 is the minimum clinically important difference. Primary outcome was AW-QOL by hernia self-awareness status among patients with clinically apparent hernias. Student’s t-test was performed to compare these differences.

Results: A total of 489 patients were enrolled, of which 158 (32.3%) had a clinically apparent hernia on physical exam: 135 (27.6%) had a ventral hernia, 34 (7.0%) had a groin hernia and 11 (2.2%) had both. One hundred and eighty seven (38.2%) patients had occult hernias and were not considered for our primary analysis. Among patients with a hernia on exam, 102 (64.6%) self-reported having a hernia and 56 (35.4%) reported no hernia. AW-QOL, of patients who were self-aware of having a hernia was significantly lower compared to those who were unaware (median (IQR), 43.9 (55.9) vs. 64.9 (50.6); P<0.001).

Conclusion: One third of patients with a clinically apparent ventral or groin hernias are unaware of having a hernia. Self-awareness of the presence of these hernias by patients, have a negative impact in their AW-QOL. Further studies are needed to understand if patients with lower AW-QOL are more likely to be aware of their hernia or if being aware of their hernia causes the lower AW-QOL.
QS 62. STEPS FOR SURGEONS TO INTEGRATE PALLIATIVE CARE PRINCIPLES IN THE SURGICAL INTENSIVE CARE UNIT

HJ Madsen, AL Cralley, C Robinson, R Jackson, A Sauaia, CC Burlew, KB Platnick
Presenter: Helen Madsen MD | Denver Health Medical Center

Background: The modern scope of palliative care has broadened to include reduction and alleviation of suffering in multiple domains without any requirement for life threatening disease, and is often provided simultaneously with curative therapies. The incorporation of palliative care tenets, such as goals of care discussion or appointment of surrogate decision makers by the surgical team has clear benefits; however, barriers including lack of provider training and inconsistent workflow exist. Our study evaluates the impact of an electronic medical record (EMR) template with education and attending emphasis on improving identification of surrogate decision makers in the surgical intensive care unit (SICU).

Method: In January 2017 there was a surgical attending driven emphasis to incorporate palliative care principles in a level one trauma SICU; subsequently in October 2017 an EMR tool was introduced to promote a standard workflow for documenting a patient’s desired level of recovery, identification and form completion for a surrogate decision maker, and establishment of a CPR directive. Charts were reviewed retrospectively to determine the rate of surrogate decision maker identification paired with the new EMR tool, in the setting of increased education and surgical attending championing of palliative care principles.

Results: Six hundred and thirty-five SICU patients, admitted from 2016 to 2018, were chart reviewed for inclusion of palliative care principles by their primary surgical team. The majority were white (n=467) males (n=434), and the average age was 49 years. The most common reason for admit to the SICU was trauma (71.2%), with an average injury severity score of 15.9. Total hospital length of stay was 14.2 days on average. Of the 217 patients reviewed after the EMR tool was implemented, 72 had the template completed, reflecting a 34.1% utilization rate. For the 217 patients admitted after EMR tool implementation, those with the template were 14.6 times (95% CI: 7.2-29.6) more likely to have completed MDPOA forms identifying a surrogate decision maker for that hospitalization (p<.0001).

Conclusion: The implementation of an EMR template along with increased education on palliative care principles and daily emphasis on palliative care integration by surgical attendings is an effective and efficient way to increase palliative care principle integration in the SICU. The high rate of surrogate decision maker appointment in those patients who had the EMR tool completed highlights the value of a simple and reproducible tool in facilitating palliative care principles in an urban level I trauma center SICU.
QS 63. INFECTION IS THE PRIMARY DRIVER OF MAJOR LOWER EXTREMITY AMPUTATION IN AN INDIGENT POPULATION: IMPLICATIONS FOR POPULATION-BASED MANAGEMENT

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Presenter: Ahmed Khouqeer MD | Baylor College of Medicine

**Background:** The diabetic foot ulcer (DFU), often complicated by the presence of peripheral artery disease (PAD), is a major precursor of major lower limb amputation. Despite advances in limb salvage care, major amputation rates remain highest among uninsured and/or minority patients. Afflicted indigent patients often resort to safety net hospitals with limited specialty resources to seek care for this entity. The objective of this study is to identify the major clinical driver(s) of lower extremity amputation in an indigent population so that resources can be better allocated to enhance limb salvage efforts.

**Method:** The institutional billing database at an urban, safety net hospital serving an indigent population was retrospectively queried for all consecutive major lower extremity amputations performed from 2011 – 2017. Continuous normal and non-normal data were compared using t-test and the Wilcoxon’s rank sum test, respectively. Categorical variables were compared using the $\chi^2$-test. WIfI (Wound, Ischemia, foot Infection) threatened limb grades were calculated when images on presentation and ankle brachial indices within the previous 30 days were available. Forward stepwise, logistic regression models identified factors describing patients who received infection control-related (InR) amputations compared to non-infection-related (Non-InR) amputations including: extensive gangrene, tissue loss, non-healing wounds, and uncorrectable ischemia.

**Results:** Initially, 203 major amputations were retrieved. Excluding 17 amputation revisions, 13 stump complications requiring further amputation, and 6 trauma-related amputations, the final dataset included 167 amputations. Amputations were done for InR (n=127, 76%), extensive gangrene and non-healing wounds, (n=30, 18%), and uncorrectable ischemia (n=9, 5%). Patients receiving amputations for InR were younger (mean=55.8 years, standard deviation [SD] =9.4) compared to those receiving amputations for Non-InR (mean=61.6 years, SD=12.7, p=0.001). Half of the amputations occurred among Hispanics; among these, 56% were for InR, compared to other race/ethnicities (p=0.001). Most amputation patients were referred through the Emergency Department (ED) [70%] – of these, a majority presented for InR (76% vs. 49%, p=0.001). WIfI infection grades were calculated in 50% (n=84), 78% (n=66) for InR group, (stage 1=2, stage 2=29, stage 3=35). Pulses and/or Doppler signals were documented in 66% of InR amputations vs. 33% of Non-InR amputations (p<0.001).

**Conclusion:** Infection control is the overwhelming driver for major limb amputation in this population. Increased resources within safety net hospitals should be allocated for ulcer and infection prevention, and streamlined pathways to promptly address infection expeditiously. Limb salvage specialists will need to focus more efforts towards upstream infection management in addition to downstream revascularization and wound healing strategies. Involvement of acute care surgery services, in addition to using WIfI scores for stratification, may aid in the overall care for this population.
QS 64. PREDICTING NEED FOR EARLY TRACHEOSTOMY IN INTENSIVE CARE TRAUMA PATIENTS WITHOUT SEVERE HEAD INJURY, ANALYSIS FROM TRAUMA QUALITY IMPROVEMENT PROGRAM

A Azim, K Prabhakaran, J Con, R Latifi

Presenter: Asad Azim MD | Westchester Medical Center

**Background:** Multiple studies have shown early tracheostomy is associated with improved outcomes and decrease resource utilization in ventilated patients. Predicting need for tracheostomy in intensive care trauma patients early during the hospital course can be challenging. Aim of this study is to identify clinical characteristics that may help in early identification of trauma patients that require tracheostomy.

**Method:** One year (2016) retrospective analysis of all trauma patients who were admitted to intensive Care Unit for > 7 days was performed. Patients who were dead on arrival, and those with severe head injury were excluded. Data points including age gender race, admission vitals, ISS, AIS, ICU admission, comorbidities, Ventilator days and operative intervention (Thoracotomy or Laparotomy) were collected. Univariate and Multivariate regression analysis was performed.

**Results:** A total of 21,663 trauma patient who were admitted ICU for >7 days without severe head injury were Identified. Mean age was 44.5+/−34, 72.2% were white, 67.9% were male, Mean ISS was 18.82+/−31, Mean SBP was 102+/−36.3, and Mean HR was 110.7+/−28.2. Tracheostomy rate was 18.3%. On univariate regression analysis Age >70, Major procedure, Flail chest, thoracostomy tube, bilateral rib fractures, ventilator days > 5 and COPD were significant factors associated with need of tracheostomy. On multivariate regression analysis, Age > 70 OR:1.84 [CI: 1.76 – 1.93], Flail Chest OR: 2.6 [1.8 – 3.2], Major Procedure OR 8.3 [6.2 – 9.9], Ventilator days > 5 days OR: 6.6 [5.3 – 7.8] and COPD OR:1.4[1.2 – 1.6] were factors independently associated with need of tracheostomy.

**Conclusion:** Our data analysis show that Age >70, Flail chest, Major procedure, ventilator days >5 and COPD are independent predictors of need for tracheostomy in trauma patients without severe TBI. Prospective studies are required to further identify the factor that will help in early identification of trauma patients requiring tracheostomy to improve outcome and for better resource utilization in critically injured trauma patients
QS 65. PREDICTORS OF UNPLANNED REOPERATION FOLLOWING SURGICAL MANAGEMENT FOR SMALL BOWEL OBSTRUCTION

Y Puckett, T Pham, KY Pei

Presenter: Sharmila Dissanaike MD | Texas Tech University Health Sciences

Background: Adhesive small bowel obstruction is common, and while many patients resolve with a trial of nonoperative management, some require surgical exploration and adhesiolysis. Unfortunately, a portion of these patients may require unplanned reoperation within the same admission due to anastomotic leaks, iatrogenic bowel injury, and immediate postop obstruction. It is unknown what patient or surgical decision factors (including timing of both index and unplanned operations) may influence the risk of reoperation following initial surgical management of small bowel obstruction. The purpose of this study is to assess the comorbidities and complications associated with reoperation on small bowel obstruction.

Method: We queried the 2014 National Surgical Quality Improvement Program database (NSQIP) for patients undergoing exploration for diagnosis of small bowel obstructions (ICD-9 Code 560.9). The cases were divided into two groups: Unplanned return to the operating room (OR) and no unplanned return to the OR. Demographical data, preoperative, intraoperative, and postoperative factors, as well as data on complications and comorbidities were compared between two groups. Independent t-test was used to compare continuous variables and Chi-Square test was used to compare categorical variables. Multiple logistic regression was used to assess for predictors of unplanned reoperation.

Results: There was a total 2154 patients included for analysis. Unplanned reoperation occurred in 6.7% (145). Mean days from principal operation to unplanned reoperation was 9.15 [SD 11.57]. Patients requiring an unplanned return to the OR were more likely to be male (p=0.045), show signs of systemic sepsis (p<0.0001), be partially dependent or totally dependent in functional status (p=0.01), and currently be on hemodialysis (p=0.0001). After adjusting for comorbidities, for every 2 minute increase in operative time at the index operation, odds of reoperation increased by 2%. Patients requiring a takeback for reoperation were three times as likely to require readmission, twice as likely to be discharged to a nursing facility or rehab, and twice as likely to die in the hospital. Days from hospital admission to index operation was not found to be a statistically significant factor for reoperation.

Conclusion: Unplanned reoperation for small bowel obstruction are associated with increased morbidity and mortality. The duration of nonoperative management does not appear to affect the risk of reoperation. Frail patients, patients requiring dialysis, and patients undergoing longer index procedures appear to be at an increased risk of reoperation.
QS 66. REGIONAL ABDOMINAL WALL NERVE BLOCK VERSUS EPIDURAL ANESTHESIA FOR LIVER RESECTION: ANALYSIS OF THE AMERICAN COLLEGE OF SURGEONS NATIONAL SURGICAL QUALITY IMPROVEMENT PROGRAM DATABASE

CN Trujillo, M Al-Temimi, J Lee, S Johna, A DiFronzo

Presenter: Charles Trujillo MD | Arrowhead Regional Medical Center

Background: The aim of this study is to examine whether regional abdominal wall nerve block is superior adjunct anesthesia modality to epidural anesthesia (EA) for patient undergoing hepatectomy.

Method: Patients undergoing hepatectomy in the NSQIP targeted file (2014-2016) were identified. Those with INR>1.5, Platelets< 100, bleeding disorders and spinal anesthesia were excluded. Patients with regional abdominal wall nerve block (ARB), which are mostly transversus abdominis plane (TAP) blocks, were matched (1:1) to those undergoing EA using propensity scores to adjust for baseline differences.

Results: Out of 2,050 who met our inclusion criteria, 482 (23%) had ARB. Of whom 462 were matched (1:1) to those with EA. The matched cohort is well-balanced on preoperative characteristics and type of operation (extent of liver resection, concurrent resection, concurrent ablations and biliary reconstruction). ARB was associated with shorter hospital stay (median: 6 d vs. 5 d, p<0.001) and higher readmission rate (12.1% vs. 7.6%, p=0.02). Overall morbidity (35.5% vs. 40%, p=0.154) and mortality (1.7% vs. 2.8%, p=0.27) were not different between ARB and EA. Blood transfusion (23.6% vs. 16.2%), cardiac arrest (1.5% vs. 0.22%) and sepsis (2.2% vs. 4.6%) were lower with ARB, while organ/space infection (9.9% vs. 6.1%) and complications requiring invasive intervention (13.1% vs. 8.5%) were higher (P<0.05).

Conclusion: Regional abdominal nerve block is associated with shorter hospital stay than epidural anesthesia without an increase in overall postoperative morbidity. Clinical trials are needed to determine which modality is superior in patients undergoing hepatectomy.
**Background:** Telephone follow up in pediatric surgical patients after outpatient procedures has shown favorable outcomes including an assessment of post-operative pain, complications, and need for additional interventions. This method of follow up can also provide information about the use of opioids. After a recent intervention at our institution which heightened awareness of opioid usage after umbilical hernia repair, a question regarding opioid doses taken was added to the telephone script for outpatient follow up. The aim of this study was to determine if discordance exists between opioid prescription doses and usage for a given operation.

**Method:** We retrospectively reviewed outpatient procedures at Arkansas Children’s Hospital from 7/15/18-10/1/18. Each patient received a phone call follow up approximately two weeks post procedure by surgical specialty nurses. An additional question asked if the parents filled an opioid prescription and how many doses the patient took. The seven most common outpatient operations were included in this study: appendectomy, umbilical hernia repair, skin/soft tissue excision, cholecystectomy, inguinal hernia repair, gastrocutaneous fistula closure, and port removal. The number of doses prescribed were compared to those utilized. Per protocol, the phone call also assessed for any surgical site complications, any ER visits, need for a further clinic visit, and any other concerns.

**Results:** 65 parents were asked about opioid use during their telephone follow up. The mean number of doses prescribed for all procedures was 7.73 doses (range, 4-20 doses) but only 3.76 doses (range, 0-15 doses) were utilized (48.6%). The procedures with the largest discrepancies between doses prescribed vs doses used included appendectomies (8 vs 2.56, 32% used [range, 5-16 vs 0-8]), port removals (9.4 vs 3, 31.9% used [range, 5-20 vs 0-10]), and inguinal hernia repairs (7.67 vs 2.67, 34.8% used [range, 5-10 vs 0-5]). Parents gave fewer opioids than prescribed after all studied procedures and there was no need for additional pain medication at follow up.

**Conclusion:** A telephone follow up for outpatient procedures can provide valuable information about the utilization of opioid prescriptions. There was discordance between the number of doses prescribed and number of doses used by patients for all procedures. Using this preliminary data, it is likely safe to prescribe a lower number of doses of opioids to our patient population without any significant changes to their post-operative course. This data also provides an opportunity to standardize the number of doses prescribed for different procedures. This will help to prescribe the appropriate number of opioid doses.
QS 68. DEDICATED TRAUMA CASE MANAGERS, THE MOST IMPORTANT TRAUMA TEAM MEMBER? THEIR IMPACT ON HOSPITAL LENGTH OF STAY (LOS), TRAUMA TEAM DYNAMICS, AND PROVIDER SATISFACTION.  

*MK Rao, KR Vide, M Hayashi, K Ng, R Severino, FZ Zhao*  
**Presenter:** Kelly Vide PA-C | The Queen’s Medical Center

**Background:** The polytrauma patient requires multiple specialties and a holistic approach to the medical and psychosocial impacts of their injuries. Many patients continue to have physical and emotional disability after discharge and lack the financial and social support to obtain optimal care. Multiple studies have demonstrated the importance of case managers in facilitating the patient’s hospital course. However, a dedicated trauma case manager may not be available in many hospitals. Therefore, we aim to study if the dedicated trauma case manager can better streamline the hospital course for both the patient and the provider as compared to the general case manager.

**Method:** Prior to November 15, 2017 our level 1 trauma center had 2 dedicated trauma case managers. After this date, due to personnel constraints, these case managers were removed from the trauma service and the trauma teams relied on general case managers for patient disposition. We conducted an IRB approved, retrospective cohort study of the trauma registry using 500 admitted trauma patients prior to November 1, 2017 and 500 patients after December 1, 2017. Continuous and categorical patient data were analyzed using T-Test and Chi squared tests respectively. We then surveyed all trauma providers (Attendings, Residents, APPs) to compare aspects of patient care including ease of communication, efficiency of care delivery, daily time spent coordinating care, and daily number of general case managers utilized.

**Results:** The two cohorts (1: with dedicated case managers, 2: with general case managers) were found to have no statistically significant differences in baseline demographic data including age, gender, insurance status, homelessness, and mechanism of injury. There were also no differences when looking at mean ISS (12.7 vs 12.6), mortality (4.2% vs 3.8%), LOS (6.7 vs 7.0 days) and percent discharged before 11 am (11.4% vs 9.4%). However, the survey of trauma providers strongly favored dedicated trauma case managers and had a 75% response rate (24 out of 32 providers). The responders reported that each provider spent an average of 25 minutes more per day coordinating patient care without a dedicated case manager. 4-5 general case managers were needed per day to cover the trauma census. 100% of responders favored dedicated case managers regarding efficiency and quality of care provided, provider frustration, and ease of communication for the trauma team.
**Conclusion:** Our study did not show a difference in LOS or early discharge with the utilization of the dedicated trauma case manager. However, it did show important differences in the delivery of patient care. When dedicated case managers were not present, significant portions of care coordination duties fell to the trauma providers. This is supported by the reported daily average increase of 25 minutes per provider spent on care coordination. On a 6-person team, this would correspond to 150 minutes (2.5 man-hours) extra per day and 17.5 man-hours (0.44 FTE/Full Time Equivalents) extra per week. This burden was universally viewed as less efficient, increased communication difficulties, and increased provider frustration. Therefore, the dedicated trauma case manager should be strongly considered when assembling a trauma team.
QS 69. GENERAL SURGEON SHORTAGE IN RURAL AND FRONTIER COUNTIES

_B Stringer, J Reyes, SD Helmer, K Vincent_

**Presenter:** Brandon Stringer MD | University of Kansas School of Medicine – Wichita

**Background:** There is an increasing trend in surgical residency graduates to choose a fellowship, which therefore reduces the number of graduates that will be seeking rural general surgery positions. The HMO benchmark for general surgery coverage is 5.1 surgeons per 100,000 people. About 85% of the population in our state lives in counties that are designated as rural or frontier. The objective of this research study was to evaluate the rural surgery workforce in our state to determine if there is a shortage, or will be a shortage, in the near future.

**Method:** A list of 106 hospitals or healthcare centers was generated from public records. Specialty hospitals or outpatient clinics were excluded. We were able to successfully contact 66 hospitals (27 Frontier, 21 Rural, and 18 Densely-settled Rural). Hospital representatives were asked about the size of the population served, the number of permanent general surgeons on staff, the number of locum tenum surgeons, the number of rotating surgeons, how many surgeons will retire in the next 5 years, plans to replace retiring surgeons, if they are actively seeking general surgeons, if surgeons typically stay at least 5 years, the percentage of patients that are transferred each year due to lack of surgical coverage, and what are the current impediments to surgical care at their facility.

**Results:** Over one-third of hospitals interviewed were frontier (40.9%, n=27). Only 1 facility reported that they had a permanent surgeon on staff. The percentage of surgical patients that are transferred due to lack of surgical coverage ranged from 0% to 100%, with 100% being the median. The median coverage ratio for permanent surgeons was 0 surgeons per 100,000 people and ranged from 0 to 15.4. For rural hospitals, the populations served \ ranged from 2,500 to 25,000 people. The median coverage ratio for permanent surgeons was 0 surgeons per 100,000 people. When including rotating surgeons, the median was 8.7 surgeons per 100,000 people. Densely-Settled Rural Hospitals serve from 3,000 to 100,000 people. The median coverage ratio for permanent surgeons was 0 surgeons per 100,000 people. The median was 5.0 surgeons per 100,000 people when including rotating surgeons. Nearly one-third of rural and densely-settled rural facilities are currently seeking a general surgeon.

**Conclusion:** Results of the survey show that there is indeed a shortage of general surgeons providing coverage to rural counties. Additional studies will be needed to identify barriers to recruitment and to help provide a solution for the current and foreseeable workforce shortage.
QS 70. OPEN VERSUS THORACOSCOPIC THYMECTOMY FOR PEDIATRIC MYASTHENIA GRAVIS: CLINICAL OUTCOMES

SC Derderian, S Bansal, PG Rowse, DD Potter, C Moir, DA Partrick
Presenter: Sarkis Derderian MD | University of Colorado School of Medicine

Background: Myasthenia gravis (MG) is an organ specific autoimmune disorder involving the production of auto-antibodies directed against the nicotinic acetylcholine receptors. Thymectomy has been shown to reduce symptoms in a majority of patients. Traditionally, this procedure has been performed via transcervical or transsternal approach; however, thoracoscopic thymectomies are becoming more frequently performed in adults. The role of thoracoscopic thymectomy in children; however, has not been well defined. The aim of this study is to compare the technical and therapeutic efficacy of thoracoscopic and open approaches for thymectomy in children.

Method: A retrospective review of all patients (≤20yrs) undergoing open and thoracoscopic thymectomies in two geographically separate academic institutions over a 10-year period was performed. Patient data were abstracted from the electronic medical record to include demographics, age at presentation, pre- and post-operative symptoms, operative approach and time, perioperative complications, need for blood transfusion, duration of postoperative intravenous narcotic requirements, and length of hospitalization.

Results: Twenty-six thymectomies were performed between the two institutions during the study period; 17 by an open technique and nine using a thoracoscopic approach. Among the open thymectomies, six were transsternal, five were transcervical, and six were thoracoscopic assisted transcervical. The mean age was not significantly different between groups – 11.1±4.1 years in the thoracoscopic and 15.5±4 years in the open group. Operative times were similar between the two groups (143±34 minutes in the thoracoscopic and 110±48 minutes in the open group). There were no major complications or deaths in either group. Intraoperative blood loss was significantly less in the thoracoscopic group (5 ml vs 57 ml), although no patients required a blood transfusion. Patients in the thoracoscopic group had a decreased postoperative intravenous pain medication duration (5 vs 20 hrs) and significantly shorter hospitalization (1.7±0.9 vs 2.9±1.1 days). Clinical improvement was approximately 90% in both groups.

Conclusion: Our study demonstrates that thoracoscopic thymectomy in children is feasible, safe, and an effective surgical option in the treatment of MG. The advantages include a minimally invasive approach, shorter intravenous narcotic requirement, decreased length of hospitalization, and presumably superior cosmesis. Aside from perioperative outcomes, we found clinical improvement and remission rates to be equivalent between groups. This study provides timely evidence supporting thoracoscopic thymectomy as the procedure of choice in the treatment of pediatric patients with MG. We postulate these data will result in an increase in acceptance of thoracoscopic thymectomy by patients, parents and neurologists, enabling earlier surgical management in the course of the disease.
**QS 71. MEDICAL STUDENT PREPARATION FOR THE OR IN 2018: WHERE ARE WE?**  
*KA Swanson, JC Heard, CE Welch, Z Khorgami, CA Howard, GS Chow*  
**Presenter:** Kerry Swanson BS | University of Oklahoma College of Medicine – Tulsa

**Background:** Each year, medical students and physician assistant (PA) students participate in surgery clerkships and are expected to attend and be prepared for operating room (OR) cases. There is limited data evaluating student preparation for the OR. This study evaluates student perception of preparation for the OR.

**Method:** Medical and PA students were surveyed using a 7-point Likert Scale to evaluate perceptions of OR preparation. Survey questions assessed student perceptions of preparedness for various aspects of surgical procedures, how much time was spent in preparation, resources used, and if they perceived their preparation as helpful.

**Results:** Ninety five students responded to the survey (49%). Students felt that they were prepared to discuss indications and contraindications (73%), relevant anatomy (86%), complications related to the procedure (70%), and their preparation was helpful (69%). Students spent a mean of 28 minutes (SD: 16) preparing for cases, and thirty one percent of students felt unprepared to discuss the necessary steps of the procedure after this preparation. Students used a wide variety of sources, citing UpToDate and online videos as the most commonly used resources (74%; 73%).

**Conclusion:** Students reported feeling prepared for surgical cases in the OR, but the majority felt unprepared to discuss the major steps of common cases. Current medical students are less likely to utilize traditional textbooks or medical journals. A majority of the students included in this study intend to enter a non-procedural specialty and they might not view procedural steps as important for their education. An alternative explanation is that procedural steps are not overtly taught whereas anatomy and pathophysiology are required. Future resources for students might include an interactive, digital, easily accessible format with a focus on steps of essential procedures, while reinforcing complementary knowledge. This may allow students to better participate in the OR and reinforce knowledge learned outside of the clinical setting.
Background: Physician and surgeon health is very much at the forefront of both the medical world and the public eye. Current literature suggest that over 50% of surgeons experience “burnout”, and that our psychological health is paramount. However, surgical ergonomics appears to play an equally if not more important role in physician well-being. Its importance and understanding is often grossly downplayed. We aimed to conduct a survey of the General Surgery faculty and residents at the University of Utah to see how well ergonomics was understood and find out the prevalence of work related injuries (WRI).

Method: A 19 point questionnaire was given to the General Surgery faculty and residency program at the University of Utah. The questionnaire collected data on demographics, physician health habits, ergonomic issues and guidelines in the OR, musculoskeletal symptoms, and posture related metrics developed with the assistance of physical therapists at the University of Utah Hospital. The survey was distributed via an anonymous data collection tool. Informed consent was obtained at the start of the survey.

Results: A total of fifty six responses were obtained. Almost 60% of the respondents have never received formal ergonomic training. Although over 50% correctly identified the appropriate height of the table for open surgery, just over 50% percent did not know the appropriate table height for laparoscopic surgery. Similarly over 40% incorrectly positioned their monitors. Over 20% of responders admitted to some degree of cervical neck pain that required some degree of intervention, with all of these responders being faculty. 55% admitted to some thoracic and lower back pain and stiffness that required no intervention but almost 30% had at least daily back pain that has required some degree of intervention, with a clear trend in more training years leading to more debilitating problems.

Conclusion: There is a clear relationship between surgeon WRI, specifically neck, thoracic and lower back injuries and the number of years they have been practicing. As we would expect, young surgical trainees who are healthier at baseline experience far fewer WRI, but there is an inevitable progression to some sort or WRI for the majority. With the help of the Department of Physical Therapy, and grants from the University of Utah, we aim to develop a formal ergonomic teaching module for younger trainees as well as a rehabilitation and correction program for more senior surgeons who have already suffered the consequences of poor surgical ergonomics.
QS 73. IMPROVEMENTS IN ABSITE PERFORMANCE AND ACGME RESIDENT EVALUATIONS AFTER INSTITUTION OF A PROTECTED, RESIDENT-DRIVEN EDUCATIONAL CURRICULUM

RW Griffith, JM Johnson, WM Peterson, GE Kimm, JM Ciocchetti, EA Speer, DK Davis-Merritt, HW Hollis

Presenter: Ryan Griffith MD | St. Joseph’s Hospital and Medical Center

Background: Performance on the ABSITE is correlated with success on the ABS board exams. Previous studies have identified the effects of resident education on ABSITE scores. We implemented a multi-faceted, protected educational curriculum at a community general surgery residency to improve our ABSITE results. We compared ABSITE test results for the same 16 residents before and after the curriculum. Using ACGME resident survey results, we compared how the residents’ perception of their education changed as well.

Method: ABSITE scores from two consecutive academic years (2016-2017) at a community teaching hospital were analyzed. A protected educational curriculum was instituted in the interval between examinations. Standard scores and percentiles were compared for postgraduate year (PGY) 1-4 residents in 2016 and PGY 2-5 residents in 2017. Resident perception of curriculum effectiveness was measured from annual Accreditation Council for Graduate Medical Education (ACGME) surveys.

Results: Overall resident performance improved from an average percentile of 54% to 61% between 2016 and 2017. Percentile improvements were confined to the PGY2 and PGY4 cohorts where scores increased by 18% and 38% respectively. PGY1 and PGY3 average percentile scores decreased by 18.75% and 8.75% respectively. The PGY1 and PGY3 residents spent approximately 50% of the year away from the home institution, limiting their exposure to the newly implemented curriculum. The PGY2 and PGY4 classes, however, spent 10 and 12 months respectively at the home institution where they were responsible for planning and presenting the educational curriculum. Resident perception of their educational experience as reported in the annual ACGME resident survey demonstrated improvements in the program evaluation mean score as well as the percent compliance in the questions regarding education. The residents’ overall evaluation of the program improved from 79% very positive to 93% very positive.

Conclusion: Implementation of a resident administered, structured, time-protected educational curriculum can improve academic performance as measured by ABSITE scores. This improvement was noted only in resident cohorts who were involved in the preparation and presentation of the curriculum. Resident perceptions of their educational experience and overall program evaluations on ACGME surveys can also be improved. Surgery residency programs wishing to have improved ABSITE performance and higher resident program evaluations in their annual resident surveys should consider adoption of a time-protected weekly educational conference.
Background: Ground level falls are the largest cause of geriatric trauma in the United States. The discrepancy between mechanism and severity of injury as well as the significant morbidity and mortality in this cohort is well documented. Often these patients have significant traumatic intracranial hemorrhages but are asymptomatic. Despite our knowledge of this they continue to be under-triaged leading to delays in treatment and adverse outcomes. Something is amiss in our management of these patients. To improve the care of ground level falls in elderly people we need a new approach.

Method: We used the trauma registry from a level II trauma center which services rural North Dakota to analyze ground level falls in elderly patients over a five-year period from 2013-2017. A retrospective chart review was performed on patients who were under-triaged ground level falls and expired.

Results: We identified 4232 traumas during this time period. There were 1413 ground level falls, making approximately 1/3 of our trauma. Of the 4232 traumas there were 210 patients who were under-triaged. Sixty-four of these were ground level falls. Fifty-one of those under-triaged ground level falls (80%) were associated with traumatic intracranial hemorrhage. Of the 210 under triaged patients there were 15 deaths, 14 of these were associated with intracranial hemorrhage.

Conclusion: Our research suggests a serious flaw in the triage of traumatic intracranial hemorrhage due to ground level falls in elderly patients. Triage influences who receives the patient, admission location, and treatment. In our rural environment with various levels of practitioners, small facilities with limited resources, and increased transit times, accurate triage is critical. We utilize an algorithm published by the CDC and ACS-COT but not until the very end of this algorithm is any consideration given to elderly individuals with potentially devastating intracranial hemorrhage from ground level falls. We aim to improve the triage and care of these patients through education of EMS, implementing new algorithms specific for ground level falls in elderly patients, and incorporating an early multi-disciplinary team approach to inpatient management.
QS 75. A TALE OF TWO CAMPUSES? AN ANALYSIS OF TWO AFFILIATED MEDICAL SCHOOL CAMPUSES WITH DIFFERENT MATCH RATES IN GENERAL SURGERY
RJ Sliter, J Reyes, SD Helmer, MF McBoyle
Presenter: R. Joseph Sliter MD | University of Kansas School of Medicine – Wichita

Background: The rate of medical students graduating from US medical schools that match into general surgery residencies has been declining in recent years. Recent data from our institution shows a difference in the rates of students who match into general surgery residencies when comparing academic and community-based campuses. The purpose of this study was to compare factors that may contribute to the higher than average number of students that match into general surgery at a community-based campus relative to an academic campus.

Method: A survey was sent to graduating medical students from a single university. Each student attended medical school at either a community-based campus or an academic campus. Surveys were sent to all graduating students after the residency match in 2018. The survey assessed student experiences and perceptions during their surgical clerkship. Specific questions were asked with regard to residents and attendings, procedural experiences, perceived lifestyle, and general interest in surgery before and after clerkship.

Results: Of 59 respondents, 25 (42.4%) attended the academic campus and 34 (57.6%) attended the community campus. More students from the community campus matched into a general surgery program than those from the academic campus (15.6% vs. 4.0%, P=0.215). Factors that were positively correlated with interest in surgery included interactions with attendings (0.86), interactions with residents (0.63), time spent in the OR (0.77), participation in the OR (0.62) and complexity of cases (0.61). More students from the community campus were “Not interested at all” in surgery prior to their surgery clerkship (26.5% vs. 16.0). Significantly more academic students indicated they were “Not interested at all” in surgery after their surgery clerkship (52.0 vs. 17.6%), while more students on the community campus indicated they were “extremely interested” (29.4 vs. 12.0%, P=0.005) after their surgery clerkship. Students on the community campus spent more weeks on general surgery services (6 vs. 4, P<0.001).

Conclusion: The rate of students matching into general surgery between the two campuses are different, with the community campus having nearly four times the rate of students matching into general surgery. Programs may be able to increase their medical student match rate into general surgery by allowing students more opportunities to participate in the operating room, spending more time on a general surgery service, and by ensuring that staff and residents include the medical students as part of the surgical team.
ePOSTER ABSTRACTS
P 1. ANALYSIS OF THE USE OF LIPOSOMAL BUPIVACAINE VERSUS BUPIVACAINE PAIN CATHETERS FOR POST-OPERATIVE PAIN CONTROL AFTER BARIATRIC SURGERY

GM Albrecht, MJ Hopman, F Pieracci

Presenter: Gale Albrecht PharmD, BCCCP, MS | Denver Health Medical Center

Background: Inadequate pain control limits the recovery process and increases the risk of complications after bariatric surgery. Bupivacaine pain catheters have been used for post-operative pain but are limited by continuous medication delivery, potential leakage at the insertion site, and patient dissatisfaction with an indwelling catheter. Liposomal bupivacaine (Exparel®) is a single dose, injectable medication which provides pain control for up to 72 hours. This study aims to look at opiate usage, pain control, nausea, and cost associated with the use of Exparel® versus bupivacaine pain catheters in the post-operative bariatric population.

Method: This was a retrospective, single-center pre-post cohort study. Forty primary bariatric surgery patients (gastric bypass or sleeve gastrectomy) who received bupivacaine pain catheters were compared to forty primary bariatric surgery patients who received liposomal bupivacaine. Patients were excluded if their surgery was a revision. In addition to assessment of total opioid usage during admission, secondary outcomes included verbal pain scores, antiemetic use, length of stay, and medication related cost differences. An unpaired T-test was used to analyze continuous data and the Fisher’s exact test was used to analyze categorical data. An anonymous survey was sent to nurses to assess patient pain control using liposomal bupivacaine as compared to a bupivacaine pain catheter.

Results: Eighty total patients were evaluated; forty in each group. There was no difference between the pain catheter and liposomal groups in total opioid dose requirements reported in oral hydromorphone equivalents (50 mg vs 43.8 mg, respectively, p=0.42), average verbal pain scores (average 5.4 vs 5.2, respectively, p=0.21), antiemetic doses required during admission (average 1.7 vs 2.5 doses, respectively, p=0.11), or length of stay (average 2.3 vs 2.5 days, respectively, p=0.19). The rate of bupivacaine pain catheter leakage requiring early device removal was 10%. In an anonymous survey, 69.2% of nurses preferred the use of liposomal bupivacaine for pain control as compared to 15.38% of nurses who preferred a bupivacaine pain catheter. 53.85% of nurses reported improved pain control with liposomal bupivacaine, while 7.69% of respondents reported worse pain control. The cost of using bilateral bupivacaine pain catheters using an On-Q pump is 45% higher per case versus liposomal bupivacaine.

Conclusion: Total opioid requirements, patient reported pain scores, nausea, and hospital length of stay were equivalent whether bupivacaine pain catheter or liposomal bupivacaine was used as the loco regional analgesic modality following elective bariatric surgery. There is both potential nursing preference and an associated financial benefit in using liposomal bupivacaine over bupivacaine On-Q pain catheters in patients undergoing elective bariatric surgery.
P 2. ABERRANT SINGLE CYSTIC ARTERY ORIGINATING FROM A RIGHT REPLACED HEPATIC ARTERY ENTERING THE GALLBLADDER FROM THE POSTERIOR INFERIOR ASPECT

H. Bonatti, A, Khairat

Presenter: Hugo Bonatti MD | Meritus Health

**Background:** The cystic artery has numerous anatomical variations but usually can be found in the triangle of Calot. These variations may cause confusion and complications, especially in more difficult laparoscopic cholecystectomy (LC).

**Method:** A 55 year old female was diagnosed with biliary dyskinesia on HIDA scan. LC was started with three 5mm ports (LUQ x2, umbilicus). The Gallbladder (GB) serosa was incised on both sides. A window was created behind the GB midportion and widened towards fundus and infundibulum. The infundibulum and cystic duct (CD) were trapped in significant scar tissue. No cystic artery (CA) was identified left or anterior to the CD. A large right hepatic artery was visualized running into the transverse fissure. On further dissection of the fundus at the dorsal and inferior aspect, an arterial bleed occurred, which was controlled using tamponade with a grasper. The LUQ 5mm port was exchanged for a 10-12mm trocar and the 5mm trocar was placed in the RUQ.

**Results:** As a critical view was obtained with the modified dome down technique, the GB was stapled off just above the infundibulum. The bleeding artery was identified dorsally and inferior to the CD, controlled with a grasper and clipped. The infundibulum and CD were completely mobilized, the CD was secured with an endoloop, the GB remnant was amputated and both specimens were placed into a retrieval bag. The CA was dissected out and the origin from the right hepatic artery identified and two clips were placed at the offspring. The right hepatic artery came from the free edge of the hepatoduodenal ligament and the proper hepatic artery anterior in the hepatoduodenal ligament only supplied the left lobe. The patient dropped her hemoglobin 4 points, total blood loss was 1200ml but she remained hemodynamically stable. She was discharged on the second post-operative day and was well on her two weeks follow up.

**Conclusion:** This anatomical variant of the CA seems to be extremely rare and represents an important pitfall in LC.
P 3. THE EVER SHRINKING OPERATIVE TRAUMA EXPERIENCE IN SURGERY RESIDENCY: CAUSE FOR CONCERN

MD Jones, MZ Shehada, JV Jacobs, TL Gillespie, JN Bogert, JA Weinberg

Presenter: Michael Jones MD | St. Joseph’s Hospital and Medical Center

Background: Resident exposure to operative trauma is ever decreasing. Non-operative management strategies, work-hour restrictions, and safer vehicles are contributing to this trend. To date, reports concerning resident operative experience have relied largely on self-reported case logs, which may not reliably reflect operative experience. We sought to quantify accurate representation of general surgery resident experience in a training program centered at an urban level 1 trauma center.

Method: Trauma laparotomies performed between 2014 and 2017 were identified from the registry of a level 1 trauma center. Operative reports were reviewed for resident participation and procedure performed. Accreditation Council for General Medical Education case log reports for the residency program were reviewed to obtain annual percentile rank in operative trauma with respect to national experience.

Results: Between 2014 and 2017, 233 trauma laparotomies were identified. Laparotomies requiring intervention on the liver averaged 0.67 cases per resident per year (0 – 4). Operations involving the spleen averaged 0.35 cases per resident per year (0 – 5). Operations involving abdominal vessels averaged 0.30 cases per resident per year (0 – 2) where abdominal vessels were defined as the aorta, celiac trunk, iliac arteries and veins and the SVC. Annual percentile ranks in operative trauma per ACGME reports for the residency were 68% to 87% over the period of the study.

Conclusion: General surgery resident operative experience centered at a single level 1 trauma center is markedly sparse despite a high percentile ranking relative to other training programs across the country. In fact, experience with specific procedures is so infrequent as to question proficiency in these procedures at completion of training.
P 4. THE VALUE OF AN APPRENTICESHIP AT A SAFETY NET TRAUMA HOSPITAL FOR TRAINING CHIEF GENERAL SURGERY RESIDENTS
HB Moore, EE Moore, CC Burlew, EM Campion, AP Morton, MJ Cohen, K Jaiswal, M Nehler, C Travis, FM Pieracci
Presenter: Hunter Moore MD, PhD | Denver Health Medical Center

Background: The American Board of Surgery (ABS) has implemented new requirements for operative experience of surgical residents for qualifying exam eligibility. This includes completing a minimum of 850 cases, 200 of which are required to be completed during the resident’s chief year. Additionally, 11 sub-operative categories covering various components of surgery ranging from pancreatic resection to soft tissue mass excisions require a minimal volume. We hypothesized that a safety net trauma hospital provides a significant volume and variety of operative cases for a chief resident that enables completion of ABS requirements in an expedited time frame.

Method: A chief surgical resident entering their final year of training had only completed 700 operative cases and was deficient in 37% (4/11) subcategories to qualify for the ABS qualifying exam. The resident met with the program director and options included 1) rotations in a high-volume outpatient setting and subspecialty rotations in colorectal surgery and surgical oncology versus 2) working at the safety net trauma hospital with no surgical sub specialists but had an operative practice that covered all deficient categories. The resident identified a mentor to facilitate the objective of 200 chief cases and fulfill all deficiencies at the safety net hospital. Option 2 was pursued with program approval.

Results: The resident met the objective of 200 chief cases with only three rotation blocks (~40% of 8 total rotations during year). The resident averaged 11 cases per week, staffed patients in an elective surgical clinic weekly (averaging 35 patients), and trauma/acute care call (24 hr) every other Saturday. All deficiencies leading into the chief year were successfully corrected within this time frame. The resident had operative experience in 9/11 sub categories (no plastics or pediatrics) with the majority being alimentary (30%) and abdominal (26%) cases. During this time 19-week time frame, the resident met ABS requirements for operative trauma, vascular access, stomach, esophagus, mastectomy, and skin/soft tissue. 41% of cases were completed with the resident mentor, and 25% were completed with a senior surgical faculty member designated as a master surgeon.

Conclusion: This apprenticeship model at a safety net trauma hospital provides a proof of concept for completing chief level surgery training in an expedited fashion. Chief surgical residents who are lacking multiple subcategories of training can resolve their deficiencies and become eligible for their ABS certifying exam in a short time frame. This enables the remaining 60% of the chief year to be uninhibited to specific case requirements and allows the chief resident focus teach medical students and junior residents, while still seeking advance complex surgical cases, and maintaining research opportunities.
Background: Hepatic portal venous gas (HPVG) is an ominous radiographic sign, often associated with severe acute abdominal pathology. This is a sequelae of bowel necrosis in up to 72% of reported cases, and mortality rates of 55-90%, with the highest rates seen when HPVG co-occurs with pneumatosis intestinalis. The prognosis of patients presenting with this sign is dependent on the clinical events surrounding its development and the comorbid conditions of the patient.

Method: A 64-year-old male with history of COPD, hepatitis C, atrial fibrillation, and acute pancreatitis presented with severe sepsis, acute renal failure, altered mental status, and 2 days of diffuse abdominal pain. His surgical history included an incarcerated ventral hernia repair, right colectomy and subsequent diverting ileostomy. On physical exam, he was hypotensive, tachycardic, and had diffuse abdominal tenderness. Labs demonstrated white blood count of 33,000, CT revealed portal venous gas (Images 1 & 2) and pneumatosis intestinalis (Image 3) and the patient was taken to the OR emergently for an exploratory laparotomy. Intraoperatively, there were dense adhesions. After extensive adhesiolysis, there were no ischemic changes or necrotic bowel. Post-operatively, the patient recovered without event, infectious work-up was unremarkable, and his renal function normalized.

Results: The clinical picture surrounding this patient’s history, laboratory, and radiographic studies suggested an ischemic and life-threatening abdominal process. Despite extensive surgical and medical work up, the source of HPVG remains idiopathic. There are a few reports of aerophagia in the setting of COPD, hernia, pancreatitis, or ileus as a source of HPVG. Case reports have demonstrated the presence of HPVG following endoscopy. Literature describing this sign in the setting of other non-operative conditions is largely limited to small studies. Mortality of patients with benign HPVG is approximately 25%.

Conclusion: HPVG is often a foreboding sign of potentially lethal intra-abdominal process. In this case, the patient presented with sepsis and renal failure. After surgical exploration and extensive adhesiolysis, the patient recovered to full activity and extensive workup did not provide a primary source and explanation for the clinical presentation. Although the HPVG is not an absolute indication for surgery, care must be taken to rule out deadly causes and to treat the underlying disease process.
P 6. INITIAL EXPERIENCE WITH PREPECTORAL BREAST RECONSTRUCTION AND AEROFORM TISSUE EXPANDERS
C Boneti, M Bedrossian, S Ovadia, K Gishen, S Kohanzadeh
Presenter: Melody Bedrossian BS | University of Miami, Miller School of Medicine

Background: The breast reconstruction field is rapidly evolving with the integration of new technologies. The most disruptive innovations in the recent years are the use of acellular dermal matrix and its evolution to a prepectoral breast reconstruction technique, which essentially eliminated animation deformity as a complication, and the remotely activated tissue expanders, which improved patient experience and reduced the expansion process duration. The objective of this study was to analyze the outcomes after integrating these techniques into an academic practice.

Method: A total of thirty-five study subjects were analyzed adding to a total of sixty breast reconstructions, twenty-five bilateral and ten unilateral. Average age was 50.8 ± 12.4 years and average BMI was 26.2 ± 5.3. A retrospective chart review of all cases undergoing prepectoral breast reconstruction at the University of Miami from 6/29/17 to 1/9/18 was conducted. Subjects demographics, clinical stage of the disease, and outcomes were analyzed with descriptive statistics.

Results: The most common indication was immediate reconstruction after breast cancer ablation in 29 cases (82.8%), followed by immediate breast reconstruction for prophylactic mastectomies in case of a genetic mutation (4/35 or 11.4%), delayed breast reconstruction (1/35 or 2.8%) and amastia a result of Poland’s Syndrome (1/35 or 2.8%). 34.4% of cases were completed in locally advanced disease, including T2 and T3 breast cancers. Average follow-up was 3.8 ± 1.7 months to the date of analysis, where 12 of the 35 study subjects (34.3%) completed the exchange of the tissue expanders to silicone implants. Complications occurred in 7 cases (20%), only 2 of which required tissue expander removal (5.7%). A small seroma was present in all cases, with only 3 large volume cases. None of these cases were associated with a negative outcome. There were no primary infections of the tissue expander. All subjects expressed a positive experience with minimal discomfort.

Conclusion: Prepectoral reconstruction with remotely activated air based Aeroform expanders is safe with complication rates comparable to similar reconstruction techniques. Patient experience and aesthetic results are greatly improved with less discomfort, reduced number of office visits, and a shorter expansion period.
P 7. THE FUTILITY OF OPEN CARDIAC MASSAGE IN PENETRATING CARDIAC TRAUMA
F Bokhari, C Fu, F Bajani, CC Burlew, C Butler, L Tatebe, A Dennis, F Starr, T Meeser, M Kaminsky, S Poulakidas
Presenter: Faran Bokhari MD | Cook County Health System

Background: Emergency thoracotomy (ET) and open cardiac massage (OCM) remain controversial. We analyzed the US National Trauma Data Bank to evaluate these procedures in chest trauma patients.

Method: From July 1, 2009 to June 30, 2016, chest trauma patients (ICD-9: 860.0-862.9) with exploratory thoracotomy (ICD-9: 34.02) within 2 hours of emergency department arrival were enrolled. Univariate and multivariate analysis evaluated factors for survival. 1:1 propensity score matching (PSM) analysis compared patients with and without OCM.

Results: 14,230 chest trauma patients with ET had a mean ISS of 29.2 and a mortality of 70.9%. Penetrating injury favored survival (odds ratio: 2.051, p<0.001). Among penetrating injury patients (n=9739), patients with heart injuries (n=3094, 31.8%) had a higher mortality (77.0% vs. 63.7%, p<0.001) and a higher probability of OCM (39.9% vs. 33.6%) versus patients without heart injuries. In penetrating heart injuries, patients who received OCM had lower SBP (33.7 vs. 46.2 mmHg, p<0.001), lower GCS (4.4 vs. 6.0, p<0.001), higher ISS (42.7 vs. 39.6, p<0.001) and higher mortality (92.0% vs. 67.0%, p<0.001). After controlling demographics, condition on arrival and injury severity with PSM, OCM patients had significantly higher mortality versus non-OCM patients (92.0% vs. 76.8%).

Conclusion: Penetrating chest injury with ET has a higher survival compared to blunt chest injury requiring ET. Patients with cardiac injury unsurprisingly have worse physiological parameters and outcomes. Despite the addition of OCM to ET and controlling for poorer physiology for penetrating cardiac injury, these patients continued to have unacceptably high mortality.
P 8. NON-INVASIVE TIME-RESOLVED SPECTROSCOPY PROVES SENSITIVE TO DECREASED CEREBRAL PERFUSION: INCIDENTAL FINDING IN PILOT STUDY

C Figueroa, G Philipopoulos, C Barrios

Presenter: George P. Philipopoulos BS | University of California Irvine Medical Center

**Background:** Time-Resolved Spectroscopy (TRS) is a non-invasive optical technique similar to that of pulse oximetry, but with more robust light source and detector allowing for greater depth and larger volume of tissue analysis. This technology can theoretically provide real time quantification of tissue and cerebral hemodynamics. The goal of this pilot study was to evaluate if TRS is sensitive enough to detect both muscle and cerebral hemodynamic changes during the early stages of hemorrhage using the blood donation process as a model of early blood loss.

**Method:** Fifty-three healthy blood donors were monitored using a two-channel TRS instrument. One channel monitored various muscle tissue sites (bicep n=47, forearm n=3, calf n=3) contralateral to the blood draw and the other channel monitored cerebral hemodynamics (n=34). A baseline value was established 5-7 minutes prior to blood draw. The volume of a typical blood donation was approximately 460 cc.

**Results:** Micromolar differences before and after blood draw in deoxyhemoglobin (Hb) (25.0 vs. 27.1, p=0.27), oxyhemoglobin (HbO2) (58.9 vs. 59.9, p=0.83), and total hemoglobin (THb) (84.0 vs. 87.0, p=0.63) were not statistically significant. We had an incidental finding whereby one subject experienced an episode of syncope and the TRS device proved to be sensitive at detecting a decrease in cerebral perfusion during this vasovagal response.

**Conclusion:** Our data did not conclude that TRS is a sensitive technique capable of monitoring hemodynamic changes in muscle and cerebral tissue in the setting of mild blood loss. However, the device may be capable of detecting more significant hemodynamic changes associated with cerebral blood perfusion (CBP), such as those associated with a vasovagal response. Future studies focused on CBP and oxygenation are warranted to evaluate the effectiveness of this noninvasive technology against that of current gold standard invasive cerebral monitors.
P 9. ABDOMINAL VISCERAL VASCULAR INJURY AFTER BLUNT TRAUMA

**AL Halpern, JM Samuels, EE Moore, MJ Cohen, KB Platnick, CD Fox, FM Pieracci, JJ Coleman, EM Campion, RA Lawless, CC Burlew**

**Presenter:** Alison Halpern MD | Denver Health Medical Center

**Background:** Abdominal visceral vascular injury due to blunt trauma is a rare entity with few reports in the published literature. The expanding use of endovascular therapy for vascular trauma, as well as the use of antithrombotic therapy for blunt cerebrovascular injury (BCVI), has potentially altered current treatment of visceral vascular injuries. We hypothesized that blunt abdominal visceral vascular injury (BAVVI) patients, without indications for emergent operative intervention, can be managed with antithrombotic therapy with acceptable outcomes. The purpose of this study was to review outcomes of BAVVI managed with antithrombotic therapy.

**Method:** The trauma registry of our level I urban trauma center was queried for patients with BAVVI of the celiac artery (CA), superior mesenteric artery (SMA), and inferior mesenteric artery (IMA) from 2009-2018. Patient demographics, treatment of BAVVI, and patient outcomes were reviewed.

**Results:** We identified 10 patients with BAVVI. Mean age was 46.9 years (27-66 years) with mean injury severity score of 23.1 (10-66). All suffered deceleration injuries. Eight patients suffered injury to the CA or its more distal branches and 2 patients had SMA injuries. No IMA injuries were observed. Two patients required intervention; 1 patient with a CA injury combined with a suprarenal aortic dissection required endovascular stenting, and 1 patient suffered avulsion of the common hepatic artery requiring open vascular reconstruction. 88% (7/8) of patients not initially requiring surgery were treated with antithrombotic therapy initiated within the first 24 hours. More severe injuries (>25% narrowing by CTA) were treated with therapeutic heparin followed by warfarin and less severe injuries (<25% lumen) received daily aspirin. There were no episodes of major bleeding associated with antithrombotic therapy and no patients who were initially managed with antithrombotic therapy required surgical or endovascular interventions.

**Conclusion:** This is one of the first case series describing the management of patients sustaining BAVVI, which is a rare injury following blunt trauma. For patients sustaining low grade BAVVI with luminal narrowing, similar to Grade I or II on the Denver Grading Scale of BCVI, the use of antithrombotic therapy appears to be safe with reasonable outcomes.
P 10. THORACIC COMPARTMENT SYNDROME FOLLOWING NECROTIZING SOFT TISSUE INFECTION AND SEPSIS

*DJ Hall, AM Mohr, CA Croft, RS Smith*

**Presenter:** Andrew Martin MD | University of Florida

**Background:** Abdominal compartment syndrome is a well known and relatively common complication following resuscitation with large volumes of crystalloid and blood. Conversely, thoracic compartment syndrome (TCS) is a rare, but that occasionally is encountered in patients that have undergone cardiac or thoracic procedures or thoracic injury. Herein, we report a case of (TCS) that developed from aggressive resuscitation for severe sepsis.

**Method:** A 51-year-old woman presented to a referring hospital with a 48-hour history of severe pain, erythema, and edema of the left upper extremity. The patient fell outdoors causing a contaminated laceration of the arm. She received high volume crystalloid resuscitation, underwent wide debridement and fasciotomies, and was given broad spectrum antibiotics. Unfortunately, she rapidly developed severe sepsis, including profound shock requiring multiple vasopressors, acute renal insufficiency that necessitated dialysis, and respiratory failure requiring mechanical ventilation. Due to the complexity of her clinical findings, she was transferred to our facility for further care. Upon arrival, she was hemodynamically unstable with respiratory failure and was noted to have abdominal compartment syndrome.

**Results:** A decompressive laparotomy was immediately performed in the ICU as well as placement of bilateral tube thoracostomies for pleural effusions. She underwent serial debridement of the left arm. The patient required ongoing volume resuscitation and blood transfusions for hypotension and falling blood counts. An erroneous hemoglobin level measured by a point of care testing device, coupled with hemodynamic instability resulted in activation of the massive transfusion protocol on day 6 of her course. Shortly thereafter, she developed profound hypotension and inability to ventilate due to high inspiratory pressures. The diagnosis of TCS was made and the patient received an emergent median sternotomy. Immediate improvement in hemodynamic and respiratory parameters was noted. The patient gradually recovered from sepsis and received skin grafts to the upper extremity. The sternotomy was closed after further dialysis and improvement of the volume status.

**Conclusion:** TCS is a life threatening complication that should be considered when increasing airway pressures, falling cardiac output, and progressive acidosis follow aggressive volume resuscitation. Rapid thoracic decompression can be life-saving.
P 11. REPAIR OF AN ACUTE LUNG HERNIA AND A NOVEL TECHNIQUE IN SURGICAL STABILIZATION OF RIB FRACTURES
BW Thomas, CS Kuppler, RF Sing
Presenter: Chris Kuppler MD | Carolinas Medical Center

Background: Rib fractures comprise approximately 10% of all traumatically injured patients. Over the last two decades there has been growing interest in surgical stabilization of rib fractures. While most current guidelines conditionally recommend operative fixation of flail segment, there has been increasing interest investigating operative fixation of rib fractures in adults with non-flail pattern rib fractures. Post-traumatic lung herniation is an uncommon injury not extensively reported and treated via many modalities in the 300 or so cases reported.

Method: A 68-year-old female presented to our level I trauma center following a two vehicle MVC. She was hypotensive and tachycardic on arrival and was found to have fractures of ribs 6 and 7 on the left. The seventh rib was severely displaced, and she was also found to have an acute traumatic left lung herniation on computed tomography imaging. She initially required exploratory laparotomy and on hospital day 2 her lung hernia was repaired surgically.

Results: The patient was taken for surgical fixation of the rib fracture and lung hernia through an anterolateral thoracotomy. Latissimus flaps were raised superiorly and inferiorly and the traumatic herniation through the intercostal space was immediately visualized. A chest tube and thoracotomy closure sutures were placed to close the defect along its length. We then performed a rib fracture stabilization by placing the fixation pin in the most distal point of the plate and securing it to the center of the rib on the other side using tactile feedback alone, similar to a dental pick. The remainder of the plate was then secured using bicortical screws. Following reduction and fixation of the fractured and displaced rib, we then tightened our thoracotomy closure sutures which effectively closed the chest wall hernia.

Conclusion: Acute lung herniation has been repaired using techniques varying from thoracoscopy, to open thoracotomy in the literature. Intercostal herniations should be immediately surgically repaired as there is risk of incarceration and strangulation. In this particular case to re-approximate the defect surgical stabilization of the severely displaced seventh rib allowed for structural integrity of the closure. Additionally, using the novel “dental pick” technique we were able to achieve a well-positioned internal fixation without the use of fluoroscopy or direct visualization in a limited space.
**Background:** Phlegmonous gastritis (PG) is a rare, advanced bacterial infection of the gastric wall that can be rapidly progressive and fatal if not recognized early and treated appropriately. Streptococcus is often the primary cause (50-60%), though polymicrobial infection (15-20%) has been documented. Reported mortality is 25-30% overall. Risk factors include any immunocompromised state (obesity, diabetes, autoimmune disorder, lymphoma). This condition presents with sudden, severe epigastric pain and vomiting that can mimic perforated or penetrating ulcer. The key to a good outcome is early recognition, confirmation on imaging, aggressive treatment of sepsis and monitoring for progression requiring operative resection.

**Method:** A 36 year old morbidly obese male (BMI 54) presented with acute onset of severe epigastric pain, nausea and vomiting. On initial exam he was tachycardic and febrile, but without evidence of peritonitis on abdominal exam. WBC was 24.6, lactate was 5.9. Abdominal CT scan with oral contrast revealed gastric wall thickening with surrounding fat stranding, and no evidence of perforation. He was treated initially with fluids, and antibiotics, namely Clindamycin. The patient was monitored closely in the ICU for changes in abdominal exam and worsening sepsis.

**Results:** Initial blood cultures were positive in 2 of 4 bottles for Streptococcus pyogenes (Group A serotype). The diagnosis of PG was clinically confirmed based on blood cultures and CT findings. The patient improved significantly after Clindamycin was started. Upper endoscopy was performed 6 days after admission which revealed an erythematous mosaic patterning of the gastric body mucosa, and a normal antrum without evidence of ischemia, purulence, ulcer or masses. Mucosal tissue cultures revealed rare Alpha Hemolytic Streptococcus and Enterobacter aerogenes. Tissue pathology revealed chronic gastritis with negative H. pylori. The patient improved overall and was discharged on hospital day 10.

**Conclusion:** PG is a severe and rapidly progressive infection of the gastric wall that may lead to septicemia, shock, and death if not identified and treated early. Clinical presentation is commonly comprised of sudden onset epigastric pain with vomiting along with severe sepsis. Initial testing should rule out gastric perforation as this would prompt surgical intervention early in a patient’s course. These patients benefit from endoscopy, tissue pathology and cultures to establish PG definitively. Management of PG should include early aggressive treatment with fluid and antibiotics, specifically an anti-ribosomal agent such as Clindamycin. Surgical resection is reserved for medically refractory cases or advanced staged cases, and often requires subtotal or total gastrectomy to obtain source control. Therefore, the key to a good outcome is early recognition.
Background: Familial adenomatous polyposis (FAP) patients are at high risk for multiple malignancies; notably colorectal, duodenal, and thyroid. Due to the near inevitable development of colorectal cancer, FAP patients undergo rigorous screening with prophylactic or early surgical intervention due to dysplasia, polyposis, or symptoms. Multiple surgical approaches exist to reduce the risk of colorectal cancer and consider the future risk of dysplasia, quality of life, and need for reoperation. As FAP patients experience improved survival from early colorectal resections, there remains a risk of other FAP-related cancers. This study examines surgical interventions, cancer diagnoses, and mortalities among FAP patients.

Method: Patients with a diagnosis of FAP or attenuated FAP (AFAP) were included in this retrospective study. Patients were identified by linking the Hereditary Gastrointestinal Cancer Registry (HGCR) with University of Utah’s electronic medical records (UUEMR). HGCR is a longitudinal study going back 20 years of individuals with a high risk of developing gastrointestinal cancers due to hereditary syndromes or family history and includes medical, surgical, and family histories. Patients without sufficient information from HGCR or electronic record were excluded. Patient data including demographics, surgical histories, date of operation, cancer diagnoses, vital status, and cause of death were reviewed and reconciled from both HGCR records and the patient’s electronic medical record.

Results: 178 patients with FAP/AFAP were identified in UUEMR. 39 contained limited information and were excluded, leaving 139 patients. Of these 29.5% had AFAP, mean age was 49.1 years, 57.6% were female, and 10.1% had died. Initial colorectal surgery included: 43.2% ileal pouch-anal anastomosis (IPAA); 35.3% colectomy with ileorectal anastomosis (IRA); 3.6% segmental colectomy (SC); 7.9% proctocolectomy with ileostomy (PI), and 9.4% had no colorectal surgery (NS). AFAP patients comprised 8.3% of IPAA patients, 42.9% of IRA patients, 40% of SC patients, 0% of PI patients, and 100% of NS patients. Colorectal cancer was diagnosed in 18% of patients, mean age at diagnosis 33.2, 5.0% were diagnosed with gastric cancer, mean age at diagnosis 52.3, and 6.5% of patients underwent a Whipple or duodenal resection. Of 14 deceased patients; 5 died from gastric adenocarcinoma, 3 from non-FAP malignancies, 2 from desmoid complications, 1 from colorectal cancer, and 3 from other causes.

Conclusion: Our study retrospectively examined the history of FAP and AFAP patients to determine types and frequencies of surgical intervention, cancer
diagnoses, and causes of mortality. A plurality of patients initially underwent IPAA. AFAP was more prevalent in patients undergoing IRA, SC, or NS. Over 10% of patients ultimately developed gastric or duodenal dysplasia. Gastric adenocarcinoma was the most common cause of death. Current upper gastrointestinal screening guidelines are determined by the Spigelman classification derived from degree of duodenal polyposis and dysplasia without consideration of gastric findings. This study suggests that the development of gastric dysplasia is common and should play a larger role in screening; this along with appropriate surgical intervention may reduce the incidence of gastric adenocarcinoma and associated mortality in this population.
P 14. RESECTION OF PANCREATOBLASTOMA WITH PORTAL VEIN TUMOR EXTENSION
SA Arshad, DG Lemon, JQ McKee

Presenter: Seyed Arshad MD | University of New Mexico

Background: Malignant tumors of the pancreas are uncommon within the pediatric population. Pancreatoblastoma is a rare, malignant tumor of the pancreas originating from epithelial exocrine cells with approximately 200 cases reported in the literature. Due to the rarity, treatment regimens have not been standardized and much of the information available in the literature, especially in regards to chemotherapy and radiation, is anecdotal. We present the case of a rare pediatric pancreatoblastoma with extension of the tumor into the portal vein, treated with neoadjuvant chemotherapy and surgery with a unique operative course given the portal vein involvement.

Method: A 2-year-old male presented to the emergency department with decreased appetite and abdominal pain, where advanced imaging was concerning for an intraabdominal mass. The patient was found to have an LDH of 361, and an AFP of 48,690. Biopsy of the mass was significant for pancreatoblastoma. The patient’s metastatic workup was negative, however, given the significant tumor burden, was not surgically resectable. The patient underwent 6 cycles of Cisplatin and Doxorubicin and subsequent imaging showed an overall 68% reduction in tumor volume. The patient was taken for surgical resection where he underwent distal pancreatectomy, splenectomy, en bloc resection of the transverse colon and partial gastrectomy, tumor removal from the portal vein (vascular isolation, tumor removed, and SMV/PV primarily repaired), and lymph node biopsy.

Results: The patient was admitted to the pediatric ICU post-operatively. He was initiated on aspirin for portal vein thromboprophylaxis. He had return of bowel function on post-operative day six and was able to be discharged on day twelve. The patient’s pathology revealed a pancreatoblastoma, negative for metastasis to the colon or stomach and no nodal involvement, including 0/23 nodes within the pancreatic regional lymph nodes. There was some extension of tumor to the peripancreatic fat along the posterior pancreatic margin. Using TNM staging for pancreatic ductal carcinoma (per World Health Organization guidelines), the patient is a TNM stage ypT3NO (Stage IIa). A one-month post-operative CT showed no recurrence with no thrombus of the SMV or Portal vein. His AFP level dropped to 1.8 (normal <15). Subjectively, his activity and energy levels have both improved and he continues to undergo surveillance with oncology and is awaiting a 3-month CT and labs.

Conclusion: Pancreatoblastoma is a rare, malignant tumor with an annual incidence of 0.004 cases per 100,000 persons. Given the rarity of pancreatoblastomas, there are no specific NCCN guidelines or consensus in the
literature for treatment. Treatment of our patient was based on general oncologic principles and knowledge gleaned from review of the literature. Our patient underwent neoadjuvant chemotherapy, allowing for shrinkage of the tumor burden to a surgically manageable size. He then underwent surgical resection, taking care intraoperatively to resect all tissue concerning for tumor involvement, including removal of tumor burden from the portal vein. This afforded our patient a good oncologic resection validated by his drop in post-operative AFP to normal levels.
P 15. A CASE OF SQUAMOUS CELL CARCINOMA ARISING FROM AN INCLUSION CYST FOUND WITHIN CHRONICALLY RECURRING GLUTEAL ABSCESSES

Ju Elegino, R Vogel

Presenter: Jun Élegino DO | St. Anthony Hospital

Background: In surgical practice, epidermal cysts are frequently encountered skin lesions. However, the findings of malignant transformations arising from epidermal inclusion cysts are rare and uncommon. We report a case of a 46 year old male, presenting with a squamous cell carcinoma arising within an epidermoid cyst found on histopathology after excision of a chronic gluteal abscess. Incidence of this malignant transformation is 0.011-0.045%

Method: A 46 yo male, with a history of Diabetes Mellitus type 1 complicated by End Stage Renal Disease and retinopathy on hemodialysis presents with a one year history of recurrent left gluteal abscesses measuring 1.1 x 6 x 0.1 cm. Patient failed conservative wound care therapy and was recommended for surgical excision. On pathology, the patient was found to have a well differentiated invasive squamous cell carcinoma arising from an epidural cyst. A pubmed search was performed using the following key terms: Squamous cell carcinoma, epidermal cyst, inclusion cyst, and malignant transformation.

Results: Squamous cell carcinoma arising from an epidermal inclusion cyst is a rare malignant transformation only occurring in 0.011-0.045% of the population with a mean age of 61.8 at time of diagnosis. Literature review showed 36 case reports with most cases occurring in lesions of the head and neck. Current treatments recommend a wide excision with 4-6mm margins and 2 cm in high risk tumors. Of the cases reported, three cases of metastasis were reported with death within 5-10 months of presentation.

Conclusion: Excisions of epidermal cysts is a common general surgical procedure. However, malignant transformation in chronic epidermal cysts should raise the suspicion for malignant transformation. Consideration of wide excisions with 4-6 mm margins are recommended since mortality is high in advanced metastatic lesions.
ePOSTER ABSTRACTS (continued)

P 16. CONCOMITANT BLEEDING RIGHT COLON CANCER AND ACUTE PULMONARY EMBOLISM: EXPERIENCE WITH THREE CASES  
HJR Bonatti, VM Giffin, KP Riggle, SM Sachs, DS Kotlyar  
Presenter: Hugo Bonatti MD | Meritus Health

Background: Colon cancer may increase the risk for deep venous thrombosis (DVT) and pulmonary embolism (PE). Advanced right colon cancer commonly presents with blood loss anemia.

Method: We report three patients aged 50, 66 and 68 years old including two males and one female presenting with recent significant weight loss, syncope and anemia to the emergency room. In all three CT-scan showed locally advanced right colon cancer and PE (multiple peripheral, segmental and right lower lobe PE, respectively).

Results: All patients received blood transfusions, were fluid resuscitated and were started on a heparin drip. After stabilization, colonoscopy revealed right colon adenocarcinoma. Primary colectomy followed by adjuvant chemotherapy was chosen in all cases. The female underwent successful laparoscopic right hemicolectomy, in the two men the right colon was laparoscopically partially mobilized and then switched to open surgery. Abdominal side wall and Gerotas fascia were infiltrated in all cases. In the two open cases also other organs such as bladder, ureter, duodenum and uncinate process were infiltrated demanding more extensive resections not amendable to laparoscopy. The two males had a protracted course and required TPN, the female had no complications. Pathology showed T4 tumors in all patients. Chemotherapy was initiated within 4-6 weeks; all were started on anticoagulation within 48 hours post surgery. Two patients had an IVC filter placed during colectomy. All patients are alive with good response to chemotherapy.

Conclusion: Patients with advanced right colon cancer and PE may do better with primary colectomy. On the other hand, neoadjuvant chemotherapy with anticoagulation may have a high risk for life threatening acute hemorrhage. Perioperative placement of an IVC filter seems a good option in such cases.
Background: As medical therapy improves, patients with Cystic Fibrosis (CF) are living further into adulthood, allowing physicians to better understand later-onset malignancies that occur in this population. The risk of colorectal cancer (CRC) in cystic fibrosis (CF) patients is 5-10 times that of the general population, and rises to 25-30 times greater after lung transplantation. While CRC tends to occur at a younger age in CF patients, CRC-related deaths are lower in CF patients than the general population. New guidelines recommend screening colonoscopies to begin at age 40 for most CF patients and age 30 for those with solid-organ transplant.

Method: We performed a retrospective case review of three patients with cystic fibrosis patients treated in the Department of Surgery at the University of Nebraska Medical Center between 2015 and 2018. Patients were identified by reviewing case logs, and their charts were inspected for details regarding baseline illness and disease presentation.

Results: A 30 year old man presented with a T3N2M1 cancer of the splenic flexure with associated large bowel obstruction and multiple bi-lobar hepatic metastases. He required emergent subtotal colectomy for his obstruction, which he tolerated well. He went on to complete multiple cycles of chemotherapy and later two liver resections for metastasis. He is alive 3.5 years after diagnosis and continues to receive systemic therapy. A 32 year old woman presented with a complete large bowel obstruction from a perforated T4N0M0 sigmoid colon cancer that invaded the bladder. She underwent low anterior resection with en bloc partial cystectomy and left salpingo-oopherectomy. She received adjuvant chemotherapy, and is currently disease-free 2.5 years after surgery. A 42 year old man with bilateral lung transplants had a T1N0M0 rectal cancer detected on routine screening colonoscopy. He underwent a laparoscopic low anterior resection, recovering without incident.

Conclusion: We identified three patients with cystic fibrosis who presented with three very different disease burdens. Current guidelines for screening were employed at our institution, but the two younger patients did not meet screening criteria, and presented with severe symptoms and advanced disease. As cystic fibrosis patients live longer, our understanding of colorectal cancer in this population will continue to improve, which may lead to more aggressive screening guidelines. In the meantime, surgeons should always maintain a high level of suspicion for malignancy when treating this population.
P 18. A RARE CASE OF A 65 YEAR OLD FEMALE WITH A MESENTERIC PARAGANGLIOMA

R Rocco, BL Murphy, VP Patel, O Hamidi, AY Chang, ML Lyden

Presenter: Raffaele Rocco MD | Mayo Clinic Rochester

**Background:** Paragangliomas (PGLs) are rare neuroendocrine neoplasms of neural crest origin that arise from the extra adrenal autonomic paraganglia. Mesenteric PGLs are exceedingly rare. It was reported that these tumors are more prone to develop in women aged in the late 50’s. We describe a female patient presenting with a mesenteric PGL who underwent successful surgical resection.

**Method:** A 65-year-old woman with a history of breast cancer presented with a symptomatic type III hiatal hernia seen on computed tomography (CT). Incidentally, she was also found to have a 3.7 cm mass in the mesentery in the right lower quadrant. CT-guided core biopsy yielded tumor cells which were immunoreactive for chromogranin and synaptophysin and negative for pancytokeratin and S100. A subsequent 68Ga-DOTATATE (PET)/CT scan showed isolated uptake of the lesion.

**Results:** The 4-cm mass was located at the base of the mesentery in the mid-jejunum and was unsuitable for extracorporeal anastomosis; thus, a mini laparotomy was created and a 15-cm jejunal segment was resected with the corresponding mesentery. Pathology confirmed the diagnosis of PGL with negative surgical margins. The classic Zellballen appearance related to a uniform cluster of polygonal cells with vascular coats was demonstrated with strong synaptophysin and chromogranin expression while S-100 protein highlighted sustentacular cells.

**Conclusion:** Mesenteric PGLs are a rare form of PGLs. Our patient had the typical presentation, which is an occurrence in a middle aged woman that is asymptomatic. Modern imaging for diagnosis includes 68Ga-DOTATATE PET/CT, which is both sensitive and specific for somatostatin receptor-positive neuroendocrine tumors. Surgical resection of the bowel and involved mesentery is the standard treatment, with ongoing surveillance.
Background: In today’s era of evidence-based medicine, clinical practice guidelines are ubiquitous, but it is not known how physicians and surgeons’ perceptions of guidelines change over time after their release. It is possible that over time guidelines are viewed more positively as they become the “de facto” standard of care, regardless of their actual scientific merit. In this study, we sought to determine how perceptions of the American Thyroid Association (ATA) Differentiated Thyroid Cancer Guidelines changed over time after their release. We hypothesized that perceptions of guidelines become more positive over time as they become increasingly accepted as standard of care.

Method: A systematic literature search was performed using PubMed. To be included in the study, articles had to be primary research articles specifically scrutinizing the validity of the 2009 ATA guidelines, and also had to describe the validity of the guidelines either positively or negatively. Meta-analyses, reviews, and editorial commentaries were excluded. Each article was individually read and determined to be either positive or negative toward the guidelines through detailed content review. Histograms of perceptions over time were constructed and analyzed for frequency and descriptive statistics. The Shapiro-Wilk test was performed to characterize and determine the nature of the distributions.

Results: Our initial search returned 412 articles. After exclusion criteria were applied, 33 articles were ultimately included in the analysis. The number of positive articles peaked at 4 years and the negative articles peaked at 2 years following the 2009 ATA guidelines’ publication. Skewness and kurtosis values for both positive (-0.41, -1.5) and negative (-0.77, 0.26) articles were between -2 and 2, consistent with a normal distribution. Based on results of the Shapiro-Wilk test, both positive (p = 0.15) and negative (p = 0.29) articles formed a normal distribution over time after guideline publication.

Conclusion: In this study, we demonstrate that following the publication of a new set of clinical practice guidelines, clinicians’ response to guidelines seem to follow a predictable pattern of acceptance. The lack of skew in the distribution of perceptions of the guidelines over time suggests that guidelines may continue to gain positive acceptance as initial interest in their validity wears off, regardless of their true scientific merit. This notion has ramifications for clinical care and, relative to thyroidectomy guidelines, potentially significant impact on surgical practice. Our results suggest that guidelines, often thought of as objective and strictly evidence-based, may be somewhat arbitrarily and falsely accepted as standard of care. Further investigation is needed to better understand how practice guidelines are interpreted and integrated into surgical care.
P 20. TUBE CECOSTOMY AS A BRIDGE TO DEFINITIVE SURGERY FOR COLONIC OBSTRUCTION

ZM Wong, RWY Wong

Presenter: Zoe Wong BS | Peninsula Hospital

Background: The optimal treatment for patients with complete colonic obstruction remains unsettled. Recent studies support the efficacy of self-expanding metallic stents (SEMS) as a bridge to definitive resection. The use of tube cecostomy for acute colonic decompression has been controversial and is often absent from guidelines for management of colonic obstruction. This study aims to evaluate the role of tube cecostomy in the management of complete colonic obstruction.

Method: 14 patients who underwent tube cecostomy for complete colonic obstruction between 2014 and 2017 were reviewed. Data included age, cause and site of obstruction, time from cecostomy tube placement to definitive surgery, length of hospital stay, and complications. This data was compared to published results on the use of SEMS for complete colonic obstruction.

Results: The 14 patients studied had colonic obstructions due to both benign (4) and malignant (10) disease. The obstructions presented in the sigmoid colon (8), descending colon (4), splenic flexure (1) and transverse colon (1). Mean patient age was 61.8 years (± 3.61). Colonic decompression was successful in all cases. Definitive colonic resection was performed a mean of 4.3 days (± 0.31) after cecostomy tube placement. All but one of the definitive resections were done laparoscopically. The mean total hospital stay for all patients was 10.4 days (± 0.69). There were no major complications or mortality and no anastomotic leaks. Five of 14 patients had minor complications including prolonged healing at the tube placement site (3) and wound infection (2). Compared to published data on the use of SEMS for complete colonic obstruction, cecostomy patients showed a better success rate in achieving colonic decompression, shorter hospital stay, and similar complication rates.

Conclusion: Tube cecostomy is an effective method for colonic decompression as a bridge to definitive resection for complete colonic obstruction. With similar or better outcomes when compared to published SEMS data, tube cecostomy should be incorporated into the management options for this difficult clinical scenario.
Background: Von-Hippel Lindau disease can be caused by multiple different mutations in the Von-Hippel Lindau gene. There are four recognized phenotypes of Von-Hippel Lindau. Type 1 is associated with renal cell carcinoma and hemangioblastoma. Type 2A and 2B are associated with hemangioblastoma and pheochromocytoma, but respectively have low and high risk of renal cell carcinoma. Type 2C is associated with pheochromocytoma only. Surgery is the primary treatment for patients with Von-Hippel Lindau disease with pheochromocytoma, which can include unilateral or bilateral adrenalectomy.

Method: A 35-year old female had a history of headaches, anxiety, hypertension since her teenage years, pre-eclampsia, and multiple spontaneous abortions/miscarriages. She has a family history of Von Hippel-Lindau disease and a son with bilateral pheochromocytoma. Laboratory testing revealed elevated serum metanephrine (1,065 pg/mL) and normetanephrine (1,034 pg/mL). Imaging studies revealed bilateral adrenal lesions measuring 3.7 x 2.8 cm on the right and 2.6 x 1.9 cm on the left. A diagnosis of Von Hippel-Lindau was established. She underwent a laparoscopic bilateral adrenalectomy.

Results: Laparoscopic bilateral adrenalectomy was performed using a no-touch technique. The adrenal veins were identified and ligated. The patient had an uncomplicated hospital course and was discharged home after a short hospital stay. The final pathology confirmed bilateral benign pheochromocytomas.

Conclusion: Patients with pheochromocytoma in the setting of Von-Hippel Lindau disease can have bilateral adrenal involvement. Treatment in such cases involves bilateral adrenalectomy. The critical part of adrenalectomy is ligation of the adrenal vein. During an adrenalectomy for pheochromocytoma, manipulation of the adrenal gland prior to ligation of the adrenal vein can precipitate adrenergic crisis due to catecholamine release despite pre-operative alpha-receptor blockade. This can be avoided by implementing a no-touch technique. Intra-operative findings consistent with adrenergic crisis include sinus tachycardia, ST segment changes, and hypertension. A high index of suspicion for adrenergic crisis should be maintained.
Background: Reports have shown processed meats, smoking, and alcohol consumption are common culprits for the increasing rate of common gastrointestinal cancers (gastric, esophageal, pancreatic and colon). However, no global report comparing these variables is available. Additionally, the many advances in food additive legislation, cancer screening and food preservation that could be affecting mortality trends. The aim of this study is to evaluate the possible connection between these variables and the mortality rates of GI cancers. We sought to provide an overview of trends over time and a basic overview of the changes in the landscape of nutrition and food safety.

Method: Data was collected for five developed countries. The United States, Canada, Japan, France, and Singapore were selected to create a global perspective of observed trends. Meat production data was taken from the United Nations database FAOSTAT. The production element was used as a surrogate for meat consumption as it encompasses all meat produced from animals slaughtered commercially and agriculturally, and is a reliable way to track meat per country. All cancer mortality data was taken from the World Health Organization Cancer Mortality Database for ease of standardization. Incidence data was not used due to the difficulty in finding appropriate data for the time frame of the study (1950-2018). Data for alcohol consumption, cancer screening and smoking rates will be taken from similar databases.

Results: Overall, mortality rate for gastric and colon cancer decreased in four countries with the exception of colon cancer in Japan. Pancreatic cancer mortality rates, on the other hand, has either increased or held steady from 1955-2013 in all five countries. Esophageal cancer mortality rates decreased in Singapore and France while increasing in the US and Canada. Japan showed no real change. Regarding meat production, the following trend was observed. Total meat production was seen as to have increased for most countries, with the exception of Singapore. It should be noted some data for meat production from Singapore is not official, and is based on FAO imputation methodology.

Conclusion: The data presented here is a retrospective, descriptive analysis regarding meat production and GI cancer trends. Our data shows that there may be a relationship between the increase in meat consumption and pancreatic cancer and esophageal cancer mortality in some countries. In the cases of colon and gastric cancer, the mortality rates tended to decrease, contrary to the meat production trends, suggesting the increase in meat production isn’t affecting the mortality of these gastrointestinal cancers. However, some literature suggests red meat consumption may be linked to increased risk of colon cancer. Further research should be done into comparing meat consumption trends to cancer incidence to explore the possible connection between meat consumption and cancer risk.
**Background:** Robot-assisted laparoscopic surgery is a rapidly growing field within multiple surgical disciplines. With this relatively new technology, as compared to traditional video-based and also open surgery, arises the question about how to appropriately train surgeons in the dexterities and abilities needed to be effective, efficient, precise, and safe. An educational challenge with current robotic surgical technologies is the lack of readily available methods to simultaneously observe both the intracorporeal actions and the actual hand-movements of the surgeon at the surgeon console.

**Method:** The HMA is a free-standing camera with wireless connectivity to a video monitor. It is used to observe the hand motions of the surgeon in real time from a remote location. The HMA monitor is placed adjacent to the surgical video monitor allowing for concurrent viewing. This is particularly important in a training environment, allowing the trainer to better instruct the trainee on both intracorporeal and console-side techniques simultaneously. The current setup for the HMA is a single camera attached to the Surgeon Console of the Intuitive DaVinci Robotic Surgical System. However, the concept can be applied to other video-based surgical technologies as well.

**Results:** No results are available at this point. We are venturing into a new way of training and evaluating surgical residents as the technology and surgical approaches evolve.

**Conclusion:** During open and laparoscopic surgery, the trainer has wide view of both the operative field and the trainee hand motion allowing the trainer to provide real time feedback to all aspects of the operation (surgical steps, correcting movements, instrument handling, improvements in economy of motion, etc). With robotic surgery, simultaneous visualization of all aspects of the operation/education has proven to be a challenge. The HMA is a potential solution to such challenges, potentially improving the effectiveness of surgical education in such settings. The current concept has been employed at our institution and has had subjective success. Objective data regarding its effectiveness has yet to be gathered, which is the next important step in the development of this concept.
P 24. CHOOSING THE RIGHT PATH: A COST EFFECTIVENESS ANALYSIS OF ANTERIOR ABDOMINAL STAB WOUNDS.
AL Colonna, SM Stokes, A Jalali, BK Bellows, R Nirula, R Nelson
Presenter: Alexander Colonna MD, MSCI | University of Utah School of Medicine

Background: A multi-center randomized trial has proven the safety and efficacy of the Western Trauma Association (WTA) protocol for management of stable anterior abdominal stab wound patients. However, a cost effectiveness analysis to determine which of these strategies provides the greatest utility has yet to be performed. We hypothesized that a local wound exploration (LWE) protocol would be the most cost-effective strategy.

Method: A Markov microsimulation was developed to estimate the direct medical costs from a health care payer perspective and effectiveness (i.e., quality-adjusted life-years [QALYs]) of: i) Serial Abdominal Exams (SAE) for up to 24-hours, ii) LWE with a 12-hour observation period for positive tests, iii) Computed tomography (CT) scan with contrast, and iv) Diagnostic Laparoscopy (DL). Abdominal stab wound patients either received surgery or were discharged depending on the result of each strategy. The model accounted for surgical complications. Model probabilities were obtained from the literature or calculated from the National Surgical Quality Improvement Program. Cost and utility values were derived from the literature and from expert opinion when no published values were available. To examine parameter uncertainty, one-way and probabilistic sensitivity analyses (PSA) were performed.

Results: LWE was the most cost-effective strategy. CT scan cost $39,956 and yielded 7.16 QALYs. LWE cost $2,794 more than CT per QALY gained; SAE cost $2909 more than LWE per QALY gained. The sensitivity and specificity of each strategy had the greatest impact on the model in one-way sensitivity analysis; with total costs varying from $24,000 to $74,000.

Conclusion: LWE was the most cost-effective strategy in our analysis. Strategies with low specificity increase costs the most. The costs of readmission for missed injuries are considerable and therefore small incremental costs incurred from observation will reduce large readmission costs. Delayed recognition of anterior fascia penetration increases the risk of death which lowers the expected quality-adjusted life-years (QALY) resulting from each management approach.
P 25. EPIDEMIOLOGIC INVESTIGATION OF GUNSHOT WOUNDS FROM A LEVEL I TRAUMA CENTER
B Benton, D Watson, E Ablah, K Lightwine, H Okut, T Bui, R Lusk, JM Haan
Presenter: David Watson BS | University of Kansas School of Medicine – Wichita

Background: Little is known surrounding the demographic and geospatial factors of gun-related traumas in the Midwest Region. The purpose of this study was to examine the racial/ethnic disparities and geospatial distribution of gun-related traumas treated at a Level 1 Trauma Center in Kansas.

Method: A retrospective review was conducted of all patients 14 years or older who were admitted with a gunshot injury to a Level I trauma center between January 1, 2016 and December 31, 2017. Data collection included demographics, injury characteristics, hospitalization details and discharge disposition. Incident locations were used to generate maps, stratified by percent below poverty line, average household income, and race predominance.

Results: Among the 189 patients included, 49% were Caucasian, 24.5% were African American, and 19.6% were Hispanic/Latino. Most gunshot wounds (GSW) were due to assault (79.4%), with handguns accounting for 78.31% of injuries. Caucasians sustained the most accidental GSWs (27%), while African American (96%) and Hispanics/Latino (75.7%) patients sustained the most assaults. African American and Hispanic/Latino patients were also more likely to be admitted to the intensive care unit (ICU) (42% and 54.1% vs. 30.1%, p = .03, respectively) and experienced longer lengths of stay in the ICU than Caucasian patients (2.5 and 2.4 vs. 1.6, p=0.03, respectively). However, both African American and Hispanic/Latino patients were disproportionately represented in the study with African Americans comprising 11% and Hispanic/Latinos representing 13% of the study area population. No differences were noted regarding age, injury severity or mortality.

Conclusion: The findings of the study suggest that there are socioeconomic factors and racial disparities among patients who sustain GSWs. This study’s findings were consistent with national gun-violence trends that suggest young African American males are disproportionately affected by gun-related traumas. However, the study also suggests that Hispanic/Latino patients were disproportionately represented in the study population when compared to the surrounding population.
P 26. ECHOCARDIOGRAPHY AFTER PENETRATING CARDIAC INJURY: EVOLUTION OF MANAGEMENT
C Jiang, MY Lin, R Jhunjhunwala, J Nguyen, JS Carr, CJ Dente, RB Gelbard, RN Smith, K Williams, BC Morse
Presenter: Stuart Hurst MD | Emory University School of Medicine

Background: Transthoracic/esophageal echocardiography (TTE/TEE) is frequently performed for early detection of intracardiac structural defects after injury to the heart. Historically, TTE has been the primary modality to evaluate for these defects but TEE is becoming more widely available. The objective of this study is to evaluate the utility of routine echocardiography to detect abnormalities after cardiorrhaphy for penetrating cardiac injuries

Method: Patients that survived to reach the hospital with penetrating cardiac injuries were identified from the trauma registry of an urban, ACS level I trauma center from January 2000-December 2016. Patient demographic and outcomes data as well as intra/postoperative echocardiography findings were recorded. Data of patients who died prior to any therapy were excluded.

Results: Over the 16-year study period, 177 patients with penetrating cardiac injuries survived to reach the hospital. Of these, 68 (38%) had intra/postoperative echocardiograms (mean age 34.5 ± 14.6 years, 81% male, 72% gunshots), 46 (26%) patients died prior to echocardiography, and 63 (36%) were asymptomatic and had no echocardiography. Initial examination was performed using TTE [56 patients (83%); all postoperative] or TEE [12 patients (17%); all intraoperative]. TTEs were inadequate due to technical limitations in 22 (39%) of patients of which 12 (55%) underwent at least one additional echocardiogram (8 TEE and 4 TTE) and 10 (45%) had no clinical symptoms with no further evaluation. All asymptomatic patients had no injuries identified with either TEE or TTE. Furthermore, symptomatic patients (12/15, 80%) had injuries identified with either initial TEE or TTE; however, there were 3 injuries missed by the initial TEE in symptomatic patients that were detected by subsequent TEE.

Conclusion: Due to technical limitations and misinterpretation of findings, the role of routine postoperative TTE in asymptomatic patients after cardiac injury is limited. Conversely, intraoperative TEE seems to be a more efficacious study to identify abnormalities in both symptomatic and asymptomatic patients after cardiac injury.
Background: Morgagni hernias are rare congenital diaphragmatic hernias (CDH) that account for approximately 2% of all CDHs. Morgagni hernias are defects in the anterior diaphragm with herniation into the retro- or parasternal space. In neonates these frequently present with respiratory distress, pulmonary hypertension, and pulmonary hypoplasia whereas adults are usually asymptomatic. This video demonstrates the laparoscopic repair on a patient with bilateral Morgagni hernias. The patient was incidentally diagnosed after a CT scan was completed for right lower quadrant pain. The CT demonstrated bilateral lower lobe atelectasis as well as displacement of the cardiac mass due to the hernia contents.

Method: After pneumoperitoneum was established and port placement complete, laparoscopy confirmed a large defect in the left and small defect in the right hemidiaphragm. The left hernia contained colon, small bowel, and omentum. After reduction of contents, the left hernia sac was circumferentially excised using an Enseal. Laterally, the defect was amendable to partial primary repair using 0-Ethibond sutures. The remainder of the defect was not amendable to primary repair thus 2mm ePTFE DualMesh was utilized. Using 0 and 2-0 Ethibond, the mesh was secured extracorporeally to the diaphragm laterally, and the crus medially. Anteriorly, the mesh was anchored to the rectus fascia utilizing a subcostal skin incision and a Carter-Thomason needle. The small defect on the right was repaired in a similar fashion.

Results: This intraoperative video demonstrates a technique for the multiple elements involved in repair of a Morgagni hernia. Hernia content reduction and excision of the hernia sac are performed as with most types of hernias. Careful attention is paid to the surrounding pleura as to avoid entry into the pleural space causing a capnothorax. Once the sac is excised, the defect may be closed primarily where amendable ensuring closure in a tension free fashion. The remaining defect may require prosthetic mesh to allow a tension free repair, such as in the case presented. With anterior diaphragmatic hernias, the anterior leaflet of the mesh can be anchored to the anterior abdominal wall with use of subcostal incisions and the Carter-Thomason needle.

Conclusion: Morgagni hernia repair poses several distinct challenges. One of the major challenges with these repairs is adequate anchoring of the mesh to the anterior abdominal wall. When no rim of diaphragm is present, utilization of a subcostal skin incision allows a suture to be passed through the abdominal wall and through the mesh, and then secured anterior the anterior fascia. A Carter-Thomason needle is well-suited for use in this repair and is usually readily available. Post-operatively, the patient presented in this video recovered well. He was discharged on post-operative day three after pain was well controlled and he was tolerating a regular diet. Follow-up chest X-ray showed a normal cardiac silhouette without evidence of re-herniation.
Background: Splenic hemangiomatosis is a rare entity, where multifocal or diffuse splenic hemangiomas develop throughout the organ. It is most often described as part of a systemic disorder, including Klippel-Trenaunay syndrome, Proteus syndrome, Kasabach-Merritt syndrome, diffuse neonatal hemangiomatosis, or PHACES syndrome. It can result in spontaneous splenic rupture, as well as coagulopathy from thrombocytopenia. Splenectomy can be curative. Isolated splenic hemangiomatosis is rare. Most often, splenic hemangiomatosis occurs tandemly with other organs, such as the liver, bone, and brain.

Method: 49-year-old Hispanic woman presented with left upper quadrant abdominal pain with progressive ipsilateral shoulder discomfort. Abdominal ultrasound revealed multiloculated cysts within the spleen. CT revealed splenomegaly with elevation of the diaphragm. She was referred for surgical consultation. On examination, her spleen was palpable at two fingerbreadths below the costal margin. Splenectomy was deemed appropriate and was performed without complication. Her postoperative course was unremarkable, and she was discharged on hospital day four. Her preoperative symptoms completely resolved. Histologic exam confirmed a diagnosis of splenic hemangiomatosis. Microscopic exam demonstrated diffuse cysts lined by bland endothelium with no evidence of malignant degeneration. Vascular and lymphatic stains were performed with CD31, which was positive, and D2-40, which was negative.

Results: The spleen in splenic hemangiomatosis has a lobulated gross appearance, but sectioning shows multiple cystic structures of varying sizes, surrounded by normal parenchyma. Cysts may be filled with serous fluid or blood. The hemangiomatosis is diffuse and may replace a majority of the spleen. Microscopically, cysts are lined by bland endothelial cells with walls composed of fibromuscular tissue. As the pathologies in the differential diagnosis can have similar appearance on CT scan, pathologic and immunohistochemical analysis is required to confirm the diagnosis. To differentiate splenic hemangiomatosis from lymphangiomatosis, immunohistochemical stains for vascular (CD31) and lymphatic (D2-40) markers should be performed. In splenic hemangiomatosis, the endothelial cells are positive for CD31 and negative for D2-40, while in lymphangiomatosis the endothelial cells are positive for both. Complications of hemangiomatosis include hypersplenism, rupture, and malignant degeneration. However, it is often asymptomatic, so risk of operative intervention must be weighed against potential benefits.

Conclusion: Splenic hemangiomatosis is a rare pathology that most commonly presents as part of a systemic disorder such as Klippel-Trenaunay, Proteus,
or Kasabach-Merritt syndrome. This patient presented with symptomatic splenomegaly due to isolated splenic hemangiomatosis. Splenectomy was curative. Pathologic exam and immunohistochemical analysis confirmed the diagnosis. The patient presented has no evidence of systemic hemangiomatosis, and appears to be a novel presentation of isolated splenic hemangiomatosis, which is not well described in the literature.
Background: Cardiac herniation and subsequent dextrocardia is an uncommon and often fatal event. This is a case of a 42 year old male who sustained high-energy blunt force trauma from a sky diving accident. He was found to have traumatic pericardial rupture with associated dextrocardia which was repaired surgically.

Method: That patient is a 42yo male sky diver who was blown into a building by a gust of wind CT scan performed at outside facility revealed diaphragmatic rupture with bowel herniation and acute right heart deviation. On arrival he became hypotensive and underwent laparotomy with reduction of the diaphragmatic hernia. Hypotension worsened and a sternotomy was performed with reduction of the cardiac herniation resulting in improved hemodynamic status. Bovine patch repair of the pericardium and diaphragm were then performed. Other injuries included splenic laceration, multiple rib fractures and orthopedic injuries which were addressed during his hospital stay. He was discharged to rehab in stable condition. A thorough pubmed search was performed with the following key terms: traumatic pericardial rupture, traumatic dextrocardia, traumatic cardiac herniation.

Results: Traumatic pericardial rupture with associated dextrocardia is a rare and often fatal injury. In patients that do not expire prior to hospital arrival, early identification is key to survival. Distinguishing traumatic dextrocardia from situs inversus on CT scan lies in location of the aorta relative to the heart and the position of the ventricular septum. Torsion at the aortic root causes outflow obstruction and atrial compression resulting in hypotension, cardiac ischemia and arrhythmias which progress to death if not addressed. Surgical approach can be performed by sternotomy or thoracotomy, key principles include return of the heart to its anatomical position and repair of the pericardium by patch or suture.

Conclusion: While cardiac herniation and subsequent dextrocardia are very uncommon, a high index of suspicion should still be placed on patients who have sustained significant blunt force trauma to the chest. Early recognition and surgical intervention are key to improved survival for these patients.
P 30. SUPERIOR MESENTERIC ARTERY ABSENCE AND THORACIC ORIGIN OF THE CELIAC AXIS IN AN ASYMPTOMATIC ADULT: A CASE REPORT
KM Watkins, JL Gierman
Presenter: Sigrid Johannesen MD | University of Oklahoma Health Sciences Center

**Background:** The majority of human small bowel, parts of the colon and the pancreas are supplied by the superior mesenteric artery (SMA), a large branch off of the descending aorta. While collateral circulation exists in the small bowel mesentery, the SMA is important for the development and maintenance of small bowel and its function. The failure of this artery to develop could mean inadequate small bowel, typically noticed in neonates due to its devastating consequences.

**Method:** We present a 67-year-old male with a congenitally absent SMA. He presented to the Emergency Department days after a cardiac catheterization with groin pain. An angiogram of his lower extremity was performed, showing normal vasculature at the level of his femoral access site; however, there was a questionable aneurysm of the inferior mesenteric artery (IMA). Further imaging revealed complete absence of the conventional SMA and celiac trunk with a tortuous celiac axis originating from the descending thoracic aorta with branching into the upper abdomen. The IMA was compensatorily dilated with a collateral loop to the celiac trunk. No bowel abnormalities were identified, including a normal appendix. The patient denies any symptoms of abdominal pain and reports no history of bowel nor other abdominal surgeries.

**Results:** Aberrant arterial anatomy can cause certain congenital anomalies such as intestinal atresia. Our patient exhibits asymptomatic absence of an SMA and celiac artery axis origin in the thoracic cavity. Complete absence of the SMA in an adult patient without short gut or other intestinal issues is rare. The absence of this artery has implications when discussing abdominal surgeries such as pancreatic, colonic or small bowel resections. SMA absence and collateral from the IMA means an injury to or ligation of this compensatory vasculature would be devastating. It is important to think about coverage of this artery during abdominal aortic aneurysm repairs. The origination of the celiac trunk in the thoracic cavity also has implications for esophageal or hiatal hernia surgery. The variations in arterial anatomy in this patient illustrate the importance of preoperative imaging for resections of intraabdominal organs and supports imaging of vascular anatomy prior to foregut surgery.

**Conclusion:** Absence of an SMA can cause major issues and it is hypothesized that most embryos would not survive without this artery due to the large segment of bowel it supplies. Anatomic variants to this vasculature exist and are important to be noted prior to surgical interventions on these patients as injuries to these arteries could lead to disastrous consequences.
Background: Spontaneous pneumomediastinum is an uncommon diagnosis, accounting for 1 in 30,000 – 40,000 emergency department visits. Thought due to the Macklin effect, disruption of the alveolar membrane that allows gas to enter the perivascular space, the exact causes of individual disruptions are rarely ascertained. Dyspnea and chest pain are the most common symptoms, and it is largely self-limited, usually requiring no medical or surgical intervention. This retrospective case review from a single, tertiary care facility investigated the work-up and outcomes of 21 patients presenting with atraumatic pneumomediastinum with a special interest in cases presenting with compromise of the aerodigestive pathways.

Method: All patients admitted to the hospital between 2012-2017 with a diagnosis of pneumomediastinum were identified. We then performed an extensive chart review of each case and extracted all data regarding work-up, diagnosis, treatment, and outcomes of the pneumomediastinum. Exclusion criteria included traumatic causes of pneumomediastinum, as well as all cases of isolated subcutaneous emphysema without evidence of pneumomediastinum. All patients who met the inclusion criteria were then placed in a depersonalized database prior to outcome analysis.

Results: Our query returned 94 cases of interstitial emphysema. Thirty-six patients were excluded due to a lack of records within the EMR. Thirty-seven were directly attributable to trauma, most often motor vehicle collision. Twenty-one cases of atraumatic pneumomediastinum remained for analysis. Fifteen patients were male, with a median age of 18 years old. The median hospital stay was 3 days, with 3 cases resolving by the end of their stay. Additional chest x-rays were performed in 19 of the patients identified, CT scans of the chest were performed in 15 patients, and barium esophagram was performed in 13 patients. Esophagogastroduodenoscopy was performed on one patient, with no identified esophageal injury. Operative intervention was not required on any of these patients. Twenty of the patients were discharged home with close follow-up. One inpatient died from causes unrelated to pneumomediastinum. There were no cases of tracheal or esophageal rupture identified in this series.

Conclusion: Our findings correlate well with the current literature, confirming spontaneous pneumomediastinum as a rare event that is most often benign and self-limited. Although injury to the aerodigestive tract is rare, it is associated with significant morbidity and mortality to the patient and thus requires immediate
and thorough evaluation. Improved imaging technology has increased admissions of patients with a diagnosis of pneumomediastinum without true aerodigestive tract injury. This often leads to longer inpatient stays and additional testing to rule out underlying pathology. We conclude that the most effective approach focuses on symptoms and signs of aerodigestive tract compromise in addition to imaging. When early workup leads to a low suspicion of such etiologies, the likelihood of significantly negative outcomes is low enough to allow for discharge.
P 32. PROXIMAL HUMERUS FRACTURES IN THE ELDERLY: CONCOMITANT FRACTURES AND MANAGEMENT  
K Zachariasen, E Ablah, K Lightwine, JM Haan  
Presenter: Kelly Zachariasen MD | University of Kansas School of Medicine – Wichita

**Background:** There has been little research on non-operative treatment and concomitant injuries in elderly patients who sustain a proximal humerus fracture. This study’s purpose was to evaluate patients 65 years or older with a proximal humerus fracture. Simultaneous fractures and discrepancies in patient management with regard to type of treatment provider were identified.

**Method:** A retrospective chart review was conducted of patients 65 years or older who sustained a proximal humerus fracture at an ACS-verified level I trauma center between January 1, 2001 through December 31, 2015. Data collection included demographics, injury and treatment details, associated fractures, initial imaging obtained, hospitalization details, and disposition.

**Results:** Among the 143 patients meeting inclusion criteria, 45.5% had a concomitant fracture, most frequently at the ipsilateral hip (15.4%, n= 22) or upper extremity (13.3%, n=19). Patients with concomitant fractures had higher ISS (8.3 ± 3 vs. 6.4 ± 3, p<0.001) and were more likely to be discharged to a rehabilitation center (22% vs. 8%, p=0.014) than patients with isolated fractures. Fifty-two percent of patients were managed by a trauma team and 48% by a non-trauma team. Although patients injured in a MVC were more likely to be managed by a trauma team, there were no differences in operative rates, concomitant injuries, length of stay or discharge disposition in regard to team management. However, those managed by a trauma treatment team had a higher ISS (8.0 ± 3 vs. 6.4 ± 3, p=0.003) and had twice as many imaging studies performed than did patients managed by non-trauma management teams.

**Conclusion:** Concomitant fractures are common in elderly patients who suffer a proximal humerus fracture and those treated by a trauma team are more likely to receive more images than those treated by non-trauma teams. It is important to recognize proximal humerus fractures as a sign of fragility and realize the frequency of additional fractures in order to optimize management of these patients.
P 33. BITES TRIAL: A FEASIBILITY STUDY FOR A RANDOMIZED CONTROLLED TRIAL TO DETERMINE THE EFFECTIVENESS OF FASCIAL CLOSURE TECHNIQUE TO DECREASE POSTOPERATIVE COMPLICATIONS

CR Gates, GM Berg, DL Acuna, KB Vincent

Presenter: Clint Gates MD | University of Kansas School of Medicine – Wichita

Background: Completing an expensive multi-center, randomized controlled trial is a labor-intensive process and resources may be limited, particularly when not performed at a large academic center. However, many surgeries are completed everyday in settings where research is difficult to perform. These are missed procedures that could be tracked, entered into a database, and studied. The aim of this study is to determine the feasibility of performing a large-scale, multi-center, randomized controlled trial at a hybrid-type general surgery residency program. The main clinical outcome of interest is ultrasound detected incisional hernia following small bite versus large bite suture technique for fascial closure.

Method: This study was a pilot grant funded, multi-center, randomized controlled pilot and feasibility study for 100 participants. Study coordination was planned to be in-kind and local to surgery offices. Adult patients undergoing surgery at two hospitals were eligible. Exclusion criteria included: previous incisional hernia or fascial dehiscence, pregnant, BMI over 50, laparotomy within 1 year, moribund, systolic blood pressure <90mmHgb, and ASA ≥ 4. Participants were randomized to large bite or small bite closure type in the OR. Postoperative ultrasound was performed at one year by radiologists blinded to the type of closure. Clinical and feasibility findings were summarized with descriptive statistics using means (standard deviations) and frequencies (percentages) as appropriate. Full scale study projections were predicted based on successful participant completion rate.

Results: Fifty participants were enrolled in 10 months. 33 participants had completed surgery data, their mean age was 56.6 years and 14 were male. The mean incision length (cm) was 18 and 14.3 for small and large bites groups, respectively. Mean stitches per incision were 2.2 for small bites and 1.2 for large bites group. Suture length/wound length ratios were 3.8 and 4.5 for the small and large bites respectively. 19 participants completed the one-year ultrasound, 8 and 11 participants in the small and large bite groups respectively. There was only 1 incisional hernia (small bite group). It took ten months to enroll half (50/100) of the expected participants; thus new participant enrollment was terminated. Enrollment via surgeon offices was not successful as originally planned and a study coordinator was hired to increase enrollment.

Conclusion: This was a time and resource intensive pilot study which ultimately required paid dedicated study personnel for enrollment success. To expand this pilot study to a full scaled sample size appropriate study would require a full-time study coordinator with access to the OR schedule and patient records as well as large grant funding. Depending on in-kind resources would not likely result in a successful and timely study.
P 34. SYMPTOMATIC TYPE IV PARAESOPHAGEAL HERNIA
JM Davis, GS Chow

Presenter: Joshua Davis MS4 | University of Oklahoma College of Medicine – Tulsa

Background: Epidemiological data estimates hiatal hernias affect over half of individuals over 50 years old. They are anatomically classified and can be understood by location of the gastroesophageal junction (GEJ): Type 1 GEJ above diaphragm, Type 2 GEJ below diaphragm, Type 3 mixed, Type 4 herniation of other abdominal structures. The pathophysiology involves widening of esophageal hiatus and laxity of the phrenoesophageal membrane. Possible symptoms include dysphagia, odynophagia, early satiety, bowel obstruction, GERD, and respiratory distress. Operative intervention is based on size and severity of symptoms. Laparoscopic approach is superior to transthoracic and open transabdominal repair in both morbidity and mortality.

Method: An 88-year-old woman with longstanding type IV paraesophageal hernia (PEH). She experienced interval increase in hernia size over 3 month period as seen on CT with likely associated GI respiratory, and cardiovascular symptoms. She was restricted to pureed diet with chronic intermittent GI obstruction, had tachypnea with a respiratory rate >30. ABG pre-surgery demonstrated chronic respiratory alkalosis. EKG changes within 3 months showed new onset dysrhythmia. Patient and her son were interested in proceeding with surgery. PEH repair was performed with a Dor fundoplication, the esophageal hiatus was closed with a relaxing incision and biologic mesh. The fundoplication subsequently required revision due to decreased emptying evidenced by upper GI study. Post-Surgical ABG normalized. Post operative EKG demonstrates sinus rhythm. Pre and post-op CXR.

Results: Laparoscopic operative approach is preferred in PEH repairs as it is associated superior patient outcomes, particularly in older patients. After operative reduction of hernia contents, the esophageal hiatus must be approximated and secured to prevent recurrence. In our patient, her respiratory and cardiovascular physiology was immediately improved following reduction of her hernia. Patients with decreased gastrointestinal motility may require less aggressive or, in our patient’s case, no fundoplication procedure. Biologic mesh is frequently used in the hiatal closure to add strength to a tense closure, and ensure good approximation and reinforcement. Mesh significantly decreases short term PEH recurrence at <5 years but has not shown long term benefits.

Conclusion: A fundoplication anti-reflux procedure is typically preformed with PEH to treat concomitant reflux and in order to further secure the esophageal hiatus. A Nissen fundoplication is typically used, but a less aggressive wrap may be used in patients with ineffective motility. A Dor fundoplication consists of an anterior 180° wrap. Hiatal hernias form from laxity of the structures that surround the esophagus at the diaphragmatic junction and are a common physiologic variant of aging. Symptomatic hiatal hernias require repair and best outcomes have been demonstrated using a laparoscopic approach. Biologic mesh can be used to reinforce the hiatal repair, but have minimal benefit regarding long-term PEH recurrence.
P 35. METABOLOMIC SIGNATURE IN THE SERUM OF PATIENTS AFTER LONG BONE INJURY AND REAMING
J Dunn, H Ibrahim, O Alnachoukati, T Chapin, T Schroeppele, EP Ryan
Presenter: Julie Dunn MD | University of Colorado Health North

Background: Trauma initiates a systemic inflammatory response involving many uncharacterized small molecule mediators. The contribution of inflammatory molecules from marrow released after long bone fractures in blood merit investigation. This pilot study evaluated the serum and marrow metabolome of patients before and after marrow reaming in long bone fractures.

Method: Fifteen patients with femoral and tibial fractures were identified. Pre-ream blood samples were taken immediately after consent. Bone marrow was taken at the time of reaming and blood immediately post-ream. Serum and marrow metabolites were extracted and analyzed by ultrahigh performance liquid chromatography-tandem mass spectroscopy (UPLC-MS/MS). Biochemical identifications were completed and median scaled relative abundances compared by paired two-sample t-tests, with significance determined at p≤0.05.

Results: 15 pre- and post-ream blood samples and 15 bone marrow samples were processed to yield a total of 1259 compounds (991 known identity and 268 unknowns). There were 304 metabolites with statistically significant changes across chemical classes. Fatty acids and ceramides were elevated in post-ream samples when compared to pre-ream, whereas diacylglycerols declined. There were decreased metabolite abundances from the tryptophan metabolism pathway, whereas cysteine metabolism was higher, and there were signals of bone matrix remodeling compounds. Of the 657/738 metabolites, 81 were unique to bone marrow, and analyzed for presence in the serum.

Conclusion: This study is the first identification of a serum and marrow metabolite signature by long bone fractures and reaming in patients. Changes in tryptophan metabolism may serve as a marker of trauma inflammation, whereas changes in cysteine be linked to altered redox balance.
Background: Current data suggest trauma patients arriving via private vehicle transport (PVT) have improved outcomes compared to patients arriving via EMS. Though some researchers have speculated that this may be due to a quicker arrival to the hospital, this study hypothesizes that PVT may actually lengthen the time to care and impair resuscitation efforts due to the lack of pre-hospital preparation/triage leading to delayed mobilization of teams, patient drop-offs at the wrong location, more frequent transfers to another facility, and the transport of patients who may have otherwise been declared dead on scene.

Method: This is a single-site retrospective study that was conducted at an academic, regional Level 1 Trauma Center in Detroit from 2013-2017. Inclusion criteria were trauma patients presenting to the hospital utilizing PVT that were admitted, died in the emergency department, or transferred out of hospital. Exclusion criteria includes patients transferred from outside hospitals. Patients with the same inclusion and exclusion criteria utilizing EMS were the comparison group (N=4997, PVT n=1782). The data were obtained from a trauma registry and chart review. To describe statistical significance (p<0.01), chi-square tests were utilized for nominal data and independent samples t-tests were utilized for continuous data.

Results: In total, 36% of trauma patients utilized PVT. The overall rate of transfer out of the hospital was 11% with the vast majority (76%) being burn or pediatric patients. More than half of the patients (60%) who subsequently required transfer out of the hospital arrived by PVT, which was statistically significant when compared to patients arriving by EMS. Additionally, 1% of patients arriving by PVT and 4% of patients arriving by EMS were pronounced DOA, which was statistically significant. Examining all patients who were admitted to the hospital, there was no significant difference for time from arrival to hospital to time patient left the emergency department between PVT and EMS groups (6 hours, n=4273). However, when examining only trauma patients activated at the highest level, the average time to disposition was significantly longer for patients arriving by EMS (5 hours) than PVT (3 hours, n=610).

Conclusion: This study hypothesized that PVT delays overall time to care. Though the hypothesis is supported by the significantly higher number of patients who arrived by PVT requiring transfer out of our hospital, contrary to the hypothesis there was a significantly lower time to disposition in patients of the highest activation level and less patients who were pronounced DOA. Previous studies demonstrated patients with injury to the torso or head, poly-trauma, higher injury severity and found to be in more critical condition on arrival were more likely to utilize EMS transportation. This may account for the greater number of patients found DOA and a longer time to disposition due to a greater need for diagnostic studies prior to disposition, however further research is needed.
P 37. THE HIDDEN COST OF HIGHWAY CONSTRUCTION
L Nguyen, M Mrdutt, R Frazee
Presenter: Lucia Nguyen MD | Baylor Scott and White Healthcare

Background: Motor vehicle collisions are the leading cause of trauma deaths in individuals age 1 to 65, conveying significant financial and social burden. In 2012, the Texas Department of Safety embarked on a 9.6 mile construction project to expand Interstate-35 (I-35) in Bell County from four to six lanes. Highway construction (or ‘work-zones’) alter normal traffic patterns by narrowing and creating fewer lanes. These changes produce conditions that increase the potential for work-zone crashes. We postulate the I-35 expansion would increase the number of work-zone crashes in Bell County and convey hidden social and financial burden to motorists in Bell County.

Method: A retrospective analysis of Texas Department of Transportation (Tx-DOT) statistics was performed by year in Bell County from 2010-2016 focusing on Work Zone crashes. The pre-construction period was defined as 2010-2011. The construction period was defined as 2012-2016. Varying work zones crash severities were defined per Tx-DOT terminology: fatal; incapacitating; non-incapacitating; possible and non-injury. Chi-squared and Mann Whitney test were used for statistical analysis.

Results: The total number of crashes between pre-construction period and construction period did not change (p=0.1). The percentage of crashes in Bell County occurring in or related to a work zone has increased since starting construction in 2012 (2010: 2.2%, 2011: 2.3%, 2012: 6.4%, 2013: 12.4%, 2014: 19.0%, 2015: 16.1%, 2016: 13.4%), with a peak in 2014. Pre- and construction period percentage of WZ crashes differ (2.2 vs 13.5%, p<0.0001). Similar trends exist for WZ crashes of various severity subtypes (p<0.0001) except for fatal WZ crashes (p=0.4).

Conclusion: An increase in Bell County work-zone crashes and injuries has occurred since I-35 construction started in 2012. This represents a marked social impact, along with the financial burden due to increased need for in-the-field care, pre-hospital transport, hospital care and days of missed work. Despite current safety precautions, the quantity of work zone crashes have been overlooked. Future work is needed to correlate local trauma registry data with work-zone fatalities and injuries, create awareness amongst local and state law enforcement, elected officials, and the public.
P 38. VENOUS THROMBOEMBOLISM TESTING PRACTICES AFTER ORTHOPAEDIC TRAUMA: PATIENT FACTORS MAY INCREASE RISK FOR SURVEILLANCE BIAS

BE Haac, NN O’Hara, TT Manson, GP Slobogean, H Johal, R Castillo, R Van Besien, PZ Berger, GB Reahl, D Marinos, Y Degani, D Mascarenhas, D Connelly, TM Scalea, RV O’Toole, DM Stein

Presenter: Bryce Haac MD | University of Maryland Medical Center

Background: Orthopaedic trauma patients are at high risk for venous thromboembolism (VTE), and there is ongoing debate over which prophylaxis regimen is best in this population. In order to compare effectiveness of the available regimens, we must first understand the role of surveillance bias in VTE testing rates since increased testing is associated with increased events. We sought to determine VTE testing patterns in an orthopaedic trauma population and to evaluate for differences in VTE surveillance by prophylaxis regimen.

Method: We performed a secondary analysis of the ADAPT (A Different Approach to Preventing Thrombosis) unblinded randomized clinical trial. The trial included adult (age > 18 years) trauma patients presenting to a level-1 trauma center with an operative extremity fracture proximal to the metatarsals/carpals or any pelvic or acetabular fracture requiring VTE prophylaxis. 329 enrolled patients were randomized to receive aspirin 81mg BID (n=165) or low molecular weight heparin (LMWH) 30mg BID (n=164) for VTE prophylaxis. Patients were followed for 90 days post-injury and all VTE imaging studies were recorded. Percent of patients tested for VTE were compared between treatment groups using a Fisher’s exact test. Subsequently, multivariable regression was used to determine patient factors significantly associated with risk of receiving a VTE imaging study.

Results: 67 patients (20.4%) had VTE tests ordered during the study period. 20 (29.9%) out of these 67 patients with ordered VTE imaging tests had a positive finding. There was no difference in proportion of patients tested for VTE by prophylaxis regimen (18.8% on aspirin vs. 22.0% on LMWH, p=0.50). Factors associated with increased likelihood of VTE testing included white race (adjusted odds ratio (aOR): 2.61, 95% CI: 1.26 – 5.42), increased injury severity score (aOR for every 1-point increase: 1.10, 95% CI: 1.05 – 1.15) and lower socioeconomic status based on the Area Deprivation Index (aOR for every 10-point increase: 1.14, 95% CI: 1.00 – 1.30).

Conclusion: VTE surveillance did not significantly differ by prophylaxis regimen. This should reassure clinicians designing larger randomized trials aimed at comparing effectiveness of these regimens. On the other hand, patient demographic factors including race, injury severity and socioeconomic status were associated with differences in VTE surveillance.
P 39. MODERN MANAGEMENT OF EXTREMITY VASCULAR TRAUMA: CAN WE BYPASS THE VASCULAR SURGERY CONSULT?

CK McCarthy, JL Gierman, TX Garwe, Z Sarwar, CE Jones, JC Wilkinson, BC Axtman, MK Lindemuth, RM Albrecht, AM Cross

Presenter: Cullen McCarthy MD | University of Oklahoma Health Sciences Center

Background: While trauma surgeons (TS) are equipped to handle extremity vascular trauma (EVT), we hypothesize that mechanistic or anatomic considerations prompt consultation of vascular surgeons (VS). Further, the outcomes of EVT are based primarily on those considerations and not on surgical service performing the operation.

Method: A retrospective cohort study of patients > 18 years old treated for EVT at a level 1 trauma center from 2007-2016 was undertaken. The exposure of interest was type of surgical service (VS versus TS). Vascular injury patterns (type and location) and vascular complications were compared between the two groups. Covariates compared included sociodemographic, comorbidity, physiologic factors, overall ISS and MESS scores, and interventions.

Results: A total of 163 patients underwent an operative intervention with 70% (114/163) of the operations performed by TS. There was no significant (p>0.05) difference in the distribution of sociodemographic, physiologic data, and overall ISS and MESS scores. A trend towards disproportionately more VS involvement with blunt, axillary, and below knee popliteal injuries was noted. Complex arterial bypasses and fasciotomies were more likely to be performed by VS (p <0.05). Vascular complications were similar between the two groups (11% in TS vs 15% in VS, p=0.4038) even after adjusting for location of vascular injury (below vs above the knee) [p=0.4134].

Conclusion: VS consultation in EVT is based primarily on mechanistic and anatomic considerations. Vascular complications following EVT is independent of surgeon specialty training and anatomic location. Further large-scale investigation into national trends of EVT management is needed to confirm these findings.
P 40. A CONTEMPORARY ANALYSIS OF DELAYED DIAGNOSES AFTER TRAUMATIC INJURY: THE ROLE OF OPERATIVE THERAPY
JS Hatchimonji, AE Garcia Whitlock, EJ Kaufman, LW Ma, CE Sharoky, DN Holena
Presenter: Justin Hatchimonji MD | University of Pennsylvania

Background: Despite the introduction of the tertiary survey nearly 30 years ago, delayed injury diagnosis (DID) remains a challenge. Delay in diagnosis should be avoided, as it has been shown to result in delays in treatment and operative intervention. Increased injury severity and altered mental status at presentation are associated with missed injury, but other contributors are unknown. We sought to characterize patient factors associated with DID. We hypothesized that injuries would be missed more often in patients with severe injuries and poor mental status.

Method: We merged registry data from our urban Level I trauma center from 2007-2018 with institutional performance improvement records, in which every delay in diagnosis is documented. Our primary outcome was DID, defined as an injury diagnosed a) after tertiary survey or b) after definitive surgical treatment, but before discharge. Children (age<18 years) and burn patients were excluded. We evaluated patient demographics, mechanism, and measures of mental status and injury severity. Factors found to be associated with DID (p<.2) on univariate analysis were included in the final forced-entry multivariable model. Descriptions of DID injuries were also categorized to highlight common characteristics of these injuries.

Results: In total, we included 12,773 patients in the analysis, 89 (0.7%) of whom had a recognized DID. Factors associated with DID on univariate analysis included age, sex, injury mechanism, transfer status, increased Glasgow Coma Scale (GCS) motor score, increased Injury Severity Scale (ISS), increased number of injuries, and whether the patient underwent any operative intervention. In multivariable analysis, increased GCS motor score (OR 1.18 per point, 95% CI 1.03-1.36), increased ISS (OR 1.03 per point, 95% CI 1.01-1.05) and increasing number of injuries (OR 1.08 per injury, 95% CI 1.04-1.11) were associated with DID. Patients undergoing an operation had more than twice the odds of a delay in diagnosis of an additional injury (OR 2.65, 95% CI 1.58-4.43) compared to patients managed non-operatively. The most common category of DID was orthopedic extremity injury (22/89).

Conclusion: In our institution, DID was associated with increased injury severity, increased GCS motor score, and operative intervention for a separate injury. This suggests that the presence of an injury requiring operation, at times prior to obtaining imaging, may be enough to distract the trauma team from additional injuries, leading to DID. The most common injuries that contribute to DID are extremity orthopedic injuries.
Background: Drowning is a major public health hazard worldwide and claims 372,000 lives every year. Despite this, drowning victims are rarely found to have traumatic injuries and may not warrant a trauma activation. This study examined injuries and interventions performed on this population to assess the need for the trauma team activation with all fatal and non-fatal drowning victims.

Method: A retrospective chart review was conducted on all fatal and non-fatal drowning victims who presented as Level 1 or Level 2 traumas to a level I trauma facility from 2005 through 2017 and underwent a trauma work-up upon presentation. Data collection included demographics (age, gender, race), injury characteristics, interventions, pulmonary complications, imaging, and outcomes (hospital length of stay, ICU admission and length of stay, mechanical ventilation and ventilator days, mortality, and disposition).

Results: A total of 43 patients met inclusion criteria. The median age for patients was 6 years (range 2-20), with 27.9% of patients under the age of 2 years. The majority of patients were white (62.8%) males (69.8%), and had a median GCS score of 3 (60.5% had GCS of 3 and 25.6% had GCS of 15). Anoxic brain injury was present in 11 patients (25.6%). Only 3 patients had traumatic injuries. One patient had multiple injuries and the other 2 patients had isolated injuries (1 concussion and 1 clavicle fracture). The most common pulmonary complication was pulmonary edema (11.6%). The overall mortality was 48.8 % (n=21) among the patients; 7 patients died prior to arrival, 6 died in the ED, and 8 died in-hospital. Consults were obtained in one third of patients (34.9%); however, care was never transferred to another service.

Conclusion: Patients who present with the sole mechanism of drowning or near drowning have a very low rate of traumatic injuries. Work-up and treatment would be appropriate for emergency physicians without the need for a trauma activation.
P 42. URETEROSCOPIC LASER LITHOTRIPSY IN THE TREATMENT OF URETERIC STONES
MM Thway, SL Ngin, M Than, KZ Hlaing
Presenter: Min Thway MD | University of Medicine 1, Yangon, Myanmar

**Background:** Laser technologies are established standard modalities for application on lithotripsy. The introduction of the Ho: YAG laser have broadened the indications for ureteroscopic stone management (URS) to include larger stone size throughout the whole upper urinary tract. Ureteroscopy has evolved the most minimally invasive approach to the ureter and kidney. Furthermore, recent development in the design of ureteroscopic and endoscopic instruments has enabled the URS to replace the open surgery treatments for urinary calculi over the last decade as a minimally invasive modality Ho: YAG.

**Method:** The study was hospital based prospective study which was carried out in Department of Urology, Yangon Speciality Hospital during one year period from 1st January to 31st December, 2016. Total 45 patients were treated with semi-rigid Ho: YAG laser lithotripsy. URS was done with Karl Storz laser machine and Karl Storz semi-rigid ureteroscope. Demographic factor of the patients with ureteric stones, complications of URS laser lithotripsy within one month, the requirement for the auxiliary procedure, retreatment after the procedure and stone clearance rate were evaluated.

**Results:** Overall stone clearance rate was 95.56%, no retreatment rate, requirement for auxiliary procedure (ESWL as alternative) was 4.4%. Mean procedural duration was 27.64 minutes and mean post-op hospital stay was 3.8 days. Effectiveness Quotient was 91.49%.

**Conclusion:** Semi-rigid ureteroscopy using holmium laser is safe and effective option for treatment of ureteric stones. The use of the Ho: YAG laser appears to be an adequate tool to disintegrate ureteric calculi independent of primary location. The results demonstrated that the holmium YAG laser has high overall stone clearance rate and low morbidity.
P 43. NAILED IT!: CHALLENGES IN MANAGEMENT OF PUNCTURE CARDIAC INJURIES
SD Hurst, LR Matthews, MY Lin, C Jiang, J Nguyen, BC Morse
Presenter: Stuart Hurst MD | Emory University School of Medicine

Background: As a subset of stab wounds, puncture wounds are a rare cause of penetrating cardiac injuries. In comparison to stab wounds, there is growing evidence that these small caliber puncture injuries can be managed without standard cardiorrhaphy. The objective of this study is to evaluate the management of puncture cardiac injuries.

Method: Patients that survived to reach the hospital with penetrating cardiac injuries were identified from the trauma registry of an urban, ACS level I trauma center from January 2000-September 2008. Patient demographic and outcomes data were recorded. Data of patients who died prior to any therapy were excluded.

Results: Over the study period, 177 patients with penetrating cardiac injuries survived to reach the hospital and, of these, two patients (1%) presented with penetrating cardiac injuries resulting from pneumatic nail guns with an impaled foreign body in the heart. In 2008, Patient 1 (46 yo male) presented with a nail impaled in his chest. Patient had a positive FAST in the pericardium, EKG abnormalities and was taken emergently to the operating room (OR) for median sternotomy and cardiorrhaphy. Patient 2 in 2018 (34 yo male) presented with nail impaled in the left thoracoabdomen near the left costal margin. Patient underwent CT chest/abdomen which showed the nail terminated approximately 1 cm from heart with approximately 30 mL of hemopericardium. The nail was removed in the trauma bay and the patient was admitted for observation. The patient was discharged home on HD 4.

Conclusion: Due to the small caliber, nonoperative management of select penetrating puncture wounds of the heart may be considered. CT and echocardiogram should be considered to evaluate for anatomic proximity to the heart and evaluate for any functional cardiac defects. Patient with hypotension or life-threatening arrhythmias are not candidates for nonoperative management.
P 44. ACCELERATED WOUND HEALING IN RECALCITRANT, CONTAMINATED ABDOMINAL/GROIN WOUNDS WITH PUBM XENOGRAFT
LA Nair, B Caballero, M Effendi, M Aranke, J Griswold MD, C Ronaghan
Presenter: Arya Nair | Texas Tech University Health Sciences

**Background:** One of the leading causes of nosocomial morbidity in hospital patients is a surgical site infection (SSI). The following case series demonstrates the potential of Porcine Urinary Bladder Matrix (PUBM) in healing abdominal surgical site infections that become chronic, recalcitrant wounds. The results discussed can offer an alternative to conventional wound therapy. The patient time to healing is accelerated, painful dressing changes are eliminated, much less equipment, and patients rarely require home health wound care management. Because the wound healing is accelerated, the patient returns to functionality (work, activities of daily living) much sooner compared to that of NPWT.

**Method:** Retrospective data was collected on 25 patients with complex and/or chronic contaminated abdominal/groin wounds recalcitrant to initial therapy. All of these wounds were successfully treated with PUBM. PUBM is an extracellular matrix (ECM) which functions as a biologic scaffold. PUBM includes an intact epithelial basement membrane and lamina propria opposing surface. In addition, the device contains different collagen and proteins that are bioactive that facilitate a constructive remodeling process. This ECM is gradually and completely resorbed by the patient following implantation, resulting in reduced scarring and site appropriate functional tissue. The appropriate amount of PUBM (Micro Matrix and Cytal wound sheets) were implanted based on the unique characteristics of the wounds. All patients reviewed had significant comorbidities resulting or contributing to these chronic/complex wounds.

**Results:** Patients achieved 100% healing in these chronically contaminated abdominal/groin wounds closed with PUBM despite several comorbidities. A preliminary cost analysis demonstrates advantages to PUBM because of known accelerated healing but also the patients’ ability to return to work. Despite the many deterring factors to healing, 100% wound healing was achieved in each of these patients. Unique properties of PUBM not only accelerate wound healing, but clearly in this patient population decreased the surgical site infection rate with skin closure of these chronic wounds to 0%.

**Conclusion:** PUBM can be used as primary means of wound closure or secondary adjunct to previous failed wound closure attempts with traditional methods such as wet-to-dry dressing and negative pressure wound therapy. PUBM has proven effective to encourage constructive reomodeling with site specific tissue in both animal models and human clinical studies. Based on the encouraging results of this pilot study, an IRB protocol has been submitted which will allow prospective analysis of wound care management with PUBM. Data analysis will be expanded to include quality of life assessment, overall cosmesis, incisional hernia rate over time, time to complete wound healing and patient satisfaction. In addition, much more in depth cost analysis will be performed comparing PUBM to conventional wound therapy.
**Background:** Motor vehicles crashes (MVC) are a leading cause of trauma. The association with a positive blood alcohol content (BAC) is 37%. Studies in this population have focused on different anatomic areas and outcomes, but not on a specific organ except for traumatic brain injury. Alcohol consumption has numerous effects including increased diuresis, resulting in increased bladder volumes, creating a risk for bladder injury. The objective of this study was to assess the association of a positive BAC with bladder injury in blunt trauma. We hypothesized that following blunt trauma a positive BAC would be associated with bladder injury.

**Method:** This was a retrospective analysis of the National Trauma Data Bank from 2009-2015. Patients included sustained blunt torso trauma with an abdomen abbreviated injury scale (AIS) score > 2 who were 14 years and older. Exclusion criteria included penetrating trauma, patients who were transferred, those dead on presentation, and those with missing data. Data evaluated included patient demographics, and details surrounding the injury to include injury severity score (ISS) and AIS scores. Univariate analysis and matched control (age +/-5 years, exact ISS, and gender) analysis were performed. A p value < 0.05 was considered significant.

**Results:** Over the 8 year study period, 414,159 patients met inclusion criteria, of which 11,158 (2.69%) had bladder injuries. The study population median age was 41 (interquartile range 24-58) and 63.1% were male. The median ISS was 13 (8-21) and abdomen AIS was 2 (2-3). A positive BAC was associated with bladder injury (42.2% vs. 30.8%, p 3) (OR [CI] = 3.2 [2.4-4.3]) were associated with bladder injury.

**Conclusion:** A positive BAC is associated with bladder injury in patients sustaining blunt torso trauma. The presumed mechanism is increased diuresis, resulting in increased bladder volumes, creating an increased risk for bladder injury. Thus, for those consuming alcohol, voiding frequently might mitigate this increased risk of bladder injury if blunt torso trauma should occur.
Background: The presence of pneumomediastinum (PNM) following blunt thoracic trauma has been shown to have limited clinical relevance, described in one study as incidental and benign. However, patients are frequently transferred to trauma centers for radiographic findings of PNM due to the concern for aerodigestive injury. The aim of this study is to assess the value of invasive testing for patients with pneumomediastinum secondary to blunt trauma and to determine the appropriateness of interhospital transfer for surgical evaluation.

Method: Following IRB approval, an ACS-verified level I trauma center registry was queried from 2010 to 2017 for all blunt trauma patients with pneumomediastinum diagnosed by CT. Data not included in the registry was obtained from the electronic medical record. Outcomes of interest included mechanism of injury, procedures related to pneumomediastinum, presence of aerodigestive injury, antibiotic utilization, and indication for transfer.

Results: During the study period 280 patients were identified. One (0.36%) patient diagnosed with bronchopleural fistula due to persistent air leak following thoracostomy tube placement. There were 2(0.7%) presumed pharyngeal/tracheal injuries with associated subcutaneous emphysema following neck injury. There were no esophageal injuries. One-hundred and five(37.5%) patients presented as transfers, with 32(30.5%) transferred at least in part due to PNM and 10(9.5%) transferred exclusively for PNM. The mechanism of injury included MVC(40.6%), fall(21.9%), assault(18.8%), motorcycle/ATV accident(12.5%), and other(6.3%). Thirteen patients underwent a total of 17 additional diagnostic procedures after the initial trauma evaluation. These studies included; esophagram(N=11), bronchoscopy(N=3), and esophagoscopy(N=3). There were no aerodigestive injuries identified on further evaluation. Of the 105 patients that presented as a transfer, 6(5.7%) received additional testing, and none had an aerodigestive injury or required further intervention due to their diagnosis of PNM.

Conclusion: Conservative management of pneumomediastinum following blunt thoracic injury is safe. Patients with radiographically diagnosed pneumomediastinum did not have a clinically significant aerodigestive injury without associated physical exam findings. Additional diagnostic testing for aerodigestive injuries following blunt thoracic trauma in patients presenting for pneumomediastinum is highly unlikely to yield results which will alter patient care, and clinically stable patients do not require transfer to a level 1 trauma center for further evaluation of pneumomediastinum.
Background: Non-operative management of solid organ injury in hemodynamically stable patients is the standard of modern trauma care. Concerns over the failure rate for this approach in patients of older age were secondary to the belief that the splenic capsule thickness decreases with age. However, the exact changes and thickness of the splenic capsule with age have not been clearly described. The aim of this study was to determine the beliefs of trauma medical directors regarding splenic capsule thickness and to examine the changes in composition and thickness of the splenic capsule with age.

Method: A Red Cap survey was created and sent to trauma directors across the United States asking the question: “Splenic capsule thickness: increases with age, stays unchanged with age, or decreases with age”. Additionally, cadaveric splenic capsule samples were obtained from the Medical Examiner’s office for study. Specimens were stained with hematoxylin and eosin and with Verhoeff’s elastic tissue stain. Thickness of the elastin and collagen-rich layers and total splenic capsule thickness were measured in microns. Exclusion criteria included splenomegaly, chronic hemolytic disorders, lymphoma and leukemia. Statistical analysis was performed using one-way ANOVA. Data are expressed as mean ± standard deviation (SD), significance was attributed to p<0.05.

Results: Of 223 surveys sent, 102 (46%) responses were received. The majority (59%) answered that the splenic capsule thickness decreases with age, 25% believe it remains unchanged, and 16% replied that it increases with age. There were 94 splenic specimens obtained (age range: 29 days – 78 years). Splenic capsules of infants were thin, dense, and had a uniform layer of elastin fibers. With aging, the capsule developed two layers, an inner elastin rich layer and an outer collagen rich layer. When compared by age decile, no differences in thickness existed after age 21; therefore, patients were categorized as 0-10 years (n=15), 11-20 years (n=16), and 21-80 years (n=63). Collagen and total thickness increased with each age range (collagen: 5±7, 19±7, 34±12; total: 39±13, 75±18, 92±21, respectively; both p<0.001). Elastin thickness increased until age 10, then remained unchanged (34±7, 55±17, 58±16).

Conclusion: Most trauma directors believe that the splenic capsule decreases in thickness as the patient ages. However, our results demonstrate that the splenic capsule increases in thickness during childhood and adolescence, but remains constant in adulthood. Additionally, the spleen capsule develops an inner elastin layer and an outer collagen layer. The change in splenic capsule structure and thickness may have implications for the non-operative management and splenorrhaphy in splenic trauma.
P 48. HIGH VERSUS LOW ENERGY FALLS IN THE ELDERLY: DIFFERENCES IN LONG-TERM FUNCTIONAL OUTCOMES
SG Jimenez, MS Hayashi, R Severino, CT Tanabe, KP Ng, DS Inouye, DM Takanishi Jr
Presenter: Sophia Jimenez BS | The Queen’s Medical Center

Background: Falls are the leading cause of death in elderly trauma patients, however, the mechanism can vary considerably; based on the activities and physiologic condition of the individual. Frailty may contribute to the morbidity and mortality observed with low-energy falls, such as those from ground level. In contrast, high-energy falls may reflect more vigorous activities of daily living and greater potential for return to independence after injury. The purpose of this study was to compare the long-term disposition and functional outcomes for elderly patients after high- or low-energy falls.

Method: A retrospective cohort analysis of a single institution trauma registry was performed to identify patients age 65 or greater who sustained a fall between January 1, 2011 and December 31, 2015. Low energy falls (ICD-9 code) included Sidewalk/curb (E880.1); One level to another (E884.2-E884.6); Slipping, tripping, or stumbling (E885.9), Resulting in striking object (E888.0, E888.1); and Other/Unspecified (E888.8, E888.9). All other fall codes (E880-E886) were considered high-energy falls. Surviving patients were stratified into low- or high-energy fall groups then matched based on gender, age, and coumadin therapy. Study questionnaires were mailed to potential living patients after a review of Social Security Death Index (SSDI) and Obituaries to identify those deceased. Survey data was analyzed using SAS 9.4 (SAS Institute, Cary, NC).

Results: Of the 478 patients that were stratified 131 were identified as deceased prior to mail out. A total of 156 responses were received from patients still living: 59 low-energy (LE) and 97 high-energy (HE). Overall, 96.1% of respondents continued to live at home [LE 94.8% vs. HE 96.8%; p=0.67] and there was no significant difference in ability to complete the questionnaire on their own (LE 79.3% vs. HE 88.4%, p=0.13). HE respondents were more often independent in their activities of daily living (ADLs; LE 51.7% vs. HE 70.5%, p=0.02); though half of all respondents reported a decrease in function since injury (LE 49.1% vs. HE 48.9%, p=0.98). A median of 2 recurrent falls were reported (range 1-14); LE respondents had more recurrent falls (LE 43.1% vs. HE 27.4%, p=0.045) and 37.3% of all recurrent falls required hospitalization.

Conclusion: After both low- and high-energy falls in the elderly, the majority of patients continue to live at home. Reliance on others for ADLs, a clinical measure for frailty, was more often reported after low-energy falls. Half of respondents in both cohorts reported a decrease in function since injury, suggesting almost a third of high-energy respondents who reported independence in ADLs are at-risk for frailty. For those who experience a recurrent fall, 37% required hospitalization which may contribute to the overall prevalence of this problem.
Background: Following splenectomy, measures must be taken to prevent infection with an emphasis on the administration of vaccinations against encapsulated bacteria. After initial immunization, the Advisory Council on Immunization Practices (ACIP) recommends administration of an 8-week booster against S. pneumoniae. We previously observed poor compliance with this recommendation in patients undergoing splenectomy for trauma. While patients undergoing splenectomy secondary to hematologic, malignant, or other non-trauma conditions generally have more consistent provider follow-up, this group’s compliance is unknown. We hypothesized that patients undergoing splenectomy for non-traumatic indications would receive the recommended booster at a greater rate than those undergoing splenectomy for trauma.

Method: All non-trauma admissions at our institution who underwent splenectomy between 2010 and 2015 were included. Patients were excluded if splenectomy indication was trauma, or patient died within 14 days post-splenectomy. Demographic and injury data, splenectomy dates, follow-up visits and hospitalizations, immunization documentation, subsequent boosters received, and outcomes were collected from the medical record.

Results: Of the 163 patients who underwent splenectomy, 120 met inclusion/exclusion criteria. Six patients received subsequent boosters during office or hospital visits, with two patients receiving a booster within the ACIP recommended timeframe. The median time to subsequent boosters given was 56.9 weeks. 16 patients have had a subsequent admission for infection or sepsis, with 13 patients being readmitted for septicemia or pneumonia. Only one patient subsequently admitted for infection or sepsis had received boosters. Compliance rates with booster vaccinations did not differ between trauma and non-trauma splenectomy populations (0 vs. 2%, p=1.00), nor was a difference seen between groups with regard to hospital readmission rates (23 vs. 13%, p=0.26).

Conclusion: While the majority of patients at our institution received recommended immunizations for non-trauma splenectomy, they generally received boosters at a low rate and outside of the advised timeframe. With booster compliance and readmission rates similar to that of trauma patients, there is a clear opportunity to develop and employ a global, patient-centered approach to increase booster adherence and reduce associated infectious complications following splenectomy, regardless of the indication for the procedure.
P 50. APPLICABILITY OF ST. JOHN SEPSIS AGENT IN IDENTIFYING SEPSIS IN TRAUMA PATIENTS
DM Terrill, S Atluri, DR Neel, KG O’Rourke, M Moncure
Presenter: Danielle Terrill | University of Missouri Kansas City

**Background:** Sepsis has a high hospital mortality rate with many efforts taken to combat this very common cause of death, including early identification. One such effort to identify septic patients early is the St. John Sepsis Agent (SJSA) (Cerner Corporation, Kansas City). This electronic medical record (EMR) based alert system assists in early recognition of sepsis and notifies clinicians if three signs of System Inflammatory Response Syndrome (SIRS) or two signs of SIRS and one sign of organ dysfunction are met. However, a large percentage of trauma patients also trigger this system as a result of severe injury rather than infection.

**Method:** Data from the trauma registry at our urban Level-1 trauma teaching hospital was queried from January 2017 through July 2017 (n= 825). All patients were included for review except for pregnant women. These patients were cross checked with a SIRS/SEPSIS alert report and found a total of 272 alerts between 112 patients. Data was retrospectively collected using the EMR including patient demographics, outcomes, SIRS/SEPSIS alert criteria met, results of blood cultures, and final diagnosis. This study was approved by our Institutional Review Board.

**Results:** Our study population was 91.5% male (n=249), 43% African American (n=117), 43% Caucasian (n=118), with a mean age of (44 +/- 18.27). Of the 272 alerts, 4% (n=11) were associated with a sepsis diagnosis with 9 of these alerts subclassifying to septic shock. Length of stay between trauma admission and alert was statistically significant for those with a sepsis diagnosis versus those without (average 9.9 days, +/- 4.1; v. 4.4 days +/- 5.5; p < 0.001). Using the SJSA criteria, white blood cell count (no sepsis 15.08 v sepsis 14.29; p=0.030), respiratory rate (29.42 v 37.33; p=0.192), and heart rate (109.87 v 99.1; p=0.065) were not statistically different between the two groups. Through our calculation SJSA use on trauma patients has a positive predictive value (PPV) 1.78%, negative predictive value (NPV) 86.63%, specificity 86.63%, and sensitivity of 100%.

**Conclusion:** The SJSA has a low PPV for trauma patients and its use appears to be a poor predictor of sepsis and septic shock in this patient population based on our retrospective study. Unfortunately, due to the desire to promote early recognition, trauma patients who trigger SJSA may currently receive the same lab draws, fluid resuscitation, broad-spectrum antibiotics, and further promote “pager burn out” for surgical residents and attendings. It might be beneficial to readdress the application of the SJSA in trauma patients and exclude this patient-specific population unless there is a prolonged hospital stay. This study needs to be carried out in a prospective manner to better analyze this tool.
P 51. DEHYDRATED AMNIOTIC MEMBRANE ALLOGRAFT PROMOTES HEALING OF COMPLEX WOUNDS

S Kohanzadeh, M Bedrossian, DA Pougatsch

Presenter: Melody Bedrossian BS | Cedars Sinai Medical Center

**Background:** Human Dehydrated Amniotic Membrane Allograft* (DAMA) has successfully been used to regenerate tissue following injury. The objective of this study was to determine the efficacy of amniotic membrane in promoting healing and tissue growth in chronic wounds.

**Method:** Sixty-two wounds in thirty-eight consecutive patients (males n=19, 50%; females n=19, 50%) with an average age of 69 (range: 39-99) were treated in a multi-disciplinary setting with amniotic allograft for complex wounds throughout body. Patients were evaluated weekly for an average period of 6 weeks (range: 1-71) in accordance with standard of care (SOC). Treatments consisted of wound debridements, offloading (if necessary) and appropriate wound dressings. Wound size was measured and amniotic membrane was applied with regard to product protocol. Results were measured against a historical control of wounds treated with SOC only.

**Results:** Demographic variables that were considered include: body mass index (BMI), hypertension, immune suppressors or steroid use, and the presence of diabetes, cardiac, renal, and vascular diseases. Wound locations treated included: upper extremity (2), back and sacral (8), abdomen (3), ischium (1), thigh (1), and lower extremity (47). All wounds had adequate vascular supply as verified by Doppler ultrasound and all infected wounds were treated with a full course of antibiotics as determined by the infectious diseases specialist. Initially, the wounds measured an average of 43 cm² (range: 1-441). 15 wounds in 11 patients went on to fully heal. Remaining open wounds had improved and measured an average of 40 cm² (range: 1-360). Seven patients had negative pressure wound therapy used as an adjunct to assist with the allograft in conforming to the irregular depths of the wounds. All patients with healed wounds regained pre-injury functional status.

**Conclusion:** Human dehydrated amniotic membrane allograft is useful as an adjunct in wound closure techniques in assisting the formation of granulation tissue and healing of complex wounds in all body sites. It can help decrease healing time, and in some cases, eliminate the need for skin grafts or flap reconstruction. It can also help in cases of limb salvage when all other efforts have failed.
P 52. ENDOVASCULAR REPAIR IS A FEASIBLE OPTION FOR SUPERFICIAL FEMORAL ARTERY INJURIES: A NATIONWIDE ANALYSIS

SK Degmetich, X Zhang, M Firek, B Zakhary, R Coimbra, M Brenner

Presenter: Sean Degmetich MD | Riverside University Health Systems

**Background:** Best practice for management of Superficial femoral artery (SFA) injuries is unknown. Open repair (OR) is most commonly used and has historically been the gold standard. Endovascular repair with stent graft (SG) has been increasing in use as a definitive treatment in select patients. The aim of our study is to determine outcomes after SFA injury using the National Inpatient Sample database.

**Method:** The National Inpatient Sample was queried for SFA injuries between 2012-2014. Patients were grouped according to treatment: non-operatively (Nop), with open repair (OR), or with stent-graft (SG). Primary outcomes were mortality, hospital length of stay (HLOS), and complications. Bonferroni pairwise Chi-squared analysis with adjustments for each of the multiple variables within the Chi-squared analysis was used for comparison between groups. p<0.05 was considered statistically significant.

**Results:** 629 patients with SFA injuries were identified, mean age 37+19, and mostly male (82%) with a mean elixhauser comorbidity score of 1.7+1.7. Mortality was 4.1%, mean HLOS was 12+15 days, and 95% of admissions were non-elective. Elixhauser comorbidity score was higher in the Nop than OR groups (p=0.003). Fasciotomies were performed in 27% of patients, and amputations in 4.8%. The SG group was significantly older than OR group (p<0.001), and patients in the OR group had higher rates of fasciotomy than either SG or Nop groups (p<0.001, 0.002). Males were found to be treated more often with OR than Nop (p<0.001) or S (p=0.001). More African-Americans were treated with OR than Nop (p=0.001). More Caucasian and Medicare patients were treated by Nop than OR, and more SG than OR (all p<0.05).

**Conclusion:** OR of SFA injuries is associated with higher fasciotomy rates but no difference was found in amputation rates or mortality compared to SG. Endovascular repair of these injuries should be considered, particularly in older patients who may not tolerate open surgical procedures. Racial disparities exist regarding the treatment modality, which warrants further investigation.
P 53. EPIDEMIOLOGIC INVESTIGATION OF TRAUMA FROM A LEVEL I TRAUMA CENTER

*D Watson, B Benton, E Ablah, K Lightwine, H Okut, T Bui, R Lusk, JM Haan*

**Presenter:** David Watson BS | University of Kansas School of Medicine – Wichita

**Background:** The National Trauma Data Bank (NTDB) provides information regarding traumatic injuries in the United States. However, the NTDB does not address spatial relationships of injury patterns and lacks generalizability at the local level. This study evaluated mechanisms of injury, injury outcomes, and spatial-relationships among traumatic injuries.

**Method:** A retrospective review of traumatic injuries was conducted of all patients 14 years or older who were admitted with a traumatic injury to a Level I trauma center between January 1, 2016 and December 31, 2017. Data collection included demographics, injury characteristics, hospitalization details and discharge disposition. Incident locations were used to generate maps, stratified by mechanism of injury.

**Results:** Patients who sustained a fall were more likely to be female (59.6%, \( p < 0.001 \)) and older (72.1 ± 17.2, \( p < 0.001 \)) than those injured in a motor vehicle or motorcycle crash. In addition, fall patients were more likely to sustain a severe extremity injury (35.7%, \( p = 0.003 \)) and require surgery (44.2%, \( p < 0.001 \)) the most. Patients injured due to a motorcycle crash sustained the most severe injuries (24.1%, \( p < 0.001 \)), required mechanical ventilation the most (16.1%, \( p < 0.001 \)), and had the longest intensive care unit lengths of stay (5.3 ± 6.8, \( p < 0.001 \)) and mechanical vent days (7 ± 8.5, \( p = 0.03 \)). Morality was highest among motorcycle crash patients (7.5%) and lowest for fall patients (4.4%, \( p < 0.001 \)). Geographic Information System (GIS) mapping indicated variable areas of high incidence for each mechanism of injury, although areas of overlap did occur.

**Conclusion:** Falls, motor vehicle crashes, and motorcycle crashes were the most frequent mechanisms of injury. The use of GIS aided in the identification of the areas of highest injury incidence. Future studies can use this information to aid in the development of targeted injury prevention programs.
P 54. FEELING SALTY: EXAMINING THE EFFICACY OF ORAL SALT REPLETION IN ADULT TRAUMA PATIENTS
CY Chung, RD Zaunbrecher, A Le, J Aydelotte
Presenter: Yvonne Chung MD, MPH | The University of Texas at Austin Dell Medical School

Background: Hyponatremia is a common problem amongst trauma patients, particularly amongst those with head injuries with concerns for intracranial swelling and/or syndrome of inappropriate antidiuretic hormone release (SIADH). The usual treatment for hyponatremia in these patients comprises of fluid restriction and salt repletion via enteral and/or parenteral routes. Despite the ubiquitous nature of oral salt tablets in hospitals, there is little described in terms of their efficacy in raising serum sodium level. The primary objective of this study was to assess effectiveness of oral salt repletion on raising serum sodium level in adult trauma patients.

Method: A retrospective analysis of a Level I trauma center’s trauma database and electronic medical records was performed. Patients from the trauma registry ages 18 to 89 who received oral salt tablets without intravenous hypertonic saline from January 2010 to August 2018 were included in the study. These patients’ daily electrolytes from three days prior to initiation of oral salt tablets to seven day after were extracted from the electronic medical record. Their demographic characteristics, injury patterns, and daily serum sodium levels were described and compared.

Results: A total of 518 patients were included in the analysis. The study population comprised of 354 male patients (68%) and 164 female patients (32%). Their average age was 50±21 years. The majority of patients sustained injury from blunt mechanism (95%) as opposed to penetrating or burn mechanisms (5%). The mean head and neck abbreviated injury scale (AIS) of these patients was 2.2 ±1.9. The mean serum sodium level three days prior to initiating salt tabs was 135±4 mmol/L with a slightly decreasing trend moving towards initiation of salt tabs (two days prior, 135±4 ; one day prior, 134±4). The mean serum sodium on the day of initiating oral salt tabs was 131±3 mmol/L; while the mean after seven days of salt tabs was 135±4 mmol/L.

Conclusion: In this single-institution retrospective analysis, adult trauma patients who receive oral salt repletion have a demonstrable increase in serum sodium level seven days after therapy initiation. The injury patterns of these patients – predominantly blunt mechanisms with moderate to severe head injuries – are consistent with the expected findings typical of trauma patients with clinically significant hyponatremia. While the standard deviations of the mean daily serum sodium levels carry some overlap, there is clear trend towards normalization of serum sodium level after sustained oral salt repletion. Findings of this study may help guide practitioners when deciding treatment options and length of treatment for hyponatremic patients.
**Background:** Electric scooters have risen in popularity in the Los Angeles region due to their ease of use, affordability, and availability. Their advent, however, has stirred controversy and changes in local governmental policies. Very little is known about the injuries associated with their use and the potential implications for public health policy. The objective of this study was to characterize the injury burden associated with the use of electric scooters.

**Method:** Institutional data from an urban, tertiary, Level I trauma center were queried for patients sustaining injuries while operating an electric scooter from January 2018 to August 2018. Data collection included patient demographics, trauma level activation, diagnoses, interventions, and outcomes.

**Results:** Twelve patients were identified during the study period with a median age of 29.5 years with 4 (33.3%) with documentation supporting helmet use. Within this cohort, 6 (50.0%) triggered a trauma team activation. The most prevalent injuries included facial fractures (n=5, 41.7%), injuries to the spine (n=3, 25.0%), and traumatic brain injuries (n=3, 25.0%). Three (25.0%) patients required admission to the intensive care unit, including one (8.3%) with a high-grade hepatic injury. Four (33.3%) required at least one surgical intervention. The median hospital stay was 5 days and all patients survived to discharge.

**Conclusion:** Use of electric scooters is associated with significant injury burden to the head, face, and spine requiring prolonged hospital stays. Targeted interventions and policies should be created to address the utilization of this technology from a public health perspective.
SURVIVING A BROKEN HEART: A TRAUMATIC BLUNT CARDIAC RUPTURE CASE REPORT

KS Venincasa, CK McCarthy, BC Axtman, JS Lees, RW Letton, RM Albrecht

Presenter: Kiran Venincasa MD | University of Oklahoma Health Sciences Center

Background: While blunt cardiac injury occurs in 7-76% of blunt chest trauma, cardiac rupture is rare. The high in-field mortality associated with blunt cardiac rupture makes its incidence hard to quantify. The mortality rate of blunt cardiac rupture presenting to the hospital is >80%. We present a case of a 20 year-old man who presented to our Level 1 Trauma Center after a head on motor vehicle collision. At presentation, the patient was tachycardic, normotensive, and had a GCS of 14. He was intubated on arrival for combativeness. Chest/pelvis plain films and initial FAST exam were normal.

Method: Within minutes, his heart rate climbed to the 170s with a blood pressure of 70s/40s. Repeat FAST exam revealed fluid in the right upper quadrant and questionable pericardial fluid. Massive transfusion protocol was initiated. REBOA catheter was placed in the left femoral artery and balloon inflated at 45cm with hemodynamic improvement. He was taken for urgent exploratory laparotomy. 1L of hemoperitoneum was found without signs of intraabdominal injury. REBOA balloon was deflated without further bleeding. Pericardial window yielded large volume hemorrhage. Sternotomy identified rupture of the right atrial appendage, which was controlled with a vascular clamp, and oversewn. Superior cavoatrial junction perforation was controlled with pressure and oversewn with pledgeted suture.

Results: His sternum was closed and temporary negative pressure wound vac was placed in abdomen. He was moved to the ICU and required no further transfusions. On postoperative day 1, his abdomen was closed and sternum was plated. Patient eventually was extubated on hospital day 24 and discharged home on hospital day 35.

Conclusion: Rare and generally lethal, blunt cardiac rupture requires a high index of suspicion and rapid repair. The use of REBOA in blunt cardiac injury should be further investigated as it appears to be counterintuitive in aiding a patient with cardiac rupture with tamponade physiology. It may allow quicker resuscitation by reducing the circulating blood volume.
32 YEAR OLD MALE WITH COIL MIGRATION AFTER SPLENIC ARTERY PSEUDOANEURYSM EMBOLIZATION

B Steinke, R Vogel

Presenter: Bree Steinke DO | St. Anthony Hospital

**Background:** Splenic artery embolization is a mainstay of treatment of splenic artery hemorrhage, pseudo aneurysm and aneurysm. We report the case of a 32 year old male who underwent embolization of splenic artery pseudoaneurysm and subsequently experienced acute hemorrhagic shock requiring transfusion after distal migration of embolization coils. With fewer than 10 documented cases of coil migration in splenic artery pseudo aneurysms, coil migration is a rare but serious complication.

**Method:** A 32 year old male status post planned pancreatic cyst jejunostomy complicated by hemorrhagic shock related to erosion of cyst into splenic artery. Patient underwent initial embolization of proximal splenic artery. Patient course was further complicated by additional episode of hemorrhagic shock related to distal migration of embolization coils into splenic hilum. Repeat embolization was completed with embolization of the entire length of the splenic artery and a branch of left gastric artery. Patient remained stable and was discharged 7 days after repeat embolization. A pubmed search was performed using the following key terms: splenic artery embolization, embolization coil migration, visceral coil migration, splenic artery embolization complications

**Results:** Embolization coil migration is a rare complication of visceral artery embolization in general and splenic artery embolization in specific. Literature review shows very few documented cases of visceral artery coil migration. Of those cases fewer than ten involved migration of splenic artery coils.

**Conclusion:** There are thousands of splenic embolizations per year with fewer than ten reported cases of coil migration in published literature. Splenic artery embolization remains a relatively safe and effective strategy for managing splenic artery hemorrhage, aneurysm and pseudoaneurysm. One should consider migration of coils in patient’s presenting with hemorrhagic or abdominal complications after embolization.
P 58. HITTING THE NAIL ON THE HEAD: DIAGNOSIS AND MANAGEMENT OF PENETRATING NECK INJURIES

_C Bryant, M Mannas, JS Lees, RM Albrecht_

**Presenter:** Cressilee Bryant MD | University of Oklahoma Health Sciences Center

**Background:** Initial workup after primary survey in penetrating neck injuries with retained foreign body varies in regards to imaging, endoscopy, and operative versus non-operative management. Operative management of vascular and aerodigestive injuries varies regarding incision type and approaches to vascular repair.

**Method:** We present the case of a 24-year-old male construction worker who arrived to our trauma bay after falling and having his nail gun discharge a nail into zone 2 of his neck. GCS on arrival was 15. Primary survey was completed and patient was hemodynamically stable. Chest and lateral cervical spine plain films were obtained demonstrating a nail imbedded in the prevertebral soft tissue at approximately C6 level. CTA neck was obtained demonstrating 7.5 cm nail within the prevertebral soft tissues at C6-C7 with intermixed air and hemorrhage. No obvious vascular or osseous injuries were noted. However, the nail was noted to be abutting the right common carotid artery.

**Results:** Patient underwent a bilateral neck exploration via collar incision where the nail was found to be tamponading a right common carotid injury with a through-and-through injury to the esophagus. Primary repair of a one-third circumference injury to the right common carotid artery was performed as well as primary repair of esophagus x 2 with a muscle flap for added coverage. Flexible esophagoscopy was performed and a nasogastric tube was left in place. Patient was transferred to the ICU post-operatively for neurovascular checks and started on aspirin for anti-platelet therapy. Contrast swallow study was obtained on post-operative day 5 with no evidence of leak. Patient was tolerating a regular diet and discharged from the hospital on post-operative day 7.

**Conclusion:** Initial workup after primary survey in a penetrating neck injury with retained foreign body along with operative management of vascular and aerodigestive injuries varies among surgeons. Further investigations regarding workup and management should be undertaken.
P 59. THE BOVINE ARCH CASE SERIES: A NOVEL FINDING
T Musonza, A Khourqeer, L Trujillo, N Reddy, V Lenge de Rosen, R Gilani
Presenter: Tashinga Musonza MD | Baylor College of Medicine

Background: The “Bovine arch” (BA) defines anatomical variants in which the left common carotid and innominate artery share a common origin. While the definition and terminology are debated, there is no consensus regarding the anatomy as a marker of pathology or normal variant. The reported association of the BA with thoracic aortopathy and a rapidly expanding aorta may carry clinical significance. If consistently validated, this could potentially alter management guidelines regarding the timing of repair and surveillance of thoracic aortic aneurysms in BA patients. The study sought to identify if the BA was associated with proximal thoracic aortopathy.

Method: This was a single center retrospective study of BA patients abstracted from a radiology registry over a two-year period. Demographics and imaging modality were recorded. Measurements of the proximal aorta were taken at the sinuses of valsalva, ascending aorta and mid arch. The frequency of aortopathy between male and female patients was compared. Aortopathy was defined as either ectasia or aneurysmal disease. Ectasia was defined as a diameter greater than 4 cm at sinuses of valsalva or an ascending aorta greater than 3 cm. Aneurysmal disease was defined by a diameter greater than 5 cm at the sinuses of valsalva or an ascending aorta greater than 4 cm.

Results: 309 patients with a common origin of the innominate and left common carotid artery were identified. Median age was 56 years, 169 (54.7%) were female and 140 (45.3%) male. Diagnosis was based on CTA head and neck, CTA chest and CT chest in 205 (66.3%), 59 (19.1%) and 47 (15.2%) patients respectively. The term BA was used in nineteen (6.1%) patients only. Forty-four (14%) patients had aortopathy. In this subgroup, twenty-seven (61.3%) were female and seventeen (38.6%) male. Of those with aortopathy, sixteen (36.3%) patients had aneurysmal disease with 62.5% being male. Males with aortopathy were therefore twice likely to have aneurysmal disease as compared to females (p = 0.02). The median age of male patients with aneurysmal disease was 54 years and 51.2 years for the females.

Conclusion: In our series, the bovine arch was slightly more common in females than males. BA anatomy with concurrent proximal aortopathy was observed twice as frequently in female patients. However, male patients with aortopathy were twice likely to have aneurysmal disease than their female counterparts. This novel finding needs further validation in large population studies and may potentially alter surveillance and timing of intervention in this relatively young bovine arch population.
P 60. CHONDROID LIPOMA OF THE ABDOMINAL WALL: A CASE REPORT
C Hintzen, BJ Pottorf, CD Cool
Presenter: Calliandra Hintzen MD | St. Joseph’s Hospital and Medical Center

**Background:** Chondroid lipomas are a rare type of soft tissue tumor containing both adipose and cartilaginous tissue. These masses represent a diagnostic challenge as they may be mistaken for malignant pathologies such as myxoid liposarcoma and myxoid chondrosarcoma. Chondroid lipomas, however, are benign and resection is curative. There is no role for radiation therapy in treatment. This report highlights a case of chondroid lipoma of the anterior abdominal wall in a female in her fifth decade.

**Method:** A retrospective review of the patient’s electronic medical record including imaging studies and pathological slides form the core of this report. A detailed description of pathologic findings and a review of the literature follows.

**Results:** A 41 year old Native American female with a history of idiopathic deep venous thrombosis presented with an enlarging mass in the right upper quadrant. It had been present for approximately 19 months and became tender to palpation and valsalva. Her primary care physician noted the mass at her annual physical exam. An ultrasound was obtained suggesting a solid tumor with possible malignant characteristics. CT confirmed a 5.0 x 4.0 x 4.0 cm mass that again appeared solid and concerning for malignancy. She was referred for extirpation. The patient underwent radical en bloc resection of the mass and abdominal wall with reconstruction. She recovered well and had no postoperative issues. Final pathology demonstrated a chondroid lipoma.

**Conclusion:** Chondroid lipomas are rare tumors. Typically under 4 cm, they are benign and usually affect women in the third or fourth decade of life. Grossly, the tumor appears well-circumscribed, lobulated, and yellow or white. Microscopically, the tumor shows a mix of mature adipose cells and chondroid cells containing a prominent myxoid or hyaline matrix. The tumor also features lipoblast-like cells, which may raise concern for myxoid liposarcoma or chondrosarcoma, as they mimic hibernoma cells or lipoblasts. Nuclear pleomorphism and mitotic activity are characteristically absent. Chondroid lipomas also have a balanced translocation t(11,16)(q13;p12-13), which differentiates them from myxoid and round-cell liposarcoma. Awareness of this lesion among general surgeons is crucial to avoid overtreatment, as a chondroid lipoma may be mistaken for a malignant tumor on histopathology.
**Background:** Pulmonary embolus (PE) is a common cause of morbidity and mortality in trauma patients, especially young patients, those with TBI, prolonged immobility, orthopedic injuries, longer time on the ventilator, or those unable to be anticoagulated. Massive saddle PE is a fatal process without prompt intervention. We present the case of a 20yo male who suffered gunshot wound to the right chest. The patient had massive hemothorax requiring thoracotomy and take back. He later developed a PE and required catheter directed pulmonary embolectomy and ECMO.

**Method:** 20yo male arrived hypotensive and tachycardic to our level 1 trauma center after GSW to the right chest. R large bore thoracostomy tube was placed with 1500mL immediate output. Massive transfusion protocol was initiated and he was taken emergently to the OR for thoracotomy. A right anterolateral thoracotomy revealed several liters of blood and clot in the chest. Right upper lobe was found to have active hemorrhage, and direct pressure was applied. The incision was extended to clamshell; manual pressure was applied, and Thoracic Surgery was consulted. Central control of PA was obtained by opening the pericardium. An injury to the posterior segment of the RUL was found. Vessels were ligated, the chest was packed, and the patient was transferred to ICU for resuscitation.

**Results:** The patient was stabilized. CT scan of the chest was obtained revealing T7 fracture with cord transection. DVT prophylaxis was held initially per NSGY recommendations. The next day, the patient returned to OR for washout, wedge resection of posterior RUL, RLL superior segmentectomy, chest tube placement and closure. On HD 3 NSGY cleared the patient for DVT prophylaxis. SQH was started Over the next several days, the patient was extubated, weaned from pressors and transferred to the floor on POD 6. On HD 16, the patient was discharged to LTAC. On the day of discharge, the patient became acutely short of breath. CT revealed saddle PE. Of note, BLE dopplers required for LTAC were negative the day prior. Patient was transferred to ICU, intubated, started on inotropes and nitric oxide. Vascular surgery was consulted for catheter directed embolectomy. Later CT surgery was consulted, and the patient was placed on VA ECMO.

**Conclusion:** Status improved, pressors were weaned, and vent requirement decreased. He was decannulated after 6 days on ECMO. He was extubated and transferred to the floor. He was discharged to LTAC 2 weeks later. Expeditious intervention along with a multi-disciplinary approach proved to be lifesaving in management of this patient on two different occasions after penetrating trauma to the chest.
Background: Pneumonectomy after traumatic lung injury (TLI) is associated with shock, increased pulmonary vascular resistance, and eventual right ventricular failure. Historically, trauma pneumonectomy (TP) mortality rates ranged from 53-100%. With improved surgical critical care and operative techniques such as damage control surgery, it is unclear if the contemporary mortality rate has changed. Less extensive lung resections including lobectomy and/or segmentectomy may be associated with improved survival. Therefore, we evaluated contemporary outcomes associated with TP and more limited lung resections such as lobectomy/segmentectomy, hypothesizing that TP after TLI is associated with higher risk of death compared to lobectomy or segmentectomy.

Method: The Trauma Quality Improvement Program database was queried between 2010 and 2016 for patients 18 years and older presenting with trauma to the lung including laceration, contusion, pneumothorax, hemothorax, and hemopneumothorax. Two groups were compared: those undergoing TP versus lobectomy/segmentectomy. Bivariate analysis using Chi-squared and Mann-Whitney U tests were performed. Covariates including age >= 65 years, injury severity score (ISS) >= 25, cardiac injury, traumatic brain injury, and complications of acute respiratory distress syndrome and pneumonia were used in a multivariable logistic regression analysis to determine the adjusted risk of mortality in patients undergoing TP versus lobectomy/segmentectomy.

Results: We identified 287,276 patients who presented with lung injury. Of these, 889 required some form of lung resection with 758 (85.3%) undergoing either a lobectomy or segmentectomy and 131 (14.7%) undergoing a TP. The rate of TP among those who required lung resection remained stable from 22.0% in 2010 to 12.2% in 2016 (p=0.16). Patients who underwent a TP had a higher median ISS (26 vs. 24.5, p=0.03) and rate of traumatic brain injury (22.1% vs 15.0%, p=0.04) but no difference in initial median systolic blood pressure (109 vs. 107 mmHg, p=0.92). The most common injury mechanism in both groups was gunshot wound (TP: 48.1%, lobectomy/segmentectomy: 46.2%, p=0.69). Patients undergoing TP had a greater risk for mortality compared to those undergoing lobectomy/segmentectomy (OR 4.89, CI 3.18 – 7.54, p<0.001).

Conclusion: The rate of TP in patients with TLI did not change significantly between 2010 and 2016. Despite improved surgical critical care, massive transfusion protocols, and operative techniques, TP continues to be associated with a high mortality rate and thus should be avoided whenever possible. Future investigations should focus on identifying parameters or treatment modalities that improve survivability after trauma pneumonectomy.
P 63. CORE TEMPERATURE: MANAGEMENT OF CRANIOCEREBRAL PUNCTURE WOUND WITH A THERMOMETER PROBE

MY Lin, C Jiang, V Franco, PM Rhee, J Nguyen, BC Morse

Presenter: Bryan Morse MS MD | Emory University School of Medicine

Background: Usually caused by nails or knives, craniocerebral puncture wounds are very rare accounting for less than 1% of all brain injuries but knives and there have no reports of these injuries caused by thermometer probes. Given the rarity of these injuries management is not clearly elucidated. The objective of this study is to review diagnosis and management of a craniocerebral puncture wound caused by a self-inflicted injury with a thermometer probe.

Method: Retrospective review of the registry at an urban ACS verified level I trauma center was performed to identify patients with stab wounds to the head and craniocerebral puncture wounds. Patient demographics and outcomes were recorded.

Results: Over the one year study period, 37 victims were identified with stab wounds to the head but only one (2%) sustained a craniocerebral injury. The patient was 42 year old male who was admitted after 20 feet jump from parking garage. He had no injuries on admission but was noted to have acute depression, schizophrenia, and intoxication. On HD #2, trauma was activated to surgical ward and patient was noted have self-inflicted stab wound to the left orbit with a thermometer probe. CT angiography of the brain was performed demonstrating no intracerebral vascular injury with the thermometer extending into the temporal lobe. Patient underwent emergent craniotomy for probe removal and control of dural hemorrhage. Except for mild transient diplopia, vision of the left eye was maintained at the time of discharge. Broad spectrum and tetanus vaccination were administered as adjuncts to the operation.

Conclusion: Management of craniocerebral stab wounds represents a challenge. While the mainstay of treatment is emergent craniotomy for foreign body removal, other key principles of successful management include removal of object in operating room only, CT angiography of brain to evaluate for vascular injury, broad spectrum antibiotics to reduce risk of infectious complications, and careful ophthalmologic examination.
P 64. BLADDER DRAINAGE AFTER REPAIR FOR TRAUMA: WHEN DOES IT END?
C Mellon, TR Kopelman, PG Pieri, KM Davis, R Jamshidi, AK Hollingsworth, SJ Vail
Presenter: Christopher Mellon DO | Maricopa Medical Center

Background: Simple intraperitoneal bladder injuries (IPBI) are managed by primary repair followed by 7-10 days of decompression by indwelling catheter. This frequently requires prolonged catheterization in a patient who would otherwise be voiding spontaneously. The purpose of this study was to retrospectively review the incidence of leak after surgical repair of IPBI based upon timing of bladder evaluation, < or > 7 days post-cystorrhaphy.

Method: After IRB approval, a chart review was performed of all patients presenting to our Level 1 Trauma Center over a 10 year time period. We included all patients with IPBI who underwent simple surgical repair (defined to exclude neck or trigone repairs) and had bladder evaluation post repair. Injury demographics, imaging data and outcomes were extracted.

Results: Eighteen patients met criteria (mean age (range) 32 years (10-56), male 67%, and blunt trauma 78%). Isolated intra-peritoneal injuries (IP) were noted in 15 patients (83%) and combined IP and extra-peritoneal (EP) injuries in an additional 3 patients (17%). The majority of patients underwent a 2 layer repair (89%) and all were performed by the trauma service. Bladder integrity was evaluated in all patients with a time range of post-operative day (POD) 0-20 (average 8) and included on-table leak test (n=2), fluoroscopic cystogram (n=6) or CT cystogram (n=10). Eight patients (44%) were evaluated prior to 7 days post cystorrhaphy and all repairs were intact. Among the remaining patients (n=10) studied at >/= 7 days post repair, one leak was noted on CT cystogram obtained on POD 10 in a patient s/p GSW with a combined IPBI and recto-sigmoid injury complicated by a postoperative peri-sigmoid/vesicular abscess.

Conclusion: The risk of leak from a simple isolated IP bladder repair is low and length of postoperative catheterization should be re-examined.
P 65. LAPAROSCOPIC VENTRAL HERNIA REPAIR AND APPENDECTOMY WITH TWO 5MM PORTS AND A SUTURE PASSER
H Bonatti
Presenter: Hugo Bonatti MD | Meritus Health

Background: Most surgeons use one 10-12mm and two 5mm trocars for laparoscopic ventral hernia repair (LVHR) and appendectomy (LA). It would be desirable to further miniaturize these procedures and reduce surgical trauma without increasing costs by use of expensive instruments.

Method: All patients undergoing laparoscopic procedures in which only two 5mm trocars were used and one grasper was replaced by a suture passer from a single center during a 10 month period were reviewed. Ten patients including four women and six men with a median age of 30.1 (range 15.4 to 56.7) years were identified. There were four LVHRs (defect 2-4cm), five patients underwent LA and one had LA and repair of an incidentally found umbilical hernia. In all patients the abdomen was accessed with a Kii Fios 5mm first entry port (Applied medical) at Palmers point in the left upper quadrant.

Results: For LA a 2nd 5mm port was placed into the umbilicus and the suture passer was inserted in the right lower quadrant. The appendix was lifted up using the suture passer and completely skeletonizes; appendix and mesoappendix were secured with an endoloop and the specimen was removed in a 5mm retrieval bag using the LUQ port site. For LVHR the 2nd 5mm port was placed in the LLQ and the suture passer was inserted above the hernia and used to help resecting the preperitoneal lipoma and for lysis of adhesions. In all cases the hernia was closed using the suture passer and a 12cm round coated MESH was placed (except for the combined LVHR&LA case). All patients tolerated the procedures well without complications. Five cases were done as outpatient procedure, four patients were placed in extended recovery and only one was admitted.

Conclusion: LVHR and LA using only two 5 mm trocars and a suture passer as a holding instrument is feasible in many cases and is well accepted by patients with improved cosmetic results and less pain. The technique can be easily learned and is a cost saving way to miniaturize these common laparoscopic procedures.
P 66. A SAFER PLACEMENT TECHNIQUE FOR PERCUTANEOUS DILATATIONAL TRACHEOSTOMY

*BJ Emigh, PGR Teixeira, TB Coopwood, CVR Brown, JD Aydelotte*

**Presenter:** Brent Emigh MD | The University of Texas at Austin Dell Medical School

**Background:** Percutaneous dilatational tracheostomy is a commonly performed procedure in critically ill patients. Traditional descriptions of the procedure involve the positioning of the endotracheal tube (ETT) in the proximal trachea during initial tracheal needle cannulation, which can potentially result in accidental extubation and airway loss. To mitigate this risk, the self-described Advanced Endotracheal tube method involves the advancement of the ETT distally, to the carina, with needle cannulation occurring without direct visualization. The purpose of this study was to describe the Advanced Endotracheal tube method in full and review its safety and efficacy in our experience.

**Method:** A retrospective chart review of all patients who underwent a percutaneous dilatational tracheostomy using the Advanced Endotracheal tube method from August 2014 to August 2018 was performed. These procedures were all performed by a single surgical intensivist at our university hospital and sister community hospital, within the same network. Immediate (airway loss, pneumothorax, hemorrhage, cannula misplacement, subcutaneous emphysema, cardiopulmonary arrest, mortality), maintenance-related (cannula displacement, delayed bleeding, infection), and post-decannulation (tracheal stenosis, tracheomalacia, delayed closure) complication rates are reported.

**Results:** A total of 63 patients (71% male) underwent percutaneous dilatational tracheostomy placement using the Advanced Endotracheal tube method. 53 (84%) of these procedures were done in trauma patients, 10 (16%) in non-trauma. No loss of airway or other airway emergencies occurred. The incidence of other immediate complications was: 1 hemorrhage (1.6%) requiring ligation of external jugular vein, 1 subcutaneous emphysema (1.6%) which did not require intervention. The incidence of maintenance-related complications was: 2 cannula displacement (3.2%), 1 site infection (1.6%), 1 delayed hemorrhage (1.6%) requiring bedside hemostatic packing. Following decannulation, 3 patients developed known tracheal stenosis (4.8%), with one patient requiring surgical correction.

**Conclusion:** The Advanced Endotracheal tube method is a simple variation in technique that can potentially negate the risk of accidental extubation during percutaneous dilatational tracheostomy. Using this technique, no patients suffered from accidental extubation or an airway emergency, while other complications occurred at rates comparable to those published in traditional studies. The Advanced Endotracheal tube method is at least as safe as other percutaneous dilatational tracheostomy techniques.
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