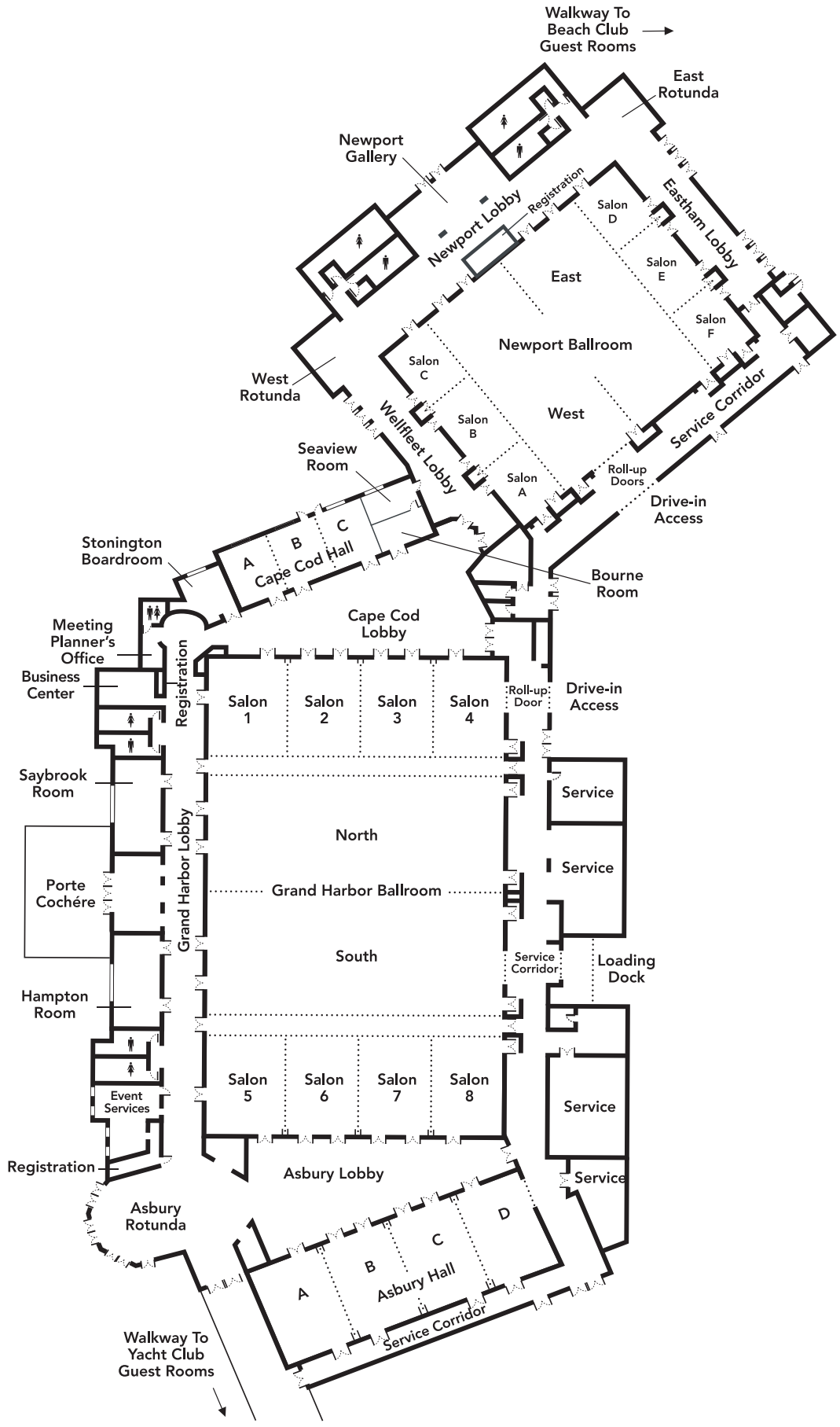

Disney's Yacht & Beach Club
Guest Services
A Lobby/Concierge
B Disney Vacation Club® Information Center
C Resort Airline Check-In
Dining
D The Market at Ale & Compass
E Ale & Compass Restaurant
F Ale & Compass Lounge
G Crew's Cup Lounge
H Yachtsman Steakhouse
I Beaches & Cream Soda Shop
J Hurricane Hanna's Waterside Bar & Grill
K Martha's Vineyard
L Cape May Cafe
M Beach Club Marketplace
Shopping
D The Market at Ale & Compass
M Beach Club Marketplace
Recreation
N Stormalong Bay
O Ship Shape Massage, Salon and Fitness
P Lafferty Place Arcade
Q Seaside Retreat
R Campfire
S Bayside Marina
Bus Stops
Disney's Magical Express® Bus Stop
Laundry
Automated External Defibrillators
Elevators
Designated Smoking Locations
Dining Reservations Recommended
(Call 407-WDW-DINE for more information.)
Running Trail (0.8 mile)
Route to Convention Center
Wi-Fi is available in many areas throughout our Resorts including Guest rooms, main lobbies and feature pools. (Coverage may vary.)
EAST Scientific Assembly and Activities held in Convention Ctr
CONVENTION CENTER
DISNEY'S BEACH CLUB ENTRANCE
BEACH CLUB RESORT
BEACH CLUB VILLAS
DISNEY'S YACHT CLUB ENTRANCE
CHECK-IN
CHECK-IN
YACHT CLUB RESORT
VOLLEYBALL COURT
TENNIS COURTS
CRESCENT LAKE
WALKWAY TO EPCOT
BOAT LAUNCH TO EPCOT® AND DISNEY'S HOLLYWOOD STUDIOS®
Service animal relief areas located in grassy areas adjacent to parking lots.
Timon and Pumbaa from "The Lion King" are part of our problem-free safety philosophy. Keep an eye out for their safety reminders throughout the Walt Disney World® Resort. To learn more visit disneywildaboutsafety.com
Room
Building
Floor
If you have questions, please call 407-934-3649 or visit the Front Desk.
©Disney YB2001/FY18PC25834 1118
Running Trail continues around Crescent Lake

DISNEY'S YACHT & BEACH CLUB RESORTS



Eastern Association for the Surgery of Trauma
36th EAST Annual Scientific Assembly
January 17-21, 2023
OVERALL SCHEDULE
Room Locations Subject to Change - See Meeting App for Most Up-to-Date Information

MONDAY, JANUARY 16, 2023

Courses - Ticketed session, additional fees apply. Pre-registration required.		
7:00 am-4:00 pm	**American Burn Association** **Advanced Burn Life Support Provider Course (ABLS)** *Presented by the EAST Burn Surgery Committee*	Newport Salon A-B

TUESDAY, JANUARY 17, 2023

7:30 am-6:00 pm	Registration	Asbury Rotunda
7:30 am-6:00 pm	Speaker Preparation	Stonington Boardroom
7:30 am-4:00 pm	EAST Development Fund & Information Kiosks	Grand Harbor Foyer
7:00 am-4:00 pm	EAST Community Outreach Program – William R. Boone High School	
Courses & Workshops - Ticketed session, additional fees apply. Pre-registration required.		
8:00 am-4:15 pm	**Leadership Starts with You-Know Yourself & Expand Your Influence: An EAST Leadership Development Workshop** *Presented by the EAST Career Development Committee*	Newport Salon A-C
1:15 pm-5:30 pm	**Bridging the Gap: A Chief Residents and Fellows Workshop If I Could Do It All Over Again** *Presented by the EAST Career Development Committee*	Newport Salon D-F
4:00 pm-8:30 pm	EAST Board of Directors Meetings	Grand Harbor Salon 1-2
6:00 pm-9:00 pm	Exhibit Set-up	Grand Harbor Ballroom North

WEDNESDAY, JANUARY 18, 2023

6:30 am-7:30 am	Friends of Bill W	Ariel's in Beach Club Resort
6:30 am-5:45 pm	Registration	Asbury Rotunda
6:30 am-5:45 pm	Speaker Preparation	Stonington Boardroom
7:00 am-1:30 pm	Exhibits Open	Grand Harbor Ballroom North
7:00 am-4:45 pm	EAST Development Fund & Information Kiosks	Grand Harbor Foyer
7:00 am-8:00 am	Breakfast in the Exhibit Hall	Grand Harbor Ballroom North
8:00 am-8:30 am	**Opening Ceremony - Flag Ceremony & Opening Remarks**	Grand Harbor Ballroom South
8:30 am-10:00 am	**Scientific Session I: Raymond H. Alexander, MD Resident Paper Competition** *(Papers 1-6)* Moderators: Deborah M. Stein, MD, MPH & Taylor Wallen, MD *(2022 Basic Science Paper Award Recipient)*	Grand Harbor Ballroom South
10:00 am-10:30 am	Morning Break - Refreshments provided in the Exhibit Hall	Grand Harbor Ballroom North
10:30 am-12:00 pm	**Scientific Session II: Raymond H. Alexander, MD Resident Paper Competition** *(Papers 7-12)* Moderators: Cynthia Talley, MD, & Mary K. Bryant, MD *(2022 Clinical Science Paper Award Recipient)*	Grand Harbor Ballroom South
12:00 pm-1:15 pm	Lunch on Own	
12:00 pm-1:15 pm	DePuy Synthes – Satellite Symposium	Grand Harbor Salon 1
12:00 pm-1:15 pm	Prytime Medical Devices – Satellite Symposium	Grand Harbor Salon 4

WEDNESDAY, JANUARY 18, 2023 (CONTINUED)

12:00 pm-5:00 pm	**EAST Blood Drive** Supported through OneBlood	Hampton Room
1:15 pm-2:15 pm	**Scientific Papers that Should Change Your Practice** *Presented by the EAST Manuscript & Literature Committee*	Grand Harbor Ballroom South
2:15 pm-2:30 pm	Break	
2:30 pm-3:30 pm	**Opening Keynote - Presidential Address** ***Alex's Notebook*** **Deborah M. Stein, MD, MPH, FACS, FCCM**	Grand Harbor Ballroom South
3:30 pm-3:45 pm	Break	
3:45 pm-4:45 pm	**Bless the Broken Road: Navigating Personal, Clinical or Career Wrong Turns & Roadblocks** *Presented by the EAST Career Development Committee & the EAST Mentor Member Committee*	Grand Harbor Ballroom South
3:45 pm-4:45 pm	**Language & Bias: Communication Toolkit for EAST4ALL - Are We Doing it Right?** *Presented by the EAST Equity, Diversity, & Inclusion in Trauma Surgery Practice Committee*	Grand Harbor Salon 5-6
3:45 pm-4:45 pm	**Advancing the Practice of Trauma: Utilizing Advanced Practice Providers to Improve Patient Outcomes through a Collaborative Team Approach** *Presented by the EAST Equity, Diversity, & Inclusion in Trauma Surgery Practice Committee, the EAST Career Development Committee, & the EAST Member Recruitment & Retention Committee*	Asbury Hall
3:45 pm-4:45 pm	**Rural Trauma Innovations: Creative Solutions for Providing the Right Care in the Right Place** *Presented by the EAST Military Committee & the EAST Rural Trauma Committee*	Grand Harbor Salon 7-8
5:00 pm-6:10 pm	**EAST Annual Member Forum** **Open to All EAST Members**	Grand Harbor Ballroom South

EAST Receptions & Special Events:

6:15 pm-7:15 pm	EAST Development Fund Donor Reception Reception *(By invitation only)*	Newport Salon B-C
6:30 pm-8:30 pm	Opening Reception *(RSVP requested)*	Shipwreck Beach

Eastern Association for the Surgery of Trauma
36th EAST Annual Scientific Assembly
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OVERALL SCHEDULE
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THURSDAY, JANUARY 19, 2023

6:30 am-7:30 am	Friends of Bill W	Ariel's in Beach Club Resort
6:30 am-5:00 pm	Registration	Asbury Foyer
6:30 am-5:00 pm	Speaker Preparation	Stonington Boardroom
7:00 am-1:30 pm	Exhibits Open	Grand Harbor Ballroom North
7:00 am-5:00 pm	EAST Development Fund & Information Kiosks	Grand Harbor Foyer
7:00 am-9:00 am	Breakfast in the Exhibit Hall	Grand Harbor Ballroom North
7:30 am-8:30 am	**EAST Committee & Ad Hoc Task Force Meetings**	
Grab Breakfast/Coffee in the Exhibit Hall before heading to mtg	Annual Scientific Assembly Committee	Newport Salon A
	Career Development Committee	Newport Salon B
	Development Committee	Newport Salon C
	Emergency General Surgery Committee	Newport Salon D
	Equity, Diversity, & Inclusion in Trauma Surgery Practice Cmte	Newport Salon E
	Guidelines Committee	Newport Salon F
	Manuscript & Literature Review Committee	Grand Harbor Salon 1
	Member Recruitment & Retention Committee	Grand Harbor Salon 2
	Minimally Invasive Surgery/Emerging Technologies Committee	Grand Harbor Salon 3
	Multicenter Trials Committee	Grand Harbor Salon 4
	Quality, Safety and Outcomes Committee	Grand Harbor Salon 5
	Rural Trauma Committee	Grand Harbor Salon 6
8:45 am-9:45 am	**Quick Shots Session I (Papers 1-10)** Moderators: Joshua Carson, MD & Molly Flannagan, MD	Grand Harbor Ballroom South
8:45 am-9:45 am	**Quick Shots Session II (Papers 11-20)** Moderators: Tejal Brahmbhatt, MD & Libby Schroeder, MD	Asbury Hall
9:45 am-10:00 am	Morning Break - Refreshments provided in the Exhibit Hall	Grand Harbor Ballroom North
10:00 am-11:00 am	**EAST Annual Oriens Presentations** *Presented by the EAST Career Development Committee* *Supported by an unrestricted grant from the Polk Family Charitable Foundation* Moderator: Salina Wydo, MD 10:00 am-10:45 am **Keynote Address – #WWCCBD** Clay Cothren Burlew, MD, FACS 10:45 am-11:00 am - 2023 EAST Oriens Essay Presentations Resident Winner – Colin R. Whitmore, DO Fellow Winner – Julia R. Coleman, MD, MPH	Grand Harbor Ballroom South
11:15 am-12:00 pm	**Practice Management Guidelines** *Presented by the EAST Guidelines Committee*	Grand Harbor Ballroom South
11:00 am-4:00 pm	**EAST Blood Drive** Supported through OneBlood	Hampton Room
12:00 pm-1:15 pm	Grab & Go Lunch Provided	
12:00 pm-1:15 pm	EAST Past Presidents Lunch (By invitation only)	Ariel's in Beach Club Resort

THURSDAY, JANUARY 19, 2023 (CONTINUED)

12:00 pm-1:15 pm *Grab & Go Lunch in the Exhibit Hall - grab before heading to mtg*	**EAST Committee & Ad Hoc Task Force Meetings** Burn Surgery Committee Injury Control & Violence Prevention Committee Mentoring Committee Mentor Member Committee Military Committee Educational Resources Committee Research-Scholarship Committee	 Newport Salon A Newport Salon B Newport Salon C Newport Salon D Newport Salon E Newport Salon F Grand Harbor Salon 1
1:30 pm-3:30 pm	**Scientific Session III: Potpourri** (Papers 13-20) Moderators: Laura S. Johnson, MD & Haytham Kaafarani, MD, MPH	Grand Harbor Ballroom South
1:30 pm-3:30 pm	**Scientific Session IV: Cox-Templeton Injury Prevention Paper Competition** (Papers 21-26) Moderators: Hee Soo Jung, MD & Dane Scantling, DO *(2022 Paper Award Recipient)*	Asbury Hall
3:45 pm-5:00 pm	**No Suit, No Problem: Fostering Relationships & Building Careers** *Presented by the EAST Career Development Committee* *(RSVP requested)*	Newport Ballroom East/West

EAST Receptions & Special Events:

6:00 pm-7:00 pm	Society of Trauma Nurses (STN) Networking Reception *(By invitation only)*	Newport Salon A-B
7:00 pm-10:00 pm	EAST President's Reception & Dinner *(By invitation only)*	American Adventure Rotunda at Epcot

Industry Events:

6:00 pm-8:00 pm	Avita Medical	Grand Harbor Salon 1
6:00 pm-8:00 pm	CERUS Corporation	Grand Harbor Salon 4
6:00 pm-8:00 pm	Zimmer-Biomet	Newport Salon E

Eastern Association for the Surgery of Trauma
36th EAST Annual Scientific Assembly
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OVERALL SCHEDULE
Room Locations Subject to Change - See Meeting App for Most Up-to-Date Information

FRIDAY, JANUARY 20, 2023

6:30 am-7:30 am	Friends of Bill W	Ariel's in Beach Club Resort
6:30 am-3:00 pm	Registration	Asbury Foyer
6:30 am-5:00 pm	Speaker Preparation	Stonington Boardroom
7:00 am-10:00 am	Exhibits Open	Grand Harbor Ballroom North
7:00 am-5:00 pm	EAST Development Fund & Information Kiosks	Grand Harbor Foyer
7:00 am-8:00 am	Breakfast in the Exhibit Hall	Grand Harbor Ballroom North
7:45 am-9:45 am	**Scientific Session V: Traumatic Brain Injury & Coagulation** (Papers 27-34) Moderators: Jordan Estroff, MD & Amy Rushing, MD	Grand Harbor Ballroom South
7:45 am-9:45 am	**Scientific Session VI: Multicenter Trials** (Papers 35-42) Moderators: Suresh Agarwal, Jr., MD & Esther Tseng, MD	Asbury Hall
9:45 am-10:00 am	Morning Break - Refreshments provided in the Exhibit Hall	Grand Harbor Ballroom North
10:00 am-11:00 am	**Engage the Experts** *Presented by the EAST Career Development Committee* A highly interactive session that will allow residents, fellows and junior faculty members to present brief, interesting cases to a panel of Experts who will discuss management options, pitfalls, and innovations. Moderators: Roberto Castillo, DO; Prerna Ladha, MBBS; Alaina Lasinski, MD; Hassan Mashbari, MD; Jacinta Robenstine, MD; Stephanie Streit, MD Experts: Thomas Duncan, DO, FACS, FICS Sharon Henry, MD, FACS Stephanie Savage, MD, MS, FACS Case Presentations: Morgan Evans, MD, University of New Mexico Raafat Kuk, MD, Baylor Scott and White/Temple, TX Konstantin Khariton, DO, New York Presbyterian Queens	Grand Harbor Ballroom South
11:15 am-12:00 pm	**Scott B. Frame, MD Memorial Lecture** ***It's Not a Simple Ankle Fracture*** **Rosemary A. Kozar, MD, PhD, FACS**	Grand Harbor Ballroom South

FRIDAY, JANUARY 20, 2023 (CONTINUED)

12:15 pm-1:30 pm — **EAST Awards Ceremony & Recognition & Gavel Exchange Luncheon** — Newport Ballroom East/West

Open to all meeting attendees

- Raymond H. Alexander, MD Resident Paper Competition
- Best Manuscript Award
- EAST Oriens Award
- John P. Pryor, MD Distinguished Service in Military Casualty Care Award
  - 2023 Award Recipient Recognized
- John M. Templeton, Jr., MD Military Call to Service Scholarship
  - 2023 Scholarship Recipients Recognized
- Cox-Templeton Injury Prevention Paper Award
- 2022 Brandeis Executive Leadership Scholarship Recipient
- 2022 Promising Leaders Program Scholarship Recipient
- 2022 Leadership Agility Program Scholarship Recipients
- 2023 John M. Templeton, Jr., MD Injury Prevention Research Scholarship
- 2023 Trauma Research Scholarship
- 2023 Multicenter Trials Junior Investigator Award
- 2023 Leadership Development Workshop Scholarship Recognition

2:00 pm-5:00 pm — **Short Courses - Space is limited, pre-registration required.**

2:00 pm-5:00 pm — **Short Course #1** — Grand Harbor Salon 5-6
Developing the Surgeon Scientist Across All Career Stages
Presented by the EAST Research-Scholarship Committee

2:00 pm-5:00 pm — **Short Course #2** — Grand Harbor Ballroom South
Developing an Emergency General Surgery Quality Improvement Program
Presented by the EAST Emergency General Committee

2:00 pm-5:00 pm — **Short Course #3** — Asbury Hall
Extracorporeal Life Support: To Infinity & Beyond
Presented by the EAST Career Development Committee

2:00 pm-5:00 pm — **Short Course #4** — Grand Harbor Salon 7-8
Skill Sustainment: Maintaining Operative Competency in the Face of Decreasing Operative Cases
Presented by the EAST Military Committee

SATURDAY, JANUARY 21, 2023

7:00 am-8:30 am — EAST Board of Directors Meeting *(By invitation only)* — Asbury Hall D

Eastern Association for the Surgery of Trauma (EAST)
36th Annual Scientific Assembly
SCIENTIFIC SESSIONS

WEDNESDAY, JANUARY 18, 2023

SCIENTIFIC SESSION I
RAYMOND H. ALEXANDER, MD RESIDENT PAPER COMPETITION
Presiding: Deborah Stein, MD, MPH & Taylor Wallen, MD
8:30 am-10:00 am
Location: Grand Harbor Ballroom South

8:30 am	#1	BLOOD COMPONENT RESUSCITATIVE STRATEGIES TO MITIGATE ENDOTHELIOPATHY FOLLOWING HEMORRHAGIC SHOCK Institution: University of Cincinnati Presenter: Matthew Baucom, MD Discussant: Rosemary Kozar, MD, PhD - R Adams Cowley Shock Trauma Center
8:45 am	#2	PATIENTS WITH BOTH TRAUMATIC BRAIN INJURY AND HEMORRHAGIC SHOCK BENEFIT FROM RESUSCITATION WITH WHOLE BLOOD Institution: University of Texas Health Science Center at Houston Presenter: Gabrielle Hatton, MD, MS Discussant: Carrie Sims, MD - The Ohio State University
9:00 am	#3	PLATELET-INSPIRED SYNTHETIC NANOPARTICLES IMPROVE HEMOSTASIS AND HEMODYNAMICS IN A RABBIT MODEL OF ABDOMINAL HEMORRHAGE Institution: University of Pittsburgh Medical Center Presenter: Amudan Srinivasan, MD Discussant: Alica Mohr, MD - University of Florida
9:15 am	#4	TXA DOES NOT AFFECT LEVELS OF TBI-RELATED BIOMARKERS IN BLUNT TBI WITH ICH Institution: University of Chicago Presenter: Lea Hoefer, MD Discussant: Michael Vella, MD - University of Rochester
9:30 am	#5	AGE-RELATED CHANGES IN THROMBOELASTOGRAPHY PROFILES IN INJURED CHILDREN Institution: University of Pittsburgh Medical Center Presenter: Katrina Morgan, MD Discussant: James Bardes, MD - West Virginia University
9:45 am	#6	STATISTICAL POWER OF RANDOMIZED CONTROLLED TRIALS (RCT) IN THE FIELD OF TRAUMA SURGERY Institution: Ryder Trauma Center, University of Miami Miller School of Medicine Presenter: Arthur Berg, DO Discussant: Rachael Callcut, MD, MSPH - UC Davis
10:00 am-10:30 am		Break – Refreshments in the Exhibit Area

SCIENTIFIC SESSION II
RAYMOND H. ALEXANDER, MD RESIDENT PAPER COMPETITION
Presiding: Cynthia Talley, MD & Mary K. Bryant, MD
10:30 am-12:00 pm
Location: Grand Harbor Ballroom South

10:30 am	#7	RECLAIMING THE MANAGEMENT OF COMMON DUCT STONES IN ACUTE CARE SURGERY Institution: Wake Forest Baptist Medical Center Presenter: Maggie Bosley, MD Discussant: Catherine Velopulos, MD, MS – University of Colorado Anschutz
10:45 am	#8	MULTICOMPARTMENTAL TRAUMATIC INJURY INDUCES SEX-SPECIFIC ALTERATIONS IN THE GUT MICROBIOME Institution: University of Florida Presenter: Jennifer Munley, MD Discussant: Susannah Nicholson, MD, MS - Univ of TX Health Science Ctr at San Antonio
11:00 am	#9	PECTIN BASED BIOLOGIC VELCRO EFFECTIVELY SEALS TRAUMATIC SOLID ORGAN AND SMALL BOWEL INJURIES Institution: Madigan Army Medical Center Presenter: James Williams, MD Discussant: Joseph D. Forrester, MD, MSc - Stanford University
11:15 am	#10	RIB INJURY AFTER BLUNT TRAUMA IS ASSOCIATED WITH INCREASED LONG TERM OPIOID USAGE Institution: University Hospitals Cleveland Medical Center Presenter: Avanti Badrinathan, MD Discussant: Tareq Khierbek, MD, ScM - Brown University
11:30 am	#11	REBOA AND RESUSCITATIVE THORACOTOMY ARE ASSOCIATED WITH SIMILAR OUTCOMES AFTER TRAUMATIC CARDIAC ARREST Institution: University of Texas Health Science Center at Houston Presenter: Ezra Koh, MD Discussant: Larry Lottenberg, MD - Florida Atlantic University School of Medicine
11:45 am	#12	SCANNING THE AGED TO MINIMIZE MISSED INJURY, AN EAST MULTICENTER TRIAL Institution: MetroHealth Medical Center Presenter: Sami Kishawi, MD Discussant: Krista Haines, DO - Duke University

End of Raymond H. Alexander, MD Resident Paper Competition

1:15 pm-2:15 pm
Location: Grand Harbor Ballroom South
Scientific Papers that Should Change Your Practice
Presented by the EAST Manuscript & Literature Review Committee
This session will review important papers from 2022 in the field of trauma, surgical critical care, and emergency general surgery and will discuss the ways these papers could and/or should change an individual clinician's practice.
Moderator: David S. Morris, MD
Speakers:
Brittany Bankhead, MD, MS
Laura Brown, MD, PhD
Julia Coleman, MD, MPH

2:15 pm-2:30 pm Break – Refreshments in the Exhibit Area

2:30 pm-3:30 pm
Location: Grand Harbor Ballroom South
Opening Keynote – Presidential Address
Alex's Notebook
Deborah M. Stein, MD, MPH, FACS, FCCM

3:45 pm-4:45 pm – Concurrent Educational Sessions

3:45 pm pm-4:45 pm
Location: Grand Harbor Ballroom South
Bless the Broken Road: Navigating Personal, Clinical or Career Wrong Turns & Roadblocks
Presented by the EAST Career Development Committee & the EAST Mentor Member Committee
There are a number of major personal, clinical, or job-related problems or crises that can and will unexpectedly arise over the course of a career in trauma and acute care surgery. These can include major health-related issues of the surgeon and/or family members, surgical errors or major complications and associated malpractice lawsuits, job dissatisfaction or unexpected career/position changes, adverse administrative actions, toxic or discriminatory work environments, and career burnout and/or moral injury. The resultant emotional or psychological distress and impacts on job performance or career advancement can be devastating if not navigated properly. This session will feature short vignettes presented by surgeons who have experienced one or more of these challenges and have the benefit of retrospect to identify the things they did right, the things they did wrong, and the key take-home lessons they have drawn from the experience. This will be followed by an open panel discussion and audience question and answer session.

Moderators: Tanya Egodage, MD & Salina Wydo, MD
Speakers:
Alison Wilson, MD – Family First: When Major Medical Issues Strike Close to Home
Jennifer Gurney, MD – I Fought the Law: Navigating Adverse Administrative or Legal Actions
D'Andrea Joseph, MD – Toxic Avenger: Strategies and Lessons for the Toxic Work Environment
Matthew Martin, MD – You've Been Served: Survival Skills for Malpractice Litigation
Alec Beekley, MD – The Prefect Surgical Storm: Recovering from a Major Surgical Misadventure

3:45 pm-4:45 pm – Concurrent Educational Sessions

3:45 pm pm-4:45 pm
Location: Grand Harbor Salon 7-8
Rural Trauma Innovations: Creative Solutions for Providing the Right Care in the Right Place
Presented by the EAST Military Committee & the EAST Rural Trauma Committee

Almost 30 million residents of the US live more than an hour-long drive from the nearest trauma center. Rural hospitals are frequently under-resourced and under-staffed to manage critically ill patients, and priority is made to stabilize and transfer. However, transfer of patients with minor injuries for trauma surgeon or subspecialist evaluation can result in overuse of system resources, as well as significant expense for patients. With that in mind, technologic innovation presents exciting opportunities for remote evaluation and triage of injured patients. In this session, we will present four exciting innovations in providing care for patients across large distances, as well as hold a panel discussion on the opportunities for future innovation and collaboration for improving rural residents access to prompt trauma evaluation.

Moderators: Alexandra Briggs, MD & Stephanie Streit, MD
Speakers:
Scott Armen, MD – Military Innovations - Lessons from the Golden Hour Policy
Avi Bhavaraju, MD – Innovative Solutions - Arkansas Trauma Triage
Ashley Meagher, MD, MPH – Innovative Solutions - Indiana Imaging Cloud
Irma Fleming, MD – Innovative Solutions - Utah Model for Tele-Burn Care

3:45 pm pm-4:45 pm
Location: Grand Harbor 5-6
Language & Bias: Communication Toolkit for EAST4All - Are We Doing it Right?
Presented by the EAST Equity, Diversity, & Inclusion in Trauma Surgery Practice Committee
We, as trauma surgeons, should seek to first understand our own biases and then strive to be more cognizant of our biases during patient handoffs as this translates into direct and indirect effects on patient management. Both positive and negative sentiments have the potential to influence attitudes and behaviors of other providers. Stigmatized patients may encounter clinicians in sequence, with each subsequent clinician treating them in accordance with the impressions expressed by the previous clinician. Language has a powerful role in influencing subsequent clinician attitudes and behavior. Attention to this language could have a large influence on the promotion of respect and reduction of disparities for disadvantaged groups. Humor that treats serious, frightening, or painful subject matter in a light or satirical way is well acknowledged as a coping mechanism to deal with difficult or incongruent situations as well as for establishing or affirming intimacy among peers. This humor when used in the narrative, such as during patient handoff or sign out, can introduce or perpetuate bias. Biased language can influence the quality of care patients receive. Attention to this language could have a large influence on the promotion of respect and reduction of disparities for disadvantaged groups. The aim of this session is to improve the patient handoff experiences amongst providers during trauma sign-out (bay/floor) by being aware of our biases (humor) via addressing the words used during the description of the patients/narratives.

Moderators: Ronnie Mubang, MD & Hillman Terzian, MD
Speakers:
Rikat Baroody, MD – Humor as a Coping Mechanism and Introduction of Bias
Milad Behbahaninia, MD – Effects of Biased Communication of Patient Care
Kelly Galey, MD – Skills to Mitigate Biased Language and Tools to Take Back to your Institution

3:45 pm-4:45 pm – Concurrent Educational Sessions

3:45 pm pm-4:45 pm
Location: Asbury Hall

Advancing the Practice of Trauma: Utilizing Advanced Practice Providers to Improve Patient Outcomes through a Collaborative Team Approach

Presented by the EAST Equity, Diversity, & Inclusion in Trauma Surgery Practice Committee, the EAST Career Development Committee, the EAST Member Recruitment & Retention Committee

Trauma Advanced Practice Providers (APP) patient care has been shown to be as safe and efficacious when compared to trauma resident-run teams, indicating that hiring APPs to fill service gaps with resident shortages is a worthwhile strategy for physicians or hospital administrators. APPs can also be implemented into the patient care model alongside resident-run teams, demonstrating the importance of understanding the APP role and team collaboration. This session will help the audience better understand why APPs are utilized and how they can be best integrated into trauma teams to improve patient outcomes and billing patterns most effectively. The session will also introduce APP practice to trauma attending and
resident teams who have not yet integrated them into their team.

Moderators: A. Britton Christmas, MD, MBA & Jeffrey Claridge, MD, MS
Speakers:
Allysen Shaughnessy, DMSc, PA-C – History of APP Utilization & Influence on Hospital Outcomes in Trauma
Benjamin Reynolds, PA-C – Up-to-Date APP Billing & Coding Best Practice in Trauma
Alaina Lasinski, MD – Four Diverse Trauma Centers & Their App Utilization Models

- Raquel Forsythe, MD – Level I – University of Pittsburgh Medical Center-Presbyterian
- Annika Kay, PA-C – Level I – Intermountain Healthcare
- Brian Yorkgitis, PA-C, DO – Level I – University of Florida Jacksonville
- Brandy Younge, MS ACNP – Level I – Ohio Health Grant Medical Center

5:00 pm-6:10 pm
EAST Annual Member Forum – *Open to all EAST Members*
Location: Grand Harbor Ballroom South

THURSDAY, JANUARY 19, 2023

QUICK SHOTS PARALLEL SESSION I

Presiding: Joshua Carson, MD & Molly Flannagan, MD

8:45 am-9:45 am

Location: Grand Harbor Ballroom South

8:45 am	#1	RURAL TRAUMA TEAM DEVELOPMENT COURSE POSITIVELY IMPACTS ITS DESIRED OBJECTIVES: A PROSPECTIVE, OBSERVATIONAL STUDY Institution: University of Nebraska Medical Center Presenter: Zachary Bauman, DO, MHA
8:51 am	#2	USING TRAUMA VIDEO REVIEW TO FIND THE GOLDILOCKS PRE-ACTIVATION TIME Institution: North Shore University Hospital Presenter: Ella Rastegar, BS, EMT-B
8:57 am	#3	CONTEMPORARY MANAGEMENT AND OUTCOMES OF PENETRATING COLON INJURIES USING THE 2020 AAST ORGAN INJURY SCALE Institution: R Adams Cowley Shock Trauma Center, Univ of Maryland School of Medicine Presenter: Ahmad Zeineddin, MD
9:03 am	#4	DANGEROUS PASSAGE: THE UTILITY AND ACCURACY OF MODERN CHEST COMPUTED TOMOGRAPHY IN PENETRATING INJURIES WITH POTENTIAL TRANSMEDIASTINAL TRAJECTORY Institution: LAC+USC Medical Center Presenter: Marco Sozzi, MD
9:09 am	#5	TRAUMA QUALITY OF LIFE FOLLOW UP CLINIC FOR GUN VIOLENCE SURVIVORS: A MULITDISCIPLINARY ONE-STOP SHOP Institution: Medical College of Wisconsin Presenter: Colleen Trevino, NP, PhD
9:15 am	#6	HYPOFIBRINOGENEMIA FOLLOWING INJURY IN 186 CHILDREN AND ADOLESCENTS: PATIENT CHARACTERISTICS, TRANSFUSION PATTERNS, AND OUTCOMES Institution: University of Texas Health Science Center at Houston Presenter: Justin Gerard, MD
9:21 am	#7	EMERGENCY GENERAL SURGERY IN THE ELDERLY: FACTORS ASSOCIATED WITH FRAGMENTED CARE Institution: Massachusetts General Hospital Presenter: Jefferson Proaño-Zamudio, MD
9:27 am	#8	UP AND OVER: CONSEQUENCES OF RAISING THE US-MEXICO BORDER WALL HEIGHT Institution: University of California San Diego Presenter: William Marshall, MD
9:33 am	#9	EVALUATION OF A TRAUMA-FOCUSED MEDICAL SCHOOL COURSE Institution: Vanderbilt University Medical Center Presenter: Marshall Wallace, BS
9:39 am	#10	VARIATION IN CT IMAGING OF PREGNANT TRAUMA PATIENTS ACROSS SOUTHERN CALIFORNIA TRAUMA CENTERS Institution: University of California, Irvine Presenter: Alexa Lucas, MD, MBA

QUICK SHOTS PARALLEL SESSION II

Presiding: Tejal Brahmbhatt, MD & Libby Schroeder, MD

8:45 am-9:45 am

Location: Asbury Hall

8:45 am	#11	ASSOCIATION OF ON-SCENE ADVANCED LIFE SUPPORT INTERVENTIONS WITH RETURN OF SPONTANEOUS CIRCULATION FOLLOWING TRAUMATIC OUT-OF-HOSPITAL CARDIAC ARREST Institution: West Virginia University Presenter: Tanner Smida, BS, NREMT-A
8:51 am	#12	SEE NONE, DO THREE: REPETITIVE INTENTIONAL TRAINING ON HIGH FIDELITY CADAVERIC SIMULATION RAPIDLY IMPROVES CHEST TUBE PROCEDURAL PERFORMANCE IN EARLY SURGICAL RESIDENTS Institution: Creighton University School of Medicine - Phoenix Campus Presenter: Hahn Soe-Lin, MD, MS
8:57 am	#13	AUTOMATED PARTIAL REBOA REDUCES HEMORRHAGE AND HYPOTENSION IN A LETHAL PORCINE LIVER INJURY Institution: Wake Forest University Medical School Presenter: Gabriel Cambronero, MD
9:03 am	#14	THE RACE TO TAMPONADE JUNCTIONAL NON-COMPRESSIBLE HEMORRHAGE AND SUSTAIN HEMOSTASIS FOR 72-HOUR PROLONGED FIELD CARE Institution: Naval Medical Research Unit San Antonio Presenter: Adam J. Kishman, DSc, MPAS, PA-C, LT, MSC, USN
9:09 am	#15	A SIMPLE ENGINEERING ALTERATION TO IO ACCESS DEVICE ELECTRONICS CAN LEAD TO IMPROVED PLACEMENT ACCURACY CONFIRMATION Institution: Perlman School of Medicine, School of Engineering, University of Pennsylvania Presenter: Rohan Vemu
9:15 am	#16	ASSOCIATION OF EARLY RIB PLATING ON CLINICAL AND FINANCIAL OUTCOMES: A NATIONAL ANALYSIS Institution: Loma Linda University Medical Center Presenter: Kaushik Mukherjee, MD, MSCI
9:21 am	#17	DAMAGE CONTROL THORACOTOMY: TRENDS, TECHNIQUES, AND OUTCOMES: AN EAST MULTICENTER TRIAL Institution: Indiana University Presenter: Anthony Douglas, MD
9:27 am	#18	ANGIOEMBOLIZATION FOR HIGH-GRADE BLUNT SPLENIC INJURIES WITH HEMODYNAMIC INSTABILITY: WHERE IS THE SWEET SPOT? Institution: Japan Red Cross Maebashi Hospital Presenter: Makoto Aoki, MD, PhD
9:33 am	#19	RISK FACTORS FOR ANASTOMOTIC LEAK FOLLOWING PRIMARY ANASTOMOSIS OF BLUNT-TRAUMA ASSOCIATED BUCKET HANDLE INTESTINAL INJURIES: A MULTI-CENTER STUDY Institution: Texas Tech University Health Sciences Center at Lubbock Presenter: Erin Morris, BS
9:39 am	#20	A WTA MULTICENTER COMPARISON OF MESH VERSUS NON-MESH REPAIR OF BLUNT TRAUMATIC ABDOMINAL WALL HERNIAS Institution: University of Tennessee-Chattanooga Presenter: Kevin Harrell, MD
9:45 am-10:00 am		Break – Refreshments in the Exhibit Area

THURSDAY, JANUARY 19, 2023 continued

10:00 am-11:00 am
Location: Grand Harbor Ballroom South
EAST Annual Oriens Presentations
Presented by the EAST Career Development Committee
Supported by an unrestricted grant from the Polk Family Charitable Foundation

10:00 am-10:45 am
Keynote Address - #WWCCBD
Clay Cothren Burlew, MD, FACS

10:45 am-11:00 am 2023 EAST Oriens Essay Presentations
Resident Winner – Colin R. Whitmore, DO
Fellow Winner – Julia R. Coleman, MD, MPH

11:15 am-12:00 pm
Location: Grand Harbor Ballroom South
Practice Management Guidelines
Presented by the EAST Guidelines Committee
The EAST PMGs are the association's signature product, developed using GRADE methodology, a highly regarded, rigorous, transparent, and reproducible approach to conducting systematic literature reviews and creating evidence-based recommendations. Clinicians around the world rely on EAST for these guidelines which shape how trauma, emergency surgery, injury prevention, and surgical critical care is being practiced worldwide. These PMGs help standardize and improve safety and quality of surgical care. This plenary will facilitate the dissemination and translation of cutting-edge research into clinical practice. The annual EAST PMG session is one of the most attended; participants are informed of the latest developments in our field with opportunities to incorporate evidence-based recommendations in their daily practice.

Moderators: George Kasotakis, MD, MPH & Lisa Kodadek, MD

Practice Management Guidelines to be Presented (subject to change):
- Optimal Timing of Femur Fracture Stabilization in Polytrauma Patients – Rajesh Gandhi, MD, PhD
- Pediatric Blunt Cerebrovascular Injury (BCVI) – Katherine Riera, MD
- The Efficacy & Safety of Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) Following Orthopedic Trauma – Patrick Murphy, MD, MPH, MSc
- Intimate Partner Violence Prevention – Amanda Teichman, MD
- Management of Pleural Effusion in Ventilator-Dependent Critical Care Patients – William Chiu, MD

12:00 pm-1:15 pm
Grab & Go Lunch

PARALLEL SCIENTIFIC SESSION III
POTPOURRI
Presiding: Laura S. Johnson, MD & Haytham Kaafarani, MD, MPH
1:30 pm pm-3:30 pm
Location: Grand Harbor Ballroom South

1:30 pm	#13	EMERGENCY DEPARTMENT VERSUS OPERATING ROOM INTUBATION OF PATIENTS UNDERGOING IMMEDIATE HEMORRHAGE CONTROL SURGERY Institution: Johns Hopkins School of Medicine Presenter: Zachary Dunton, BS, MPH Discussant: Douglas Schuerer, MD - Washington University School of Medicine
1:45 pm	#14	CHARACTERIZATION OF FATAL BLUNT INJURIES USING POST-MORTEM COMPUTED TOMOGRAPHY Institution: Indiana University Presenter: Jeremy Levin, MD Discussant: Jordan Estroff, MD - George Washington University
2:00 pm	#15	BURN EXCISION WITHIN 48 HOURS PORTENDS BETTER OUTCOMES THAN STANDARD MANAGEMENT Institution: Ryder Trauma Center, University of Miami Miller School of Medicine Presenter: Walter Ramsey, MD Discussant: Alisa Savetamal, MD - Bridgeport Hospital/ Connecticut Burn Center
2:15 pm	#16	AUTOMATED RIB FRACTURE DETECTION AND CHARACTERIZATION ON COMPUTED TOMOGRAPHY SCANS USING COMPUTER VISION Institution: Stanford University Presenter: Jeff Choi, MD, MSc Discussant: Patrick Greiffenstein, MD - LSU Health Science Center-New Orleans
2:30 pm	#17	PATIENT-REPORTED OUTCOMES IN TRAUMA: WHAT IS IMPORTANT TO INJURED PATIENTS? Institution: University of Texas at Austin Dell Medical School Presenter: Jason Hutzler, MD Discussant: Amy Krichten, MSN, RN, CEN, TCRN - PA Trauma Systems Foundation
2:45 pm	#18	TIMING OF REGIONAL ANALGESIA IN GERIATRIC BLUNT CHEST WALL INJURY Institution: Massachusetts General Hospital Presenter: Jefferson Proaño-Zamudio, MD Discussant: Sabrina Sanchez, MD, MPH - Boston Medical Center
3:00 pm	#19	EARLY CAREER ACUTE CARE SURGEONS' WORK PRIORITIES AND PERSPECTIVES: A MIXED-METHODS ANALYSIS Institution: Medical College of Wisconsin Presenter: Patrick Murphy, MD, MPH, MSc Discussant: Scott Sagraves, MD - Baylor Scott & White Medical Center-Temple
3:15 pm	#20	UTILITY OF CT THORACOLUMBAR SPINAL RECONSTRUCTION IMAGING IN BLUNT TRAUMA Institution: Rutgers Robert Wood Johnson Medical School Presenter: Abhishek Swarup, MD Discussant: Rachel L. Warner, DO - University of Florida-Jacksonville

PARALLEL SCIENTIFIC SESSION IV
COX-TEMPLETON INJURY PREVENTION PAPER COMPETITION
Presiding: Hee Soo Jung, MD & Dane Scantling, DO, MPH
1:30 pm pm-3:30 pm
Location: Asbury Hall

1:30 pm	#21	STEPPING-ON STEPS-UP: EVALUATION OF THE STEPPING-ON FALL PREVENTION PROGRAM Institution: UCHealth University of Colorado Hospital Presenter: Laurie Lovedale, MPH Discussant: Lisa Allee, MSW, LICSW - Boston Medical Center
1:45 pm	#22	A NOVEL TOOL TO IDENTIFY COMMUNITY RISK FOR FIREARM VIOLENCE: THE FIREARM VIOLENCE VULNERABILITY INDEX (FVVI) Institution: University of Chicago Presenter: Ann Polcari, MD, MPH, MSGH Discussant: Rebecca Plevin, MD - University of California, San Francisco
2:00 pm	#23	PROJECT INSPIRE PILOT STUDY: A HOSPITAL-LED, COMPREHENSIVE INTERVENTION REDUCES GUN VIOLENCE AMONG JUVENILES DELINQUENT OF GUN CRIMES Institution: University of South Alabama Presenter: Ashley Williams, MD Discussant: Julius Cheng, MD, MPH - University of Rochester Medical Center
2:15 pm	#24	DEVELOPMENT OF A NOMOGRAM TO IDENTIFY PATIENTS AT RISK OF SELF-HARM AFTER TRAUMA Institution: MetroHealth Medical Center Presenter: Andrew Tran, MD Discussant: D'Andrea Joseph, MD - NYU-Langone Long Island
2:30 pm	#25	FIREARM LEGISLATION – THE ASSOCIATION BETWEEN NEIGHBORING STATES AND CRUDE DEATH RATES Institution: University of Miami Miller School of Medicine Presenter: Majid Chammas, MD Discussant: Stephanie Bonne, MD - Hackensack University Medical Center
2:45 pm	#26	HISTORY REPEATS ITSELF: IMPACT OF MENTAL ILLNESS ON HOSPITAL REENCOUNTERS AND VIOLENT REINJURY AMONG FEMALE VICTIMS OF INTERPERSONAL VIOLENCE Institution: Boston University School of Medicine Presenter: Miriam Neufeld, MD, MPH Discussant: Susan Kartiko, MD, PhD - George Washington University

End of Cox-Templeton Injury Prevention Paper Competition

3:45 pm-5:45 pm
No Suit, No Problem: Fostering Relationships & Building Careers
Presented by the EAST Career Development Committee
Location: Newport Ballroom East/West

FRIDAY, JANUARY 20, 2023

PARALLEL SCIENTIFIC SESSION V – TRAUMATIC BRAIN INJURY & COAGULATION
Presiding: Bellal Joseph, MD & Amy Rushing, MD
7:45 am-9:45 am
Location: Grand Harbor Ballroom South

7:45 am	#27	SIMILAR RATE OF VENOUS THROMBOEMBOLISM AND FAILURE OF NON-OPERATIVE MANAGEMENT FOR EARLY VERSUS DELAYED VTE CHEMOPROPHYLAXIS IN ADOLESCENT BLUNT SOLID ORGAN INJURIES: A PROPENSITY-MATCHED ANALYSIS Institution: University of California Irvine Presenter: Areg Grigorian, MD Discussant: Mathew E. Kutcher, MD MS - University of Mississippi Medical Center
8:00 am	#28	TRANSFUSION-RELATED COST COMPARISON OF TRAUMA PATIENTS RECEIVING WHOLE BLOOD VERSUS COMPONENT THERAPY Institution: University of Texas Health Science Center, San Antonio, TX Presenter: John C. Myers, MD Discussant: Linda Dultz, MD, MPH - UT Southwestern Parkland Hospital
8:15 am	#29	DURA VIOLATION IS ASSOCIATED WITH INCREASED PATHOLOGIC HYPERCOAGLUABILITY IN TRAUMATIC BRAIN INJURY PATIENTS Institution: University of Colorado, Aurora Presenter: Julia Coleman, MD, MPH Discussant: Nicole M. Bedros, MD - Baylor University Medical Center Dallas
8:30 am	#30	PREDICTIVE VALUE OF EARLY INFLAMMATORY MARKERS IN TRAUMA PATIENTS Institution: University of Cincinnati Presenter: Matthew Baucom, MD Discussant: Taryn Travis, MD - Medstar Washington Hospital Center
8:45 am	#31	ANALYSIS OF BIG SCORES AND PLATELET INHIBITION IN PATIENTS WITH TRAUMATIC BRAIN INJURIES Institution: University of Tennessee-Chattanooga Presenter: Hunter Parmer, BS, MD Discussant: Purvi Patel, MD - Loyola University Medical Center
9:00 am	#32	EARLY POST-TBI TXA PREVENTS BBB HYPERPEMERABILITY INDEPENDENT OF PENUMBRAL LEUKOCYTE MOBILIZATION Institution: Perelman School of Medicine, University of Pennsylvania Presenter: Matthew Culkin, BS Discussant: Susan Rowell, MD, MBA, MCR - University of Chicago
9:15 am	#33	A RANDOM FOREST MODEL USING FLOW CYTOMETRY DATA IDENTIFIES PULMONARY INFECTION AFTER THORACIC INJURY Institution: Emory University School of Medicine Presenter: Rondi Gelbard, MD Discussant: Mark Hoofnagle, MD, PhD - Washington University
9:30 am	#34	ARE DATA DRIVING OUR AMBULANCES? LIBERAL USE OF TRANEXAMIC ACID IN THE PREHOSPITAL SETTING Institution: Wake Forest University Medical School Presenter: Alexandra Brito, MD Discussant: Avi Bhavaraju, MD - University of Arkansas for Medical Sciences

FRIDAY, JANUARY 20, 2023 continued

PARALLEL SCIENTIFIC SESSION VI – MULTICENTER TRIALS

Presiding: Suresh Agarwal, Jr., MD & Esther Tseng, MD

7:45 am-9:45 am

Location: Asbury Hall

7:45 am	#35	RETHINKING PROTOCOLIZED COMPLETION ANGIOGRAPHY FOLLOWING EXTREMITY VASCULAR TRAUMA: A PROSPECTIVE OBSERVATIONAL MULTICENTER TRIAL Institution: University of Pennsylvania Presenter: Grace Niziolek, MD Discussant: Joseph J. DuBose, MD - Dell School of Medicine, University of Texas-Austin
8:00 am	#36	MOVING THE NEEDLE ON TIME TO RESUSCITATION: AN EAST PROSPECTIVE MULTICENTER STUDY OF VASCULAR ACCESS IN HYPOTENSIVE INJURED PATIENTS USING TRAUMA VIDEO REVIEW Institution: University of Texas Southwestern Medical Center Presenter: Ryan Dumas, MD Discussant: Allyson M. Hynes, MD - University of New Mexico
8:15 am	#37	OUTCOMES AMONG TRAUMA PATIENTS WITH DUODENAL LEAK FOLLOWING PRIMARY VS COMPLEX REPAIR OF DUODENAL INJURIES: AN EAST MULTICENTER TRIAL Institution: Rutgers Robert Wood Johnson Medical School Presenter: Rachel Choron, MD Discussant: Sydney Radding, MD - Virginia Commonwealth University
8:30 am	#38	EARLY VTE PROPHYLAXIS IN SEVERE TRAUMATIC BRAIN INJURY: A PROPENSITY SCORE WEIGHTED EAST MULTI-CENTER STUDY Institution: Crozer Chester Medical Center Presenter: Daniel Kim, MD Discussant: Christina Colosimo, DO, MS - University of Arizona, Tucson
8:45 am	#39	ANTICOAGULATION IN EMERGENCY GENERAL SURGERY: WHO BLEEDS MORE? THE EAST ACES MULTICENTER TRIAL Institution: R Adams Cowley Shock Trauma Center, Univ of Maryland School of Medicine Presenter: Lindsay O'Meara, CRNP Discussant: Tasce Bongiovanni, MD, MPP, MHS - Zuckerberg San Francisco General Hospital
9:00 am	#40	DOES FRACTURE FIXATION TECHNIQUE INFLUENCE COGNITIVE OUTCOMES IN TRAUMATIC BRAIN INJURY (TBI)? THE EAST BRAIN VS. BONE MULTICENTER TRIAL Institution: R Adams Cowley Shock Trauma Center, Univ of Maryland School of Medicine Presenter: Mira Ghneim, MD Discussant: Abid Khan, MD - University of Chicago
9:15 am	#41	CRYSTALLOID VOLUME IS ASSOCIATED WITH SHORT TERM MORBIDITY IN CHILDREN WITH SEVERE TRAUMATIC BRAIN INJURY: AN EASTERN ASSOCIATION FOR THE SURGERY OF TRAUMA MULTICENTER TRIAL POST-HOC ANALYSIS Institution: Mayo Clinic Presenter: Taleen MacArthur, MD Discussant: Molly Deane, MD - Harbor UCLA Medical Center
9:30 am	#42	WOUND INFECTION RATE AFTER SKIN CLOSURE OF DAMAGE CONTROL LAPAROTOMY WITH WICKS OR INCISIONAL NEGATIVE WOUND THERAPY: AN EAST MULTICENTER TRIAL Institution: Prisma Health Upstate Presenter: John Cull, MD Discussant: Ali F. Mallat, MD, MS - Cleveland Clinic Foundation
9:45 am – 10:00 am		Break – Refreshments in the Exhibit Area

10:00 am-11:00 am
Location: Grand Harbor Ballroom South
Engage the Experts
Presented by the EAST Career Development Committee
The "Engage the Experts" forum will be a highly interactive session that will allow residents, fellows and junior faculty members to present brief, interesting cases to a panel of Experts who will discuss management options, pitfalls, and innovations.

Moderators: Roberto Castillo, DO; Prerna Ladha, MBBS; Alaina Lasinski, MD; Hassan Mashbari, MD; Jacinta Robenstine, MD; Stephanie Streit, MD

Experts:
Thomas Duncan, DO, FACS, FICS
Sharon Henry, MD, FACS
Stephanie Savage, MD, MS, FACS

Case Presentations:
- Morgan Evans, MD, University of New Mexico
- Konstantin Khariton, DO, New York Presbyterian Queens
- Raafat Kuk, MD, Baylor Scott and White/Temple, TX

11:15 am-12:00 pm
Scott B. Frame, MD Memorial Lecture
It's Not a Simple Ankle Fracture
Rosemary A. Kozar, MD, PhD, FACS
Location: Grand Harbor Ballroom South

12:15 pm-1:30 pm
EAST Awards Ceremony & Recognition & Gavel Exchange Luncheon
Open to all assembly attendees
Location: Grand Harbor Salon 1-4

2:00 pm-5:00 pm
EAST Short Courses

Short Course #1
Developing the Surgeon Scientist Across All Career Stages
Presented by the EAST Research-Scholarship Committee
Location: Grand Harbor 5-6

Short Course #2
Developing an Emergency General Surgery Quality Improvement Program
Presented by the EAST Emergency General Surgery Committee
Location: Grand Harbor Ballroom South

Short Course #3
Extracorporeal Life Support: To Infinity & Beyond
Presented by the EAST Career Development Committee
Location: Asbury Hall

Short Course #4
Skill Sustainment: Maintaining Operative Competency in the Face of Decreasing Operative Cases
Presented by the EAST Military Committee
Location: Grand Harbor Salon 7-8

east
36TH ANNUAL SCIENTIFIC ASSEMBLY
Eastern Association for the Surgery of Trauma
Advancing Science, Fostering Relationships, and Building Careers
January 17-21, 2023
Lake Buena Vista, Florida
#EAST2023

ABSTRACTS

Podium Papers

Pages 2-82

Quick Shot Papers

Pages 83-120

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #1
January 18, 2023
8:30 am

BLOOD COMPONENT RESUSCITATIVE STRATEGIES TO MITIGATE ENDOTHELIOPATHY FOLLOWING HEMORRHAGIC SHOCK

Matthew R. Baucom, MD, Taylor Wallen, MD*, Allison Amman, MD,
Nick Weissman, BS, Lisa England, RVT, Rebecca Schuster, MS,
Timothy A. Pritts, MD, PhD*, Michael Goodman, MD*
University of Cincinnati

Presenter: Matthew R. Baucom, MD

Discussant: Rosemary Kozar, MD, PhD - R Adams Cowley Shock Trauma Center

Objectives: Resuscitation with plasma components has been shown to improve endotheliopathy induced by hemorrhagic shock, but the optimal resuscitation strategy to preserve the endothelial glycocalyx has yet to be defined. The aim of this study was to determine if resuscitation with whole blood (WB), packed red blood cells (RBC), platelet rich plasma (PRP), platelet poor plasma (PPP), or balanced RBC:PRP (1:1) would best minimize endothelial damage following shock.

Methods: Male C57BL/6 mice were hemorrhaged to a goal MAP of 25 mm Hg for one hour. Unshocked sham mice served as controls. Mice were then resuscitated with equal volumes of lactated Ringer's (LR), WB, RBC, PRP, PPP, or 1:1 and then sacrificed at 1-, 4-, or 24-hours (n=5). Serum was analyzed for syndecan-1 concentration. Lungs underwent syndecan-1 immunostaining and lung injury scores were calculated after H&E stains. Proteolytic cleavage of the endothelial glycocalyx was assessed by MMP-9 and heparanase activity levels in homogenized lung tissue.

Results: Serum syndecan-1 levels were significantly decreased at 4- and 24-hours following resuscitation with WB, RBC, and PRP compared to LR (**Figure 1**). Early elevation in lung syndecan-1 staining was noted in LR treated mice following shock while WB and PPP treated animals displayed late elevation (**Figure 2**). Lung injury scores were significantly elevated 4 hours after resuscitation with LR (4.54 ± 1.48), PRP (5.96 ± 0.67), and PPP (4.59 ± 1.95) compared to WB (1.47 ± 0.76). No significant differences were noted in MMP-9 activity. Heparanase activity was increased in mice resuscitated with RBC at 1 and 24 hours vs. LR.

Conclusions: Resuscitation with WB following hemorrhagic shock reduces endothelial syndecan-1 shedding and mitigates lung injury. Further research will be necessary to determine which WB components provide optimal and sustained systemic, pulmonary, and endothelial benefit.

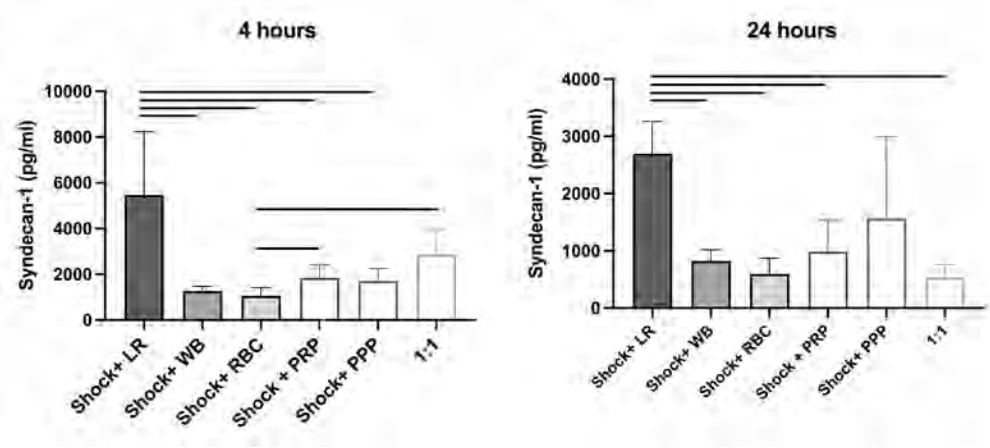


Figure 1: Serum syndecan-1 levels following hemorrhagic shock and resuscitation.

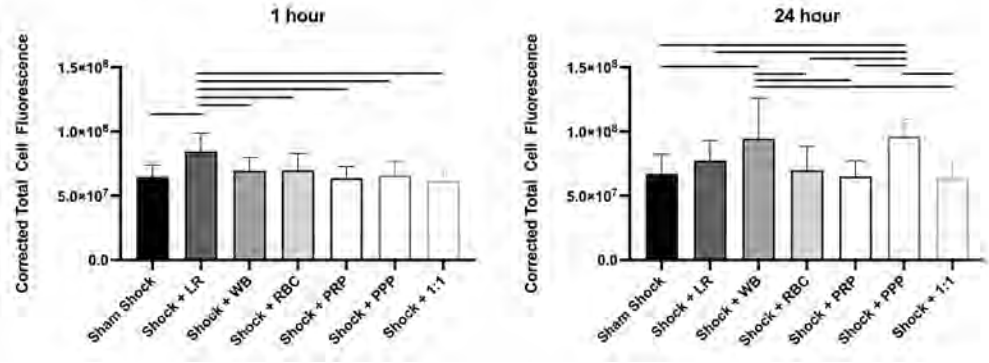


Figure 2: Lung syndecan-1 immunostaining following hemorrhagic shock and resuscitation.

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #2
January 18, 2023
8:45 am

PATIENTS WITH BOTH TRAUMATIC BRAIN INJURY AND HEMORRHAGIC SHOCK BENEFIT FROM RESUSCITATION WITH WHOLE BLOOD

Gabrielle E. Hatton, MD, MS*, Jason Brill, MD, Brian Tang, MD,
Krislynn Mueck, MD, MPH, MS*, Christopher Cameron McCoy, MD*,
Lillian Kao, MD MS, Bryan A. Cotton, MD, MPH
University of Texas Health Science Center at Houston

Presenter: Gabrielle E. Hatton, MD, MS

Discussant: Carrie Sims, MD - The Ohio State University

Objectives: Hemorrhagic shock in the setting of traumatic brain injury (TBI) reduces cerebral blood flow and doubles mortality. The optimal resuscitation strategy for hemorrhage in the setting of TBI is unknown. We hypothesized that, among patients presenting with concomitant hemorrhagic shock and TBI, resuscitation including whole blood (WB) is associated with decreased overall and TBI-related mortality when compared to patients receiving component (COMP) therapy alone.

Methods: An *a priori* subgroup of prospective, observational cohort study of injured patients receiving emergency-release blood products for hemorrhagic shock is reported. Adult trauma patients presenting 11/2017-9/2020 with TBI, defined as a Head Abbreviated Injury Scale of ³ 3, were included. WB group patients received any cold-store low-titer Group O WB units. The COMP group received fractionated blood components alone. Overall and TBI-related 30-day mortality, favorable discharge disposition (home or rehabilitation), 24-hour blood product utilization, and ventilator days were assessed. Univariate and inverse probability of treatment-weighted multivariable analyses were performed.

Results: Of 564 eligible patients, 341 received WB. Patients who received WB had a higher injury severity score (median 34 vs 29), lower scene blood pressure (104 vs 118), and higher arrival lactate (4.3 vs 3.6, all $p<0.05$). Univariate analysis noted similar overall mortality between WB and COMP; however, weighted multivariable analyses found WB was associated with decreased overall mortality, TBI-related mortality, and decreased 24-hour blood product utilization. (**Table**) Favorable discharge disposition and ventilator days were not associated with WB compared to COMP therapy.

Conclusions: In patients with concomitant hemorrhagic shock and TBI, WB transfusion was associated with decreased overall mortality, TBI-related mortality, and blood product utilization.

Comparison of Resuscitation including Whole Blood and Component Therapy Alone on Outcomes in Patients with Traumatic Brain Injury					
	Univariate			Weighted, Multivariable	
Outcome of Interest	COMP (N=223)	WB (N=341)	P	WB Odds Ratio (95% Conf. Interval)	P
24 Hour Blood Products, Units	4 (2-9)	4 (1-12)	0.07	0.91 (0.87-0.95)[#]	<0.001
30-Day Overall Mortality	39%	44%	0.32	0.70 (0.50-0.97)	0.03
30-Day TBI-Related Mortality	22%	15%	0.06	0.52 (0.35-0.77)	<0.001
Favorable Discharge Disposition	35%	29%	0.13	1.08 (0.79-1.47)	0.64
Ventilator Days (Survivors)	2 (1-7)	1 (1-5)	0.77	0.95 (0.89-1.02)[#]	0.20
Continuous Variables: Median (IQR) **[#]Rate Ratio**					

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #3
January 18, 2023
9:00 am

PLATELET-INSPIRED SYNTHETIC NANOPARTICLES IMPROVE HEMOSTASIS AND HEMODYNAMICS IN A RABBIT MODEL OF ABDOMINAL HEMORRHAGE

Amudan J. Srinivasan, MD, Zachary Secunda, BS, Roberto I. Mota-Alvidrez, MD, Norman Luc, MS, Dante Disharoon, PhD, Baylee Traylor, BS, Christa Pawlowski, PhD, Joshua B. Brown, MD, MSc, FACS*, Michael Bruckman, PhD, Anirban Sen Gupta, PhD, Matthew D. Neal, MD
University of Pittsburgh Medical Center

Presenter: Amudan J. Srinivasan, MD

Discussant: Alica Mohr, MD - University of Florida

Objectives: Early platelet transfusion is associated with decreased mortality in traumatic hemorrhage. However, donor supply constraints and rapid expiry limit potential platelet usage. SynthoPlate (SP) is a platelet-inspired synthetic nanoparticle designed by surface-decorating liposomes with peptides that mimic injury-site platelet adhesion to vWF and collagen, as well as fibrinogen-mediated platelet aggregation. SP has shown hemostatic benefit in murine, rodent and porcine hemorrhage models. We evaluated hemostasis and hemodynamic effects of SP in a rabbit model of abdominal hemorrhage.

Methods: 23 adult male New Zealand white rabbits (2.5-3.5kg) were pretreated with either buffer, control particles (CP), or SP. Under general anesthesia with invasive monitoring, rabbits underwent laparotomy with standardized splenic and hepatic injury. Hemodynamics were monitored for 30 minutes and blood loss was quantified. Blood counts, aggregometry, and catecholamine assays were performed at multiple timepoints. Analysis used ANOVA and post-hoc Tukey testing with $\alpha=0.05$.

Results: Rabbits in the SP (n=7) group had significantly lower weight-normalized blood loss compared to both buffer (n=8) and CP (n=8) animals (21.1 vs 33.2 vs 40.4 g/kg, $p<0.001$). Areas under the curve (AUC) for mean arterial and systolic pressure were calculated to evaluate hemodynamics over time. SP animals had higher systolic AUC compared to buffer and CP animals (1589 vs 1353 vs 1172mmHg*min, $p=0.01$), though post-hoc differences were only significant for the SP:CP comparison ($p=0.01$). Platelet counts, catecholamine levels, and aggregometry were similar between groups.

Conclusions: SP pretreatment reduced blood loss and improved hemodynamic metrics in a rabbit model of abdominal hemorrhage. SP has potential in trauma as an intravenous hemostatic platelet surrogate with donor-independent availability and scalable manufacture.

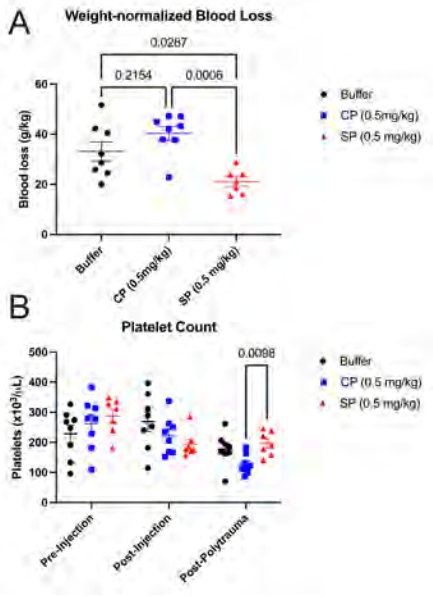


Figure 1: Normalized blood loss and platelet counts. A: Total intraperitoneal blood loss normalized by animal weight. B: Platelet counts at pre-intervention, post-intervention, and post-polytrauma timepoints. Data are presented as individual data points,
error bars denote mean +/- SEM.

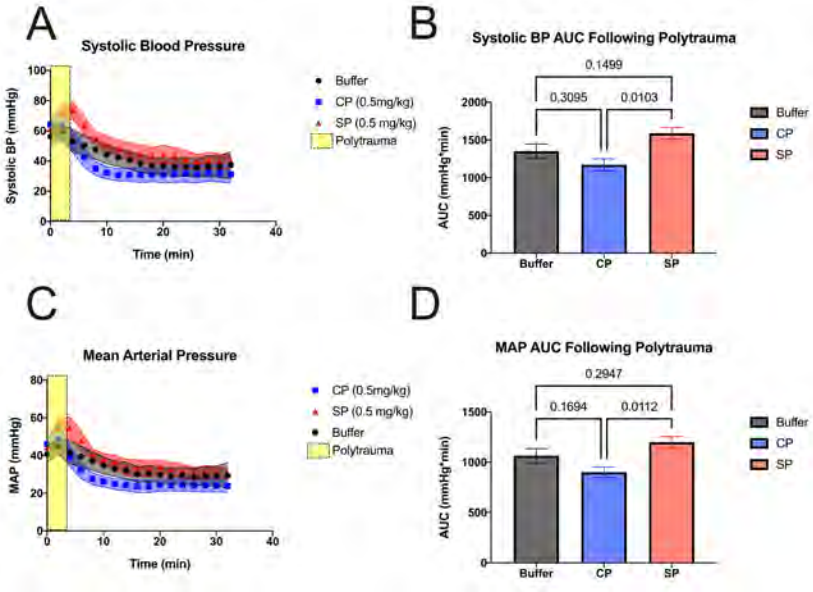


Figure 2: Systolic and mean arterial pressure (MAP) following polytrauma. Mean values for systolic pressure (A) and MAP (C) from the start of the polytrauma are graphed with shaded regions denoting +/- 1 SEM. Areas under the curve (AUC) were calculated for individual systolic pressure (B) and MAP (D) tracings to evaluate hemodynamics over time
and are displayed as mean +/- SEM.

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #4
January 18, 2023
9:15 am

TXA DOES NOT AFFECT LEVELS OF TBI-RELATED BIOMARKERS IN BLUNT TBI WITH ICH

Lea Hoefer, MD, Ann M. Polcari, MD, MPH, MSGH*,
Susan E. Rowell, MD, MBA, MCR*, Martin A. Schreiber, MD, FACS*,
Tanya L. Zakrison, MD, MPH, FRCSC, FACS*, Andrew J. Benjamin, MD, MS*
University of Chicago

Presenter: Lea Hoefer, MD

Discussant: Michael Vella, MD - University of Rochester

Objectives: Brain specific biomarkers such as glial fibrillary acidic protein (GFAP), ubiquitin C-terminal hydrolase L1 (UCH-L1), and microtubule-associatedprotein-2 (MAP-2) have been identified as tools for diagnosis in traumatic brain injury (TBI). TXA has been shown to decrease mortality in patients with ICH, yet the effect of TXA on these biomarkers is unknown. We sought to determine whether TXA affects levels of GFAP, UCH-L1, and MAP-2, and to identify whether biomarker levels are associated with mortality in patients receiving TXA.

Methods: Patients enrolled in the prehospital TXA for TBI trial had GFAP, UCHL-1 and MAP-2 levels drawn at 0 and 24 hours post injury(n=422). Patients with intracranial hemorrhage (ICH) from blunt trauma with a GCS <13 and SBP >90 were randomized to placebo, 2g TXA bolus, or 1g bolus + 1g/8hrs TXA infusion. Associations of TXA and biomarker change over 24 hours were assessed with multivariate linear regression. Association of biomarkers with 28-day mortality was assessed with multivariate logistic regression models. All models were controlled for age, GCS, ISS, and AIS head.

Results: Administration of TXA was not associated with a change in biomarkers over 24 hours post-injury. Changes in biomarker levels were most closely associated with AIS head and age (Table 1). On admission, higher GFAP (OR 1.75, CI 1.31-2.38, p<0.001) was associated with increased 28-day mortality. At 24 hours post injury, higher levels of GFAP (OR 2.09, CI 1.37-3.30, p<0.001 and UCHL-1(OR 2.98, CI 1.77-5.25, p<0.001) were associated with mortality. A change in UCH levels from 0 to 24 hours post-injury was also associated with increased mortality (OR 1.68, CI 1.15-2.49, p<0.01) (Table 2).

Conclusions: Administration of TXA does not impact change in GFAP, UCHL-1, or MAP-2 during the first 24 hours after blunt TBI with ICH. Higher levels of GFAP and UCH early after injury may help identify patients at high risk for 28-day mortality.

Table 1: Impact of patient factors and treatment group on change in biomarker levels over first 24 hours

Variable	Coefficient	2.5-97.5% CI	P value
Δ GFAP level from admission to 24 hours post injury			
ISS	-0.0099	-0.0248- 0.0050	0.19288
Age	0.0074	0.0003- 0.0145	0.04123 *
Max AIS head	-0.2389	-0.410- -0.0678	0.00634 **
Qualifying GCS	-0.0025	-0.0478- 0.0428	0.91346
2g TXA bolus	-0.1189	-0.4262-0.1883	0.44701
1g TXA bolus +1g	-0.0504	-0.375- 0.2745	0.76041
Δ UCH level from admission to 24 hours post injury			
ISS	0.9827	-0.0281- -0.0069	0.001279**
Age	1.0135	0.0083-0.01845	<0.001***
Max AIS head	1.2740	0.1203-0.3641	0.000112**
Qualifying GCS	0.9719	-0.0608-0.0037	0.082890
2g TXA bolus	0.9508	-0.2693-0.1684	0.650654
1g TXA bolus +1g	0.8831	-0.3557-0.1071	0.291589
Δ MAP level from admission to 24 hours post injury			
ISS	-0.0392	-0.0554- -0.0229	<0.001***
Age	-0.0110	-0.0188- -0.0033	0.0053**
Max AIS head	0.3829	0.1960-0.5698	<0.001***
Qualifying GCS	-0.0015	-0.0509-0.04799	0.9533
2g TXA bolus	0.0439	-0.2915 -0.3784	0.7968
1g TXA bolus +1g	-0.1525	-0.5073 – 0.2023	0.3984

*** p<0.001. ** p<0.01. * p<0.05
All biomarker levels log-adjusted

Table 2 – Factors influencing 28d mortality in patients with blunt TBI and ICH

	OR	2.5-97.5% CI	P value
ED admission (n=422)			
Age	1.05	1.028-1.073	<0.001***
ISS	1.032	0.995-1.073	0.091
AIS head	1.378	0.825-2.332	0.22
Qualifying GCS	0.733	0.663-0.846	<0.001 ***
2g TXA bolus	0.443	0.192-1.000	0.053
1g+1g TXA	0.477	0.203-1.093	0.084
GFAP	1.75	1.314-2.380	<0.001 ***
UCH	1.085	0.699-1.696	0.717
MAP	1.24	0.941-1.671	0.134
24 HRs post injury (n=364)			
Age	1.039	1.012-1.068	.0057 **
ISS	1.020	0.975-1.061	0.356
AIS head	2.180	1.258-4.066	0.0085 **
Qualifying GCS	0.778	0.651-0.918	0.004 **
2g TXA bolus	0.639	0.242-1.684	0.362
1g+1g TXA	0.790	0.288-2.150	0.644
GFAP	2.088	1.369-3.298	0.00097 ***
UCH	2.984	1.766-5.246	<0.001 ***
MAP	0.778	0.540-1.112	0.171
Δ 0-24 hours (n=346)			
Age	1.035	1.013-1.059	0.0023**
ISS	1.044	1.006- 1.084	0.0224*
AIS head	2.137	1.271- 3.752	0.0055**
Qualifying GCS	0.800	0.684- 0.923	0.0032**
2g TXA bolus	0.685	0.288-1.637	0.3909
1g+1g TXA	0.810	0.323-2.018	0.6507
Δ GFAP	0.939	0.709-1.251	0.6603
Δ UCH	1.683	1.146-2.487	0.0079**
Δ MAP	0.792	0.5667-1.091	0.1618

*** p<0.001. ** p<0.01. * p<0.05
All biomarker levels log-adjusted

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #5
January 18, 2023
9:30 am

AGE-RELATED CHANGES IN THROMBOELASTOGRAPHY PROFILES IN INJURED CHILDREN

Katrina M. Morgan, MD, Barbara A. Gaines, MD*, Christine M. Leeper, MD, MS*
University of Pittsburgh Medical Center

Presenter: Katrina M. Morgan, MD

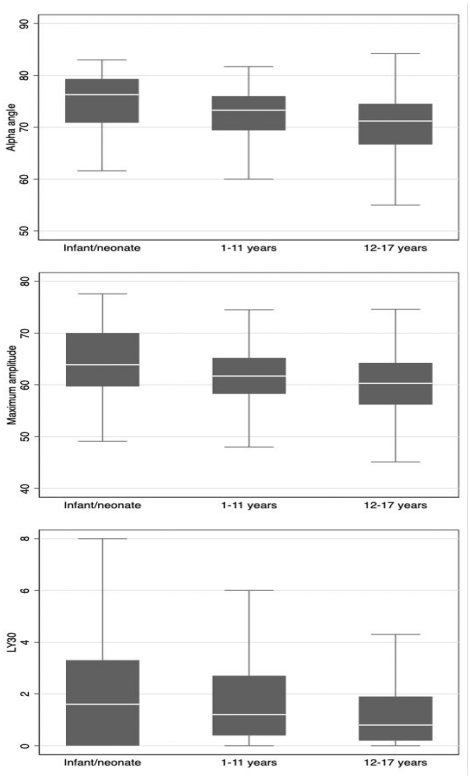
Discussant: James Bardes, MD - West Virginia University

Objectives: The role of age in mediating coagulation characteristics in injured children is not well defined. We hypothesize that thromboelastography (TEG) profiles are unique across pediatric age groups.

Methods: Consecutive trauma patients <18 years from a level I pediatric trauma center database from 2016-2020 with admission TEG were identified. Children were categorized by age according to NICHD categories (infant: ≤1 year, toddler: 1-2 years, early childhood: 3-5 years, older childhood: 6-11 years, adolescent: 12-17 years). TEG values were compared across age groups using Kruskal Wallis and Dunn's tests. Analysis of covariance was performed controlling for sex, injury severity score (ISS), admission Glasgow Coma Score (GCS), and shock.

Results: In total, 726 subjects were identified; 69% male, median(IQR) ISS=12(5-25), and 83% blunt mechanism. On univariate analysis, there were significant differences in TEG α-angle ($p<0.001$), TEG-MA ($p=0.004$), and TEG-LY30 ($p=0.01$) between groups. In post-hoc tests, the infant/neonate group had significantly greater α-angle (median(IQR)=77(71-79)) and MA (median(IQR)=64(59-70)) compared to other groups, while the adolescent group had significantly lower α-angle (median(IQR)=71(67-74)), MA (median(IQR)=60(56-64)) and LY30 (median(IQR)=0.8(0.2-1.9)) compared to other groups (Figure). There were no significant differences between toddler, early childhood, and middle childhood groups. On multivariate analysis, the relationship between age group and TEG values (angle, MA and LY30) persisted after controlling for sex, ISS, GCS, and shock.

Conclusions: Age-associated differences in TEG profiles across pediatric age groups exist. Further pediatric-specific research is required to assess whether the unique profiles at extremes of childhood may translate to differential clinical outcomes or responses to therapies.



Median thromboelastography values by National Institute of Child Health and Human Development age categories (infant: ≤1 year, toddler: 1-2 years, early childhood: 3-5 years, older childhood: 6-11 years, adolescent: 12-17 years). Infants had a significantly greater α-angle and maximum amplitude; adolescents had a significantly lower α-angle, maximum amplitude and LY30 compared to the other groups.

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #6
January 18, 2023
9:45 am

STATISTICAL POWER OF RANDOMIZED CONTROLLED TRIALS (RCT) IN THE FIELD OF TRAUMA SURGERY

Arthur Berg, DO, Abbasali Badami, MD*, John M. Reynolds, MLIS, AHIP*, Gerd Daniel Pust, MD*, Jonathan P. Meizoso, MD, MSPH*, Louis R. Pizano, MD*, Nicholas Namias, MBA, MD*, D. Dante Yeh, MD, MHPE, FACS, FCCM, FASPEN*
Ryder Trauma Center -University of Miami Miller School of Medicine

Presenter: Arthur Berg, DO

Discussant: Rachael Callcut, MD, MSPH - UC Davis

Objectives: To conduct a bibliometric study investigating the prevalence of underpowered RCTs in Trauma Surgery.

Methods: A medical librarian conducted a formal search strategy of RCTs in trauma published from 2010-2019. Data extracted included study type (superiority, inferiority, and equivalence trials), sample size calculation, and power analysis. Post hoc calculations were performed using a power of 80% and an alpha level of 0.05. Effect size was defined as standard deviation or odds ratio (OR) for mean and proportion primary endpoints, respectively, and quantified as small, medium, or large using previously published definitions. Superiority and inferiority trials were classified as single-tail and equivalence trials were calculated as two tail studies. If the type of study wasn't specified, it was classified based on hypothesis.

Results: In total, 118 RCT's from over 20 journals from multiple continents were examined and were most commonly equivalence trials (49%) (Table). A total of 70% were found to have â€œepositiveâ€ findings consistent with their hypothesis. When evaluating the integrity of each publication sample size calculation, 47% of journals did not report how they calculated their intended sample size. Of those that did include sample size calculation, 25 (43%) did not meet their target enrollment. When examining post hoc power, 35%, 49%, and 56% were adequately powered to detect a small, medium, and large effect size respectively.

Conclusions: A concerningly large proportion of recently published RCT's in trauma surgery 1) do not report a priori sample size calculations, 2) do not meet enrollment targets, and 3) are not adequately powered to detect even large effect sizes. There exists opportunity for improvement of trauma surgery study design, conduct, and reporting.

	N=118
Continent	
North America	49%
South America	1%
Asia	35%
Africa	0
Europe	18%
Australia	4%
Trial registration (%)	53%
Multicenter (%)	26%
Industry sponsored (%)	6%
Study type (%)	
Superiority	42%
Inferiority	8%
Equivalence	49%
A priori sample size calculation (%)	53%
Achieved target enrollment (%)	57%
Study Conclusion (%)	
Positive	70%
Negative	31%
Post hoc power	
Small effect size	35%
Medium effect size	49%
Large effect size	56%

Scientific Session II - Raymond H. Alexander, MD Resident Paper Competition

Paper #7
January 18, 2023
10:30 am

RECLAIMING THE MANAGEMENT OF COMMON DUCT STONES IN ACUTE CARE SURGERY

Maggie E. Bosley, MD, Aravindh Ganapathy, MD, Lucas Neff, MD, Michaela Gaffley, MD, Fadi Syriani, BS, Carl Westcott, MD, Preston R. Miller III, MD*, Andrew Nunn, MD*
Wake Forest Baptist Medical Center

Presenter: Maggie E. Bosley, MD

Discussant: Catherine Velopulos, MD, MS - University of Colorado Anschutz

Objectives: Acute care surgery (ACS) is well positioned to manage choledocholithiasis at the time of laparoscopic cholecystectomy, but barriers to laparoscopic common bile duct exploration (LCBDE) include experience and the perceived need for specialized equipment. As such, LCBDE is generally relegated to the "enthusiast." However, a simplified, effective LCBDE technique could drive wider adoption in the speciality most often managing these patients. To determine efficacy and safety, we sought to compare our initial experience with a simple, fluoro-guided, catheter-based LCBDE approach during lap cholecystectomy (LC) to LC with endoscopic retrograde cholangiopancreatography (ERCP).

Methods: We reviewed ACS patients who underwent LC+LCBDE or LC+ERCP (pre-/postoperative) at a tertiary care center over the last 3 years. Demographics, outcomes, and length of stay were compared on an intention to treat basis. LCBDE was performed via our previously described technique using wire/catheter seldinger techniques under fluoroscopic guidance with flushing or balloon dilation of the sphincter as needed.

Results: 116 patients were treated for choledocholithiasis with half receiving LCBDE. Group demographics were similar. The success rate of catheter-based LCBDE was 72.4%. LOS was reduced for the LC+LCBDE group compared to the LC+ERCP group (60.9+5.82 vs 95.1+5.10 hrs, $p < 0.0001$). Of note there were no intra- or postoperative complications in the LCBDE group. One quarter of ERCP patients required a 3rd procedure for stent removal.

Conclusions: A simplified catheter-based approach to LCBDE is safe and associated with decreased LOS when compared to ERCP. This approach may help facilitate wider LCBDE utilization by ACS providers who are well positioned to perform timely management of choledocholithasis in the OR.

Scientific Session II - Raymond H. Alexander, MD Resident Paper Competition

Paper #8
January 18, 2023
10:45 am

MULTICOMPARTMENTAL TRAUMATIC INJURY INDUCES SEX-SPECIFIC ALTERATIONS IN THE GUT MICROBIOME

Jennifer A Munley, MD, Lauren S. Kelly, MD*, Erick Pons, BS, Preston Coldwell, BS, Kolenkode Kannan, PhD, Gwendolyn Gillies, MD, Philip Efron, MD*, Ravinder Nagpal, PhD, Alicia M. Mohr, MD*
University of Florida

Presenter: Jennifer A Munley, MD

Discussant: Susannah Nicholson, MD, MS - Univ of TX Health Science Ctr at San Antonio

Objectives: Previous preclinical studies have demonstrated an altered gut microbiome after traumatic injury; however, the impact of sex on dysbiosis remains unknown. We hypothesized that the "pathobiome" phenotype induced by multicompartmental injuries and chronic stress is host sex specific with unique microbiome signatures.

Methods: Male and proestrus female Sprague-Dawley rats (n=8/group) aged 9-11 weeks were subjected to either polytrauma (PT) (lung contusion, hemorrhagic shock, cecectomy, bifemoral pseudofractures), PT plus 2-hours daily chronic restraint stress (PT/CS) or naïve controls. Fecal microbiome was measured on days 0 and 2 using high-throughput 16S rRNA sequencing and QIIME2 bioinformatics analyses. Microbial alpha diversity was assessed using Chao1 (number of different unique species) and Shannon (species richness and evenness) indices. Beta-diversity was assessed using principle coordinate analysis. Pairwise comparisons were performed in 'R' software package, with significance defined as $p<0.05$ between males versus females.

Results: PT reduced alpha diversity (Chao1) within 2-days post intervention, with a significant decrease in males compared to females ($p<0.05$). Beta diversity also differed significantly between males and females after PT ($p = 0.01$). At day 2, the microbial composition in PT females was dominated by *Ruminococcus* and PT/CS females by *Muribaculaceae*; whereas both PT and PT/CS males demonstrated elevated levels of *Bilophila*.

Conclusions: Multicompartmental trauma induces significant alterations in microbiome diversity and taxa, but these signatures differ by host sex. These findings suggest that sex is an important biological variable that may influence outcomes after severe trauma and critical illness.

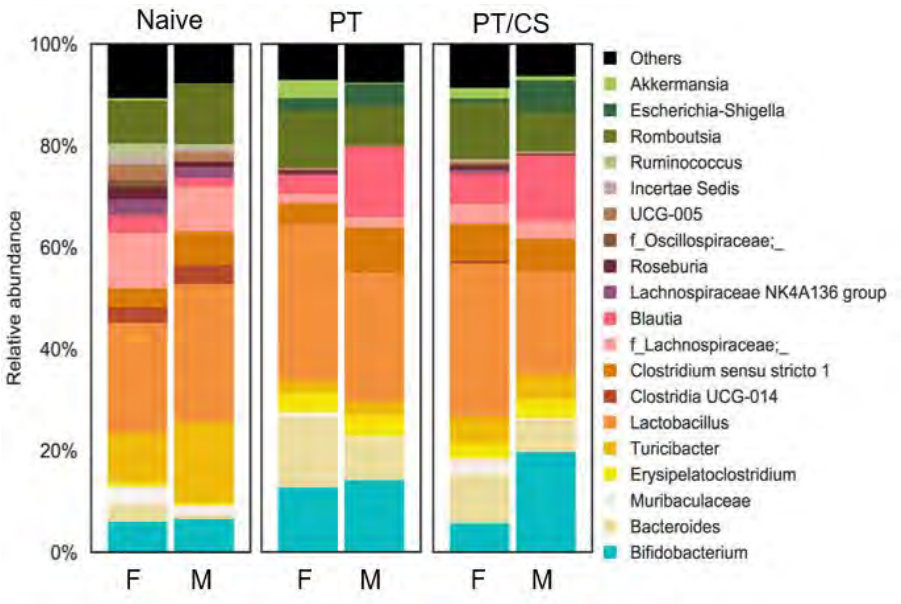


Figure 1. Microbial composition of male (M) and female (F) rats by cohort (naïve, PT – polytrauma, and PT/CS – polytrauma with chronic stress) at day 2.

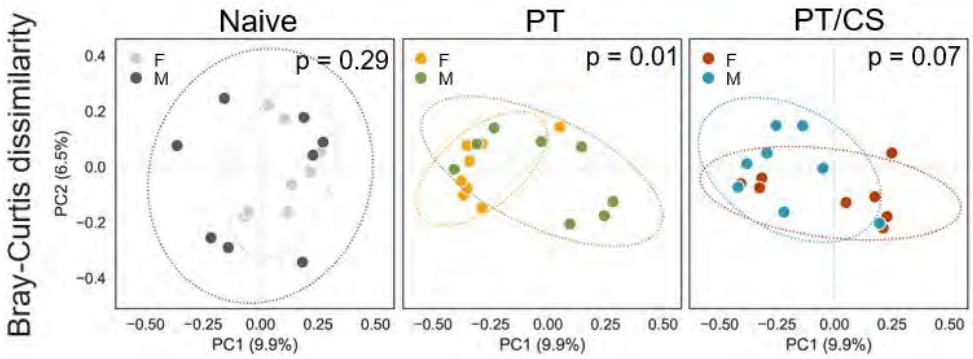


Figure 2. Beta diversity represented by principle coordinate analysis comparing males and females in each group at day 2.

Scientific Session II - Raymond H. Alexander, MD Resident Paper Competition

Paper #9
January 18, 2023
11:00 am

PECTIN BASED BIOLOGIC VELCRO EFFECTIVELY SEALS TRAUMATIC SOLID ORGAN AND SMALL BOWEL INJURIES

James Williams, MD, Beau Prey, MD, Andrew Francis, MD, Michael Weykamp, MD, Betty Liu, MD, Michael Lallemand, MD*, Steven Mentzer, MD, John P Kuckelman, DO
Madigan Army Medical Center

Presenter: James Williams, MD

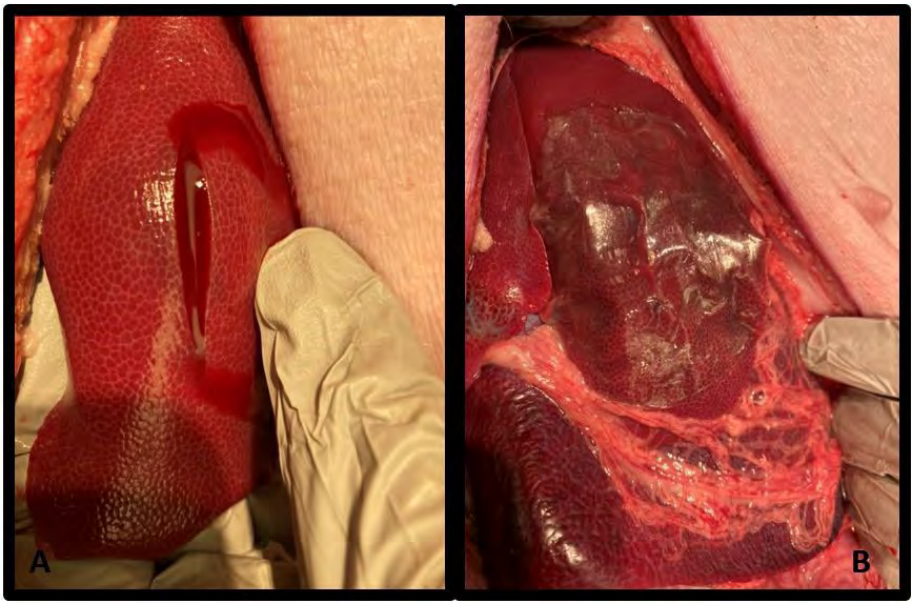
Discussant: Joseph D. Forrester, MD, MSc - Stanford University

Objectives: Injuries to the liver and small bowel are common in poly trauma. While there are currently a variety of accepted operative techniques to expeditiously manage such injuries, morbidity and mortality remains high. Pectin polymers have previously been shown to effectively seal visceral organ injuries through physiochemical entanglement with the underlying glycocalyx. We sought to compare the standard of care for the management of penetrating liver and small bowel injuries with a proprietary pectin based bioadhesive patch.

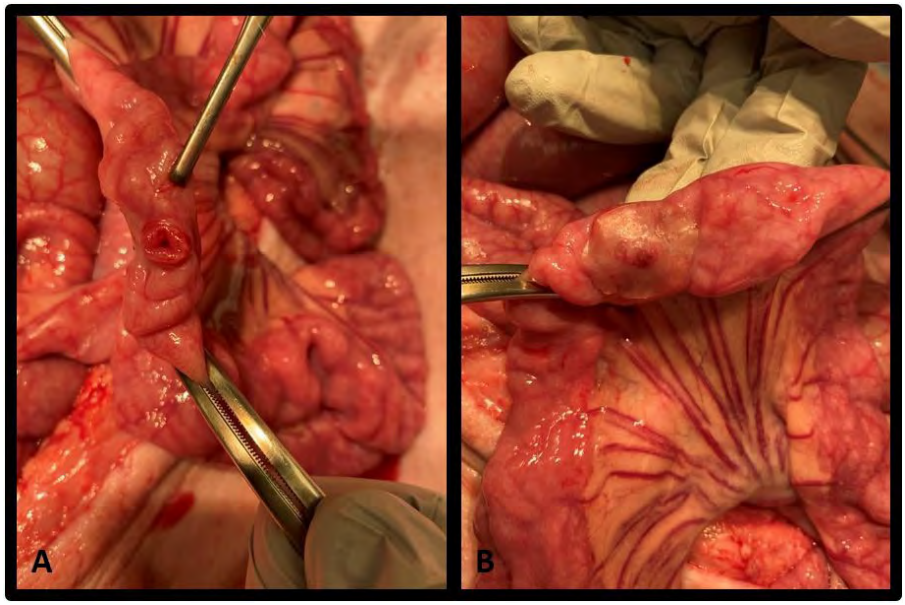
Methods: 15 adult male swine underwent a laparotomy with identification of the left medial lobe of the liver. A laceration was made sharply and animals were randomized to 1 of 3 treatment arms: packing with laparotomy pads (N=5), suture repair (N=5), or pectin patch repair (N=5, Figure 1). Following 2 hours observation blood was evacuated from the abdominal cavity and weighed. A full thickness small bowel injury was then created and animals randomized to either a two-layer sutured repair (N=7) or pectin patch repair (N=8, Figure 2). The repaired segment of bowel was then pressurized with saline until the repair failed and the burst pressure recorded.

Results: Blood loss following pectin patch repair was similar to sutured liver repair (33 vs 26 ml, p=0.258). On one-way ANOVA there was no statistical difference between groups regarding post-repair blood loss (121ml packing, p=0.05). Post repair small bowel burst pressures were similar between pectin and sutured repair (234 vs 224 mmhg, p=0.43).

Conclusions: Pectin-based bioadhesive patch performed similarly to standard of care for the management of liver laceration and full thickness bowel injuries. Further testing is warranted to better assess the biodurability of a pectin patch repair as it may offer a rapid and simple option to effectively temporize traumatic intra-abdominal injuries.



A: Liver laceration. B: Pectin patch repair.



A: Full thickness bowel injury. B: Pectin patch repair.

Scientific Session II - Raymond H. Alexander, MD Resident Paper Competition

Paper #10
January 18, 2023
11:15 am

RIB INJURY AFTER BLUNT TRAUMA IS ASSOCIATED WITH INCREASED LONG TERM OPIOID USAGE

Avanti Badrinathan, MD, Scott Martin, PhD, Aria Bassiri, MD, Vanessa P. Ho, MD, MPH, FACS*, Sami Kishawi, MD*, Matthew L. Moorman, MD, MBA, FACS, FAWM, FCCM*, Philip Linden, MD, Chris Towe
University Hospitals Cleveland Medical Center

Presenter: Avanti Badrinathan, MD

Discussant: Tareq Khierbek, MD, ScM - Brown University

Objectives: The rate of long-term opioid use among rib fracture patients is unknown. We hypothesize that opioid naïve patients with rib fracture are at high risk for chronic opiate use.

Methods: We performed a retrospective study (Oct 2015- June 2022) of the TriNetX database, which includes EMR data for ~89 million patients from 58 US health systems. Adult blunt trauma patients with at least 1 rib fracture and no previous opioid use were included. Primary outcome was opioid use at 1-3, 3-6, and 9-12-months post-injury. Patient demographics were compared to determine characteristics associated with chronic (>3 months) opioid use following rib fractures. Patients with rib fracture were also compared to blunt trauma patients without rib fracture in a 1:1 propensity matched cohort to determine if rib fracture was a risk factor for chronic opiate use.

Results: We identified 45,286 opioid- naïve adults with rib fracture, of whom 27,637 (61%) received opioid pain management. Acute opioid use was associated with younger age, male, white race, and no history of tobacco/alcohol use. The rate of opiate use at 1-3, 3-6, and 9-12 months were 12.5%, 8.1%, and 6.4% respectively. Chronic use was associated with younger age, female, and a history of substance use (figure). In a propensity matched comparison of blunt trauma patients with and without rib fractures, patients with rib fracture were more likely to use opiates acutely (OR 2.38 (95%CI 2.28-2.48)) and chronically (OR 1.55 (95%CI 1.48-1.62) figure). At 9-12 months, patients with rib fractures were also more likely to have a diagnosis of "opiate use disorder" (OR 2.15 (95%CI 1.61-2.87)).

Conclusions: Relative to other blunt traumas, patients with rib fractures are more likely to receive opioids initially and up to 12 months post-injury. Risk factors for long-term narcotic use include younger age, female gender, and white race.

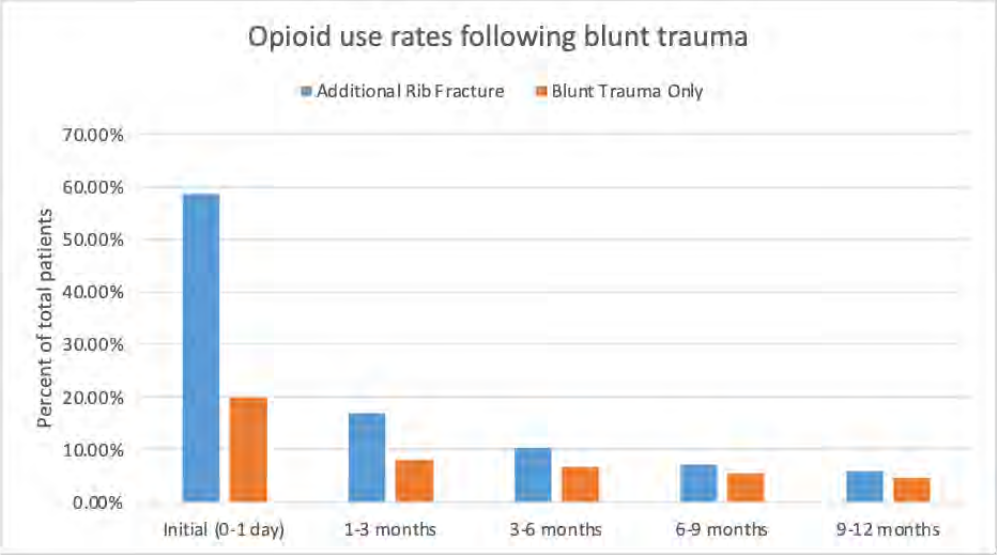


Figure 1: Opioid use trend by months post-injury

Paper #11
January 18, 2023
11:30 am

REBOA AND RESUSCITATIVE THORACOTOMY ARE ASSOCIATED WITH SIMILAR OUTCOMES AFTER TRAUMATIC CARDIAC ARREST

Ezra Koh, MD, Erin Fox, PhD, Charles E. Wade, PhD, Thomas M. Scalea, MD, FACS, FCCM*,
Charles Fox, MD, Ernest Eugene Moore, MD*, Bryan C. Morse, MS, MD*,
Kenji Inaba, MD, Eileen M. Bulger, MD, FACS*, David E Meyer, MD, MS*
University of Texas Health Science Center at Houston

Presenter: Ezra Koh, MD

Discussant: Larry Lottenberg, MD - Florida Atlantic University School of Medicine

Objectives: Resuscitative endovascular balloon occlusion of the aorta (REBOA) is an alternative to resuscitative thoracotomy (RT) in hemorrhagic shock. However, its use in traumatic cardiac arrest remains undefined.

Methods: Secondary analysis of the Department of Defense multicenter Emergent Truncal Hemorrhage Control study of trauma patients in hemorrhagic shock due to noncompressible torso hemorrhage arising below the diaphragm. All data in the first 24 hours were collected by direct observation. Patients undergoing REBOA or RT after cardiac arrest in the emergency department were analyzed. Baseline variables and hospital outcomes were compared. Due to group imbalances at baseline, propensity scores were used to perform an inverse probability of treatment weighted (IPTW) analysis. Logistic regression was used to compare mortality between groups in the weighted sample.

Results: 454 patients were enrolled at six US level 1 trauma centers. Of these, 72(16%) underwent REBOA or RT following cardiac arrest. REBOA patients were older (46±20 vs 35±14 years, p=0.02) with more blunt trauma (21[81%] vs 21[46%], p=0.008) and less severe abdominal injuries (AIS Abd 3[2-3] vs 4[2-4], p=0.045). AIS Head, AIS Chest, and rates of prehospital CPR were similar (TABLE 1). Time from arrival to aortic occlusion, AO, (20[12-33] vs 8[6-11] min, p<0.001) and from AO decision to success (7[5-10] vs 4[3-6] min, p=0.001) were longer for REBOA. REBOA patients received more red blood cells and plasma in the ED, but 24-hour blood products, unadjusted mortality (23[88%] vs 43[93%], p=0.78), and time from arrival to death (96 vs 49 min, p=0.12) were similar (TABLE 2). After IPTW, mortality risk remained the same between groups (RR 0.97, 95%CI 0.86-1.09, p=0.56).

Conclusions: Despite controlling for baseline variables and injury severity, REBOA was not associated with a survival or transfusion advantage over RT in traumatic cardiac arrest.

Variable	REBOA	RT	p Value
Age	46 (20)	35 (14)	0.022
Male Gender	16 (62%)	36 (78%)	0.212
White Race	13 (50%)	21 (46%)	0.913
Penetrating Mechanism	5 (19%)	25 (54%)	0.008
Prehospital CPR	10 (38%)	24 (52%)	0.382
AIS Head	2 (0-3)	0 (0-3)	0.465
AIS Chest	3 (3-4)	3 (2-4)	0.825
AIS Abdomen	3 (2-3)	4 (2-4)	0.046
AIS Extremity	3 (2-4)	3 (0-3)	0.039
ISS	27 (12)	33 (17)	0.282

TABLE 1. Baseline characteristics dichotomized by treatment group (REBOA vs RT). Discrete data are presented as median (IQR). Continuous data are presented as mean (SD). Categorical data are presented as n (%). CPR = cardiopulmonary resuscitation; AIS = abbreviated injury score; ISS = injury severity score.

Variable	REBOA	RT	p Value
RBC ED, units	4.5 (3-7)	2.5 (2-4.75)	0.007
Plasma ED, units	3 (0.5-5)	1 (0-3)	0.032
RBC 24 hours, units	15 (5-31)	10 (3-32)	0.185
Plasma 24 hours, units	8 (5-26)	7 (2-25)	0.211
Time from arrival to AO, min	20 (12-33)	8 (6-11)	<0.001
Time from AO decision to success, min	7 (5-10)	4 (3-6)	0.001
Time from arrival to death, min	96 (30-305)	49 (17-173)	0.118
Mortality	23 (88%)	43 (93%)	0.767

TABLE 2. Hospital outcomes dichotomized by treatment group (REBOA vs RT). Discrete data are presented as median (IQR). Continuous data are presented as mean (SD). Categorical data are presented as n (%). RBC = red blood cells; AO = aortic occlusion.

Scientific Session II - Raymond H. Alexander, MD Resident Paper Competition

Paper #12
January 18, 2023
11:45 am

SCANNING THE AGED TO MINIMIZE MISSED INJURY, AN EAST MULTICENTER TRIAL

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MetroHealth Medical Center

Presenter: Sami Kishawi, MD

Discussant: Krista Haines, DO - Duke University

Objectives: Variations in imaging practices in the workup of geriatric trauma patients may lead to missed injuries. We hypothesized that specific patient or trauma factors are associated with delayed injury diagnosis, defined as injuries not found on initial imaging workup.

Methods: We prospectively enrolled blunt trauma patients aged 65+ from 11/2020-12/2021 at eighteen Level I and II trauma centers and excluded ED deaths. Demographics, presenting history, physical exams, and diagnostic imaging performed at initial evaluation were collected. Abbreviated injury scale (AIS) codes listed at discharge were used to determine injuries to the head, cervical spine and neck, chest, abdomen, pelvis, and thoracic/lumbar spine, corresponding to body regions assessed by CT. Injured patients who did not initially receive the CT scans corresponding to their listed injuries were defined as having a delayed injury diagnosis. Logistic regression analysis identified factors associated with delayed diagnoses.

Results: Of 5,468 patients, median age was 79 [IQR 71-86], 55% were female, and 65% sustained a ground-level fall. Nearly 80% (n=4,320) were injured and mortality was 4.5%. The most common initial imaging studies were CT Head (92%) and CT C-Spine (89%). Close to 9% (n=480) of subjects had delayed injury diagnoses, most often involving the thoracic and lumbar spine and the vasculature or soft tissue of the neck (Table 1). In adjusted logistic regression, trauma consults, transfers from outside facilities, and primary language other than English or Spanish were associated with increased risk of delayed injury diagnosis (Table 2).

Conclusions: Nearly one in ten geriatric blunt trauma patients sustained injuries in body regions not imaged on initial workup. Vigilance is needed for transfers, consults, and foreign language speakers. Decision tools to reduce variation in imaging practices may minimize risk of missed injury in this vulnerable population.

Body Region	Corresponding CT Scan	CT Scan Initially Ordered, n (%)	Patients with Injuries, n (%)	Delayed injury diagnoses, n
Head	CT Head	5,040 (92.2%)	1,042 (19.1%)	13
Neck (Spine)	CT C-Spine	4,850 (88.7%)	446 (8.2%)	10
Neck (Vascular, soft tissue)	CTA Neck	723 (13.2%)	42 (0.7%)	16
Chest	CT Chest	3,472 (63.5%)	988 (18.1%)	76
Abdomen/Pelvis	CT Abd/Pel	3,498 (64.0%)	406 (7.4%)	41
Back	CT T/L-Spine	1,159 (21.2%)	592 (10.8%)	353

Table 1. Imaging characteristics and delayed injury diagnoses (n=5,468).

	Odds Ratio	95% Conf. Int.	*p*-value
Age	0.984	0.967-1.00	0.053
Gender			
Male	(ref)		
Female	1.123	0.861-1.466	0.390
Activation Level			
Full	(ref)		
Limited	0.755	0.539-1.057	0.102
Consult	1.675	1.118-2.510	**0.012**
Origin			
Scene	(ref)		
Transfer	1.541	1.154-2.059	**0.003**
Language			
English	(ref)		
Spanish	0.262	0.035-1.931	0.189
Other	2.524	1.016-6.268	**0.046**
Unknown	2.020	1.095-3.726	**0.024**
Functional Status			
Independent	(ref)		
Partly dependent	0.458	0.292-0.720	**0.001**
Fully dependent	1.841	0.842-4.025	0.126
Unknown	0.603	0.362-1.004	0.052
Dementia	0.476	0.262-0.863	**0.014**
Loss of Consciousness	1.029	0.836-1.267	0.788
Intoxication (EtOH ≥50 mg/dL)	0.710	0.412-1.223	0.217
Distracting Injury	1.323	0.847-2.064	0.218

Table 2. Adjusted logistic regression demonstrating odds of delayed injury diagnosis.

Scientific Session III - Potpourri

Paper #13
January 19, 2023
1:30 pm

EMERGENCY DEPARTMENT VERSUS OPERATING ROOM INTUBATION OF PATIENTS UNDERGOING IMMEDIATE HEMORRHAGE CONTROL SURGERY

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Johns Hopkins School of Medicine

Presenter: Zachary Dunton, BS MPH

Discussant: Douglas Schuerer, MD - Washington University School of Medicine

Objectives: Among patients that require hemorrhage control surgery, premature intubation in the ED can exacerbate shock and precipitate extremis. We hypothesized that intubation in the ED (EDI) vs. operating room is associated with adverse outcomes at both the patient and hospital-levels.

Methods: Patients undergoing immediate surgery for hemorrhage control at level 1 or 2 trauma centers were identified (NTDB 2017-19). To minimize confounding, patients dead-on-arrival, undergoing ED thoracotomy, or with clinical indications for intubation (severe head/neck/face injury or GCS≤8) were excluded. Two analytic approaches were used. First, hierarchical logistic regression measured the risk-adjusted association between EDI and mortality. Secondary outcomes included ED dwell time, units of blood transfused, and major complications (cardiac arrest, ARDS, AKI, sepsis). Second, center-level analysis explored whether hospital tendency for EDI was associated with adverse outcomes.

Results: 9,667 patients treated at 253 trauma centers met inclusion criteria. Patients were predominantly young men (median age, 33 years) that suffered penetrating injuries (71%). Median GCS was 15. One-in-five (20%) patients underwent EDI. After risk-adjustment, EDI was associated with increased risk of mortality, longer ED dwell time, greater blood transfusion, and major complications (**Table**). Center-level analysis identified significant variation in use of EDI not explained by differences in patient case-mix (**Figure**). Compared to low EDI centers, patients treated at high EDI centers were significantly more likely to suffer in-hospital cardiac arrest (6 vs. 4%; adjusted OR 1.46; 95%CI 1.04-2.03).

Conclusions: ED intubation of patients that undergo hemorrhage control surgery is associated with adverse outcomes. Where feasible, intubation should be deferred in favor of rapid resuscitation and transport to operating room.

Table. Risk-adjusted Outcomes with ED vs. OR Intubation

	ED Intubation (n = 1,972)	OR Intubation (n = 7,695)	OR/RR (95% CI)
Primary Outcome			
Overall mortality	17%	7%	1.9 (1.6 – 2.3)
Secondary Outcomes			
Median ED dwell time	31 mins	22 mins	1.2 (1.2 – 1.3)
Median RBC transfusion at 4h	6 units	4 units	1.2 (1.2 – 1.3)
Major complications			
Cardiac arrest with CPR	10%	4%	1.7 (1.4 – 2.2)
AKI	6%	4%	1.5 (1.1 – 1.9)
ARDS	3%	1%	1.6 (1.1 – 2.3)
Sepsis	3%	2%	1.3 (0.9 – 1.8)

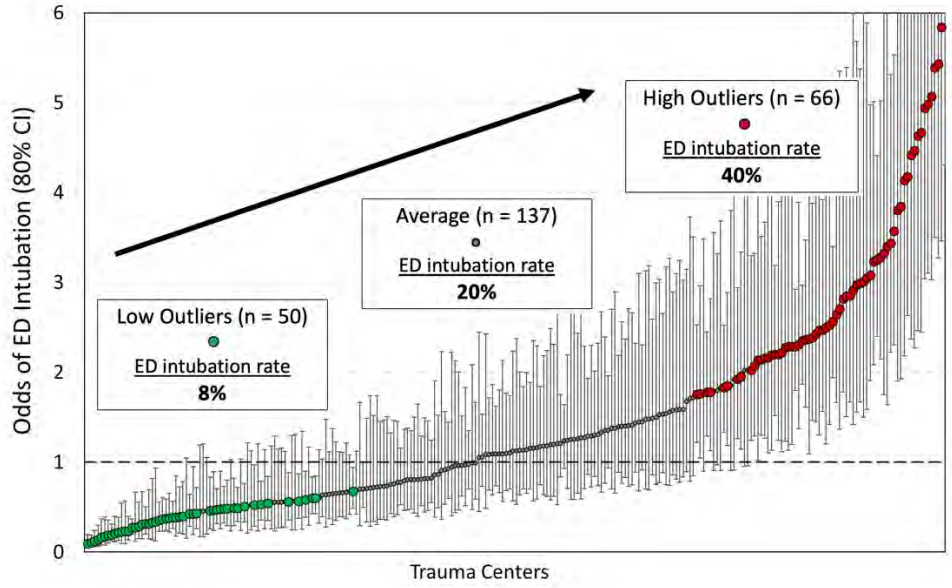

Figure. Caterpillar plot of trauma center risk-adjusted odds of ED intubation. Significant variation observed is not attributable to measured differences in patient characteristics.

Scientific Session III - Potpourri

Paper #14
January 19, 2023
1:45 pm

CHARACTERIZATION OF FATAL BLUNT INJURIES USING POST-MORTEM COMPUTED TOMOGRAPHY

Jeremy H. Levin, MD*, Peter M Hammer, MD*, Scott D Steenburg, MD, FASER
Indiana University

Presenter: Jeremy H. Levin, MD

Discussant: Jordan Estroff, MD - George Washington University

Objectives: Rapid triage of blunt agonal trauma patients is necessary to maximize survival, but autopsy is uncommon, slow, and rarely informs resuscitation guidelines. Post-mortem computed tomography (PMCT) can serve as an adjunct to autopsy in guiding blunt agonal trauma resuscitation. The aim of this novel pilot study is to characterize injury patterns in fatal blunt trauma to better inform resuscitation practices.

Methods: Retrospective cohort review of trauma decedents over a 9 year period who died at or within 1 hour of arrival following blunt trauma and underwent non-contrasted PMCT. Primary outcome was the prevalence of major injury defined as potential exsanguination (e.g., cavitary injury, long bone, pelvic fractures), TBI, and cervical spine injury. Secondary outcomes were significant pneumothoraces (PTX) and misplaced airway devices. Patients were grouped by pre- vs in-hospital arrest. Univariate analysis was used to identify differences in injury patterns including poly-cavitary injury.

Results: 80 decedents were included with average age 48.9 years, 68% male, average ISS 42.3 ± 16.3, and most common mechanism motor vehicle accidents (67.5%) with no significant differences in demographics. Prehospital traumatic arrest occurred in 62 (77.5%) decedents while 18 (22.5%) arrived with pulse (table 1). The most common major injuries were TBI (41.3%), long bone fractures (25%), significant hemoperitoneum (22.5%), and cervical spine injury (18.8%). Secondary outcomes included moderate/large PTX (18.8%) and 5% esophageal intubation rate. There were no significant differences in primary or secondary outcomes, and no differences in poly-cavitary injury pattern (table 2).

Conclusions: Fatal blunt injury patterns do not vary between pre-/in-hospital arrest decedents. High rates of pneumothorax and endotracheal tube misplacement should prompt mandatory chest decompression and confirmation of tube placement in all blunt arrest patients.

Table 1: Decedent Demographics and Injury Patterns

		Overall (N = 80)	Pulseless (n = 62)	Pulse (n = 18)	p
Demographics	**Age (years)**	48.9 +/- 21.7	49.9 +/- 20.5	45.8 +/- 25.6	0.5
	Sex (Male, %)	56 (68.3%)	43 (69.4%)	13 (72.2%)	0.82
	Mechanism of Injury (%)				0.03
	Fall	3 (3.8%)	0 (0%)	3 (16.7%)	
	MVC	54 (67.5%)	42 (67.7%)	12 (66.7%)	
	MCC	5 (6.3%)	4 (6.5%)	1 (5.6%)	
	ATV	1 (1.5%)	1 (1.6%)	0 (0%)	
	Ped Struck	12 (15%)	10 (16.1%)	2 (11.1%)	
	Crush/Machinery	5 (6.3%)	5 (8.1%)	0 (0%)	
	Injury Severity Score	42.3 +/- 16.3	42.1 +/- 16.4	42.6 +/- 16.3	0.09
	Arrived Pulseless	62 (77.5%)			
Injury Patterns	**Traumatic Brain Injury**	33 (41.3%)	29 (46.8%)	4 (22.2%)	0.06
	Herniation	9 (11.3%)	9 (14.5%)	0 (0%)	0.09
	Cervical Spine Injury	15 (18.8%)	12 (19.4%)	3 (5.6%)	0.8
	Airway				
	Endotracheal Intubation	26 (32.5%)	18 (29%)	8 (44.4%)	0.22
	Pre-hospital Endotracheal intubation	34 (42.5%)	26 (41.9%)	8 (44.4%)	0.85
	Malpositioned ETT	12 (15%)	9 (14.5%)	3 (6.7%)	0.82
	Esophageal intubation	4 (5%)	3 (4.8%)	1 (5.6%)	0.9
	Chest Trauma				
	Moderate/Large Pneumothorax	29 (36.3%)	23 (37.1%)	6 (33.3%)	0.82
	Moderate/Large Hemothorax	18 (22.5%)	16 (25.8%)	2 (11.1%)	0.35
	Pneumothorax without chest tube	15 (18.8%)	12 (19.4%)	3 (16.7%)	0.8
	Abdominal Trauma				
	Splenic laceration	15 (18.8%)	11 (17.7%)	4 (22.2%)	0.67
	Liver lacertion	6 (7.5%)	3 (4.8%)	3 (6.7%)	0.09
	Moderate/Large Hemoperitoneum	18 (22.5%)	11 (17.7%)	7 (38.9%)	0.06
	Pelvic/Retroperitoneal Trauma				
	Any pelvic fracture	26 (32.5%)	19 (30.6%)	7 (38.9%)	0.51
	APC III	1 (1.3%)	1 (1.6%)	0 (0%)	0.59
	LC III	5 (6.3%)	4 (6.5%)	1 (5.6%)	0.89
	Vertical Shear	0 (0%)	0 (0%)	0 (0%)	---
	Extremity Trauma				
	Any long bone	20 (25%)	13 (21%)	7 (38.9%)	0.12
	Unilateral femur	15 (18.8%)	10 (16.1%)	5 (27.8%)	0.17
	Bilateral femur	3 (3.8%)	3 (4.8%)	0 (0%)	0.34

pedastrian, ETT: endotracheal tube, APC: anterior/posterior compression, LC: lateral compression

Decedent demographics and injury patterns

Table 2: Cavitary and Poly-Injury Patterns

		Overall (N = 80)	Pulseless (n = 62)	Pulse (n = 18)	p
Cavity	Abdominal Cavity	24 (30%)	18 (29%)	5 (27.8%)	0.73
	Retroperitoneum/Pelvis	33 (41.3%)	24 (38.7%)	9 (50%)	0.39
	Thoracic Cavity	38 (47.5%)	32 (51.6%)	6 (33.3%)	0.17
	Long Bones	27 (21.3)	12 (19.4%)	5 (27.8%)	0.44
Multi-cavity	No Cavitary Injury	17 (21.3%)	13 (21%)	4 (22.2%)	0.9
	Solitary Cavitary Injury	26 (32.5%)	21(33.9%)	5 (27.8%)	0.63
	Two Cavity Injury	27 (33.8%)	21(33.9%)	6 (33.3%)	0.97
	Three Cavity Injury	8 (10%)	5 (8.2%)	3 (16.7%)	0.28
	Four Cavity Injury	2 (2.5%)	2 (3.2%)	0 (0%)	0.44
Mixed System	Isolated TBI	6 (7.5%)	4 (5%)	2 (11.1%)	0.51
	Isolated Cervical Spine Injury	0 (0%)	0 (0%)	1 (5.6%)	---
	Isolated TBI and Cervical Spine Injury	4 (5%)	4 (6.5%)	0 (0%)	---
	TBI & Solitary Cavity	9 (11.3%)	6 (9.7%)	3 (16.7%)	0.44
	TBI & Two Cavities	11 (13.8%)	10 (12.5%)	1 (5.6%)	0.25
	TBI & Three Cavities	3 (3.8%)	2 (3.2%)	1 (5.6%)	0.65

TBI: traumatic brain injury

Cavitary and poly-injury patterns

Scientific Session III - Potpourri

Paper #15
January 19, 2023
2:00 pm

BURN EXCISION WITHIN 48 HOURS PORTENDS BETTER OUTCOMES THAN STANDARD MANAGEMENT

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Carl I. Schulman, MD, MSPH*, Nicholas Namias, MBA, MD*,
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Presenter: Walter A. Ramsey, MD

Discussant: Alisa Savetamal, MD - Bridgeport Hospital/ Connecticut Burn Center

Objectives: Previous studies have debated the optimal time to perform excision and grafting of second- and third-degree burns. The present consensus is that excision should be performed before the sixth hospital day. We hypothesize that patients who undergo excision within 48 hours have better outcomes.

Methods: The Trauma Quality Improvement Project (TQIP) dataset was used to identify all patients with at least 10% total body surface area (TBSA) second- and third-degree burns from years 2017-2019. Patients with other serious injuries (any AIS >3), severe inhalational injury, pre-hospital cardiac arrest, and interhospital transfers were excluded. ICD-10 procedure codes were used to ascertain time of first excision. Patients who underwent first excision within 48 hours of admission (early excision) were compared to those who underwent surgery 48-120 hours from admission (control). Propensity score matching was performed to control for age and TBSA burned.

Results: 2,270 patients (72% male) were included in the analysis. Median age was 37 (23-55) years. Early excision was associated with shorter hospital length of stay (LOS), and ICU LOS (Table 2). Complications including deep venous thrombosis, pulmonary embolism, all venous thromboembolism, ventilator-associated pneumonia, and catheter-associated urinary tract infection were significantly lower with early excision. There was no significant difference in mortality.

Conclusions: Performance of excision within 48 hours is associated with shorter hospital LOS and fewer complications than standard therapy. We recommend taking patients for operative debridement and temporary or, when feasible, permanent coverage within 48 hours. Prospective trials should be performed to verify the advantages of this treatment strategy.

TABLE 1: DEMOGRAPHICS

	Early Excision (Within 48 Hours) n = 1,135 (50%)	**Control (48-120 Hours)** n = 1,135 (50%)
Age*	36 (22-54)	38 (23-55)
Female	317 (28)	323 (29)
TBSA 10-19%	722 (64)	722 (64)
TBSA 20-29%	207 (18)	207 (18)
TBSA 30-39%	82 (7)	82 (7)
TBSA 40-89%	123 (11)	123 (11)
TBSA >89%	1 (0)	1 (0)

*Reported as median (interquartile range)

TABLE 2: OUTCOMES

	Time from Arrival to First Excision		
	Within 48 Hours n = 1,135 (50%)	**Within 48-120 Hours** n = 1,135 (50%)	**p-value**
Clinical Outcomes			
Hospital Length of Stay*	12 (5-26)	16 (11-28)	**<0.001**
ICU Length of Stay*	8 (3-22)	11 (5-22)	**<0.001**
Mortality	69 (6)	54 (5)	0.164
Complications			
Deep Venous Thrombosis	12 (1)	24 (2)	**0.044**
Pulmonary Embolism	1 (0)	8 (1)	**0.039**
Venous Thromboembolism	12 (1)	28 (3)	**0.011**
Ventilator-Associated Pneumonia	38 (3)	57 (5)	**0.047**
Catheter-Associated Urinary Tract Infection	13 (1)	27 (2)	**0.026**

*Reported as median (interquartile range)

Scientific Session III - Potpourri

Paper #16
January 19, 2023
2:15 pm

AUTOMATED RIB FRACTURE DETECTION AND CHARACTERIZATION ON COMPUTED TOMOGRAPHY SCANS USING COMPUTER VISION

Jeff Choi, MD, MSc*, Sathya Edamadaka, David Brown, BSc, David A Spain, MD, FACS*, Joseph D. Forrester, MD, MSc*, Jeff Choi, MD, MSc*
Stanford University

Presenter: Jeff Choi, MD, MSc

Discussant: Patrick Greiffenstein, MD - LSU Health Science Center-New Orleans

Objectives: Rib fractures comprise diverse injury patterns; quantifying number and displacement of rib fractures are critical for clinical decision-making (e.g. surgical stabilization). Unfortunately, manually characterizing each rib fracture is tedious and limiting care planning and precision research. We developed a computer vision model using publicly-available data that automates rib fracture detection and percent displacement computation on chest computed tomography (CT) scans.

Methods: We developed and validated our model using the publicly-available RibFrac dataset (5,000 radiologist-annotated rib fractures from 660 chest CT scans; 64%-12%-24% train-validation-test sets). We developed a deep learning UNet segmentation model to detect rib fractures using class re-weighting to account for dataset imbalance (few CT slices comprising fractures). After detecting fractures, deterministic calculations quantified percent displacement (0 [non-displaced] to >100% [> one rib-width displaced]). Model performance was measured using binary DICE score, the most popular medical image segmentation metric (range 0 to 1.0, describing the overlap of predicted and actual fractures).

Results: Our model achieved a test set binary DICE score of 0.88, the highest performance among rib fracture detection models currently available. With class reweighting, our model's area under the receiver operating characteristic curve was 0.99. Qualitative analysis confirmed our model computes percent displacement accurately for various rib fracture patterns (Figures).

Conclusions: We developed a computer vision model automating rib fracture detection and percent displacement computation. To our knowledge, our model is first to quantify percent displacement. Open-source code and data are publicly-available to advance the frontier of personalized rib fracture management and precision research.

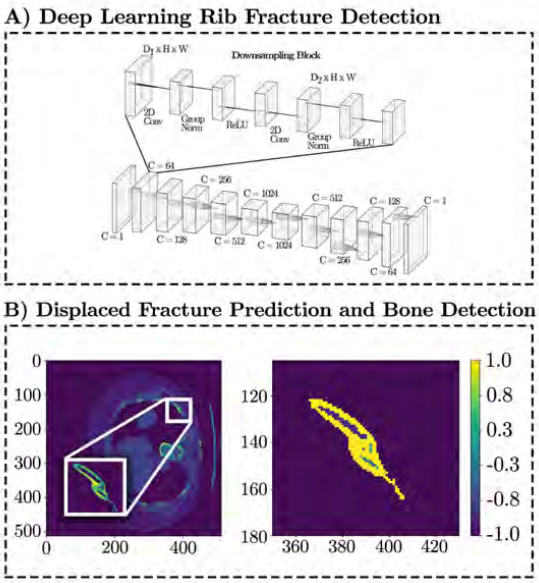

Figure 1. A) Convolutional UNet architecture for the deep learning computer vision model. B) Left- example input CT scan (rotated 90 degrees) and model-detected rib fracture; Right- analyzed, pre-processed CT scan section after individual fracture segments were detected.

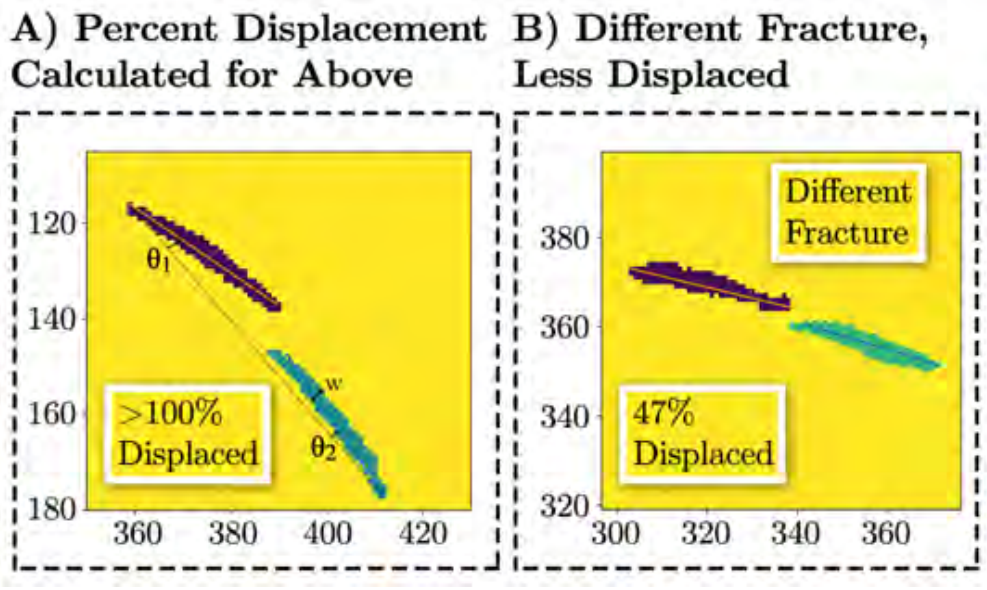

Figure 2. A) Percent displacement calculated for rib fracture in Fig 1, aggregated across several CT scan slices to account for 3-dimension volume. Predicted displacement > 100%. B) Percent displacement calculated for a different fracture with roughly 50% displacement.

Scientific Session III - Potpourri

Paper #17
January 19, 2023
2:30 pm

PATIENT-REPORTED OUTCOMES IN TRAUMA: WHAT IS IMPORTANT TO INJURED PATIENTS?

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University of Texas at Austin Dell Medical School

Presenter: Jason S. Hutzler, MD

Discussant: Amy Krichten, MSN, RN, CEN, TCRN - PA Trauma Systems Foundation

Objectives: Traditionally, outcomes in trauma have been quantified by objective measures such as mortality and length of hospital stay. With increased survival after injury, focus has shifted to quality-of-life measures. Patient-reported outcomes (PROs) have become a valuable focus for improving quality of care in specific subsets of disease. However, little has been published about PROs specific to the trauma population. This study aims to identify important factors to injured patients in the sub-acute period to guide efforts to develop PRO measures specific for trauma patients.

Methods: Between 2019 and 2022, all trauma patients admitted to our Level I trauma center were prospectively screened for inclusion. All adult patients who met inclusion criteria and agreed to answer survey questions were included. Study participants were surveyed using open-ended questions to determine their most important concerns. These questions were “What are your biggest concerns?” and “What is important to you?”. The responses were evaluated for common themes.

Results: Responses from 548 patients were collected. The responses were generally related to four major categories of concern. 62% of patients were concerned with specific aspects of their physical recovery, such as ability to recover, mobility, and time to recovery. 14% were most concerned with the socioeconomic aspects of their trauma, including cost of care, family concerns, and ability to work, and 10% had psychosocial concerns such as communication and safety. Other concerns (14%) were variable.

Conclusions: Our findings show that for most trauma patients, primary concerns are related to physical recovery. Efforts to develop and utilize PROs should focus on measures that relate to physical recovery as a marker for quality of life. However, psychosocial and socioeconomic concerns were not uncommon, and these factors should be accounted for when developing PROs specific to trauma patients.

Category n (%)	**Physical Recovery 341 (62)**	**Socioeconomic 75 (14)**	**Psychosocial 55 (10)**	**Other 77 (14)**
Subcategory n (% of primary category)	Ability to Recover 133 (39)	Financial 26 (35)	Communication 38 (69)	No Concerns 34 (44)
	Mobility 60 (18)	Family 34 (45)	Safety 17 (31)	Other 43 (56)
	Time to Recovery 43 (13)	Work 15 (20)		
	Pain Control 34 (10)			
	Overall Health 27 (8)			
	ADL's 23 (7)			
	Survival 10 (3)			
	Cosmesis 11 (3)			

Categories of Survey Responses

Scientific Session III - Potpourri

Paper #18
January 19, 2023
2:45 pm

TIMING OF REGIONAL ANALGESIA IN GERIATRIC BLUNT CHEST WALL INJURY

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Anthony Gebran, MD, Joep J. J. Ouwerkerk, BSc,
Ander Dorken Gallastegi, MD, George Velmahos, MD, PhD, MSEd,
Haytham Kaafarani, MD, MPH*, John O. Hwabejire, MD, MPH*
Massachusetts General Hospital

Presenter: Jefferson Proaño-Zamudio, MD

Discussant: Sabrina Sanchez, MD, MPH - Boston Medical Center

Objectives: Rib fractures represent a typical injury pattern in the elderly and are associated with respiratory morbidity and mortality. Regional analgesia (RA) modalities are adjuncts for pain management, but the optimal timing for their initiation remains understudied.

Methods: We performed a retrospective review of the TQIP 2017-2019 database. We included patients ≥65 years old admitted with blunt chest wall trauma who received RA. We divided patients into two groups: 1) Early RA (within 24 hours of admission) and 2) Late RA (>24 hours). Patients who remained inpatient for less than 24 hours or had severe thoracic visceral injuries were excluded. The outcomes evaluated were ventilator-associated pneumonia (VAP), unplanned ICU admission, unplanned intubation, survival with discharge to home, and length of stay (LOS). Univariable analysis and multivariable logistic regression adjusting for patient and injury characteristics, trauma center level, and respiratory interventions were performed.

Results: 2,292 patients were included. The mean(SD) age was 75.3(6.9), and 52.8% were male. The median ISS(IQR) was 13(9-17). The Early RA group had a decreased incidence of unplanned intubation (2.9% vs 5.4%, p=0.002), unplanned ICU admission (4.8% vs 8.3%, p<0.001), and shorter mean LOS (5.6 days vs 6.5 days, p=0.003). There were no significant differences in the development of VAP. In multivariable analysis, early RA was associated with decreased odds of unplanned intubation, unplanned ICU admission, and increased odds of discharge to home (Figure 1).

Conclusions: Early regional analgesia initiation is associated with improved outcomes in old blunt chest wall injury. Geriatric trauma care bundles targeting early initiation of regional analgesia have the potential to decrease complications and resource use.

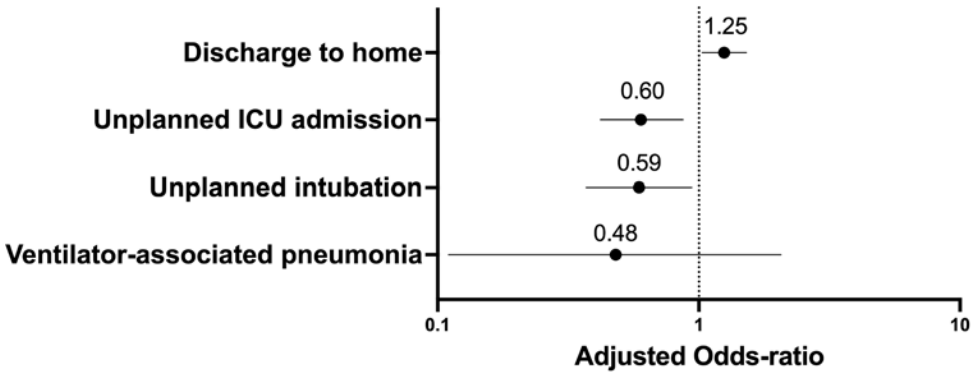

Figure 1. Outcomes of Early RA compared to Late RA.

Scientific Session III - Potpourri

Paper #19
January 19, 2023
3:00 pm

EARLY CAREER ACUTE CARE SURGEONS' WORK PRIORITIES AND PERSPECTIVES: A MIXED-METHODS ANALYSIS

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Medical College of Wisconsin

Presenter: Patrick B Murphy, MD, MPH, MSc

Discussant: Scott Sagraves, MD - Baylor Scott & White Medical Center-Temple

Objectives: Understanding the expectations of early career acute care surgeons (EC-ACS) will help clarify practice and employment models that will attract high-quality surgeons and sustain our workforce. This study aims to outline the clinical and academic preferences and priorities of fellows and EC-ACS when selecting their first job.

Methods: A survey on clinical responsibilities, employment preferences, work priorities and compensation was distributed to fellows and acute care surgeons in the first five years of practice. Agreeable respondents underwent virtual semi-structured interviews. Both quantitative and thematic analyses were used to describe current responsibilities and perspectives.

Results: 167 of 471 surgeons responded (35%), the majority of whom were assistant professors (62%) within the first 3 years of practice (80%). Median desired clinical volume was 24 clinical weeks and 48 call shifts per year. Top priorities cited in choosing a job were geography, schedule, and culture (Figure 1). There were discrepancies in current and desired practice types and operative volumes (Table 1). 36% of respondents stated their operative volume was less than desired. In our qualitative interviews we identified several themes. Interviewees were polarized on the role of elective surgery, desired transparency surrounding scheduling and expectations, and identified uncertainty about ideal employment and compensation. Three phenotypes of EC-ACS were identified based on preferred service, model preference, and the role of elective surgery.

Conclusions: Understanding the perspectives of early career surgeons entering the workforce is important. There is currently no standard workload or practice model in the field of acute care surgery. The wide variety of operative expectations, practice and schedule preferences, and academic aspirations emphasizes the need for transparency to ensure both employer and employee satisfaction.

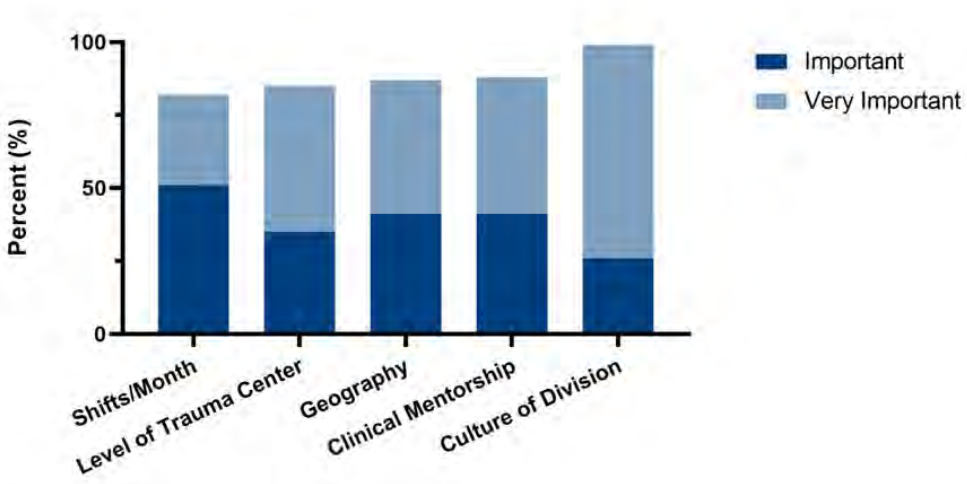


Figure 1: Top five job characteristics identified by early career acute care surgeons

	Early Career Surgeons (n = 167)	
Variable	**Current**	**Desired**
Type of Practice		
Service Based	120 (72%)	102 (61%)
Shift Based	37 (22%)	59 (35%)
Annual Operative Volume		
< 100	15 (10%)	3 (2%)
100 – 200	47 (32%)	30 (20%)
200 – 300	52 (35%)	26 (25%)
300 – 400	26 (17%)	36 (25%)
> 400	9 (6%)	12 (8%)

Table 1: Current versus desired practice type and operative volume for early career acute care surgeons

Scientific Session III - Potpourri

Paper #20
January 19, 2023
3:15 pm

UTILITY OF CT THORACOLUMBAR SPINAL RECONSTRUCTION IMAGING IN BLUNT TRAUMA

Abhishek Swarup, MD*, Rachel L. Choron, MD, FACS*,
John Park, Alexander Cong, Christopher Amro, MD
Rutgers Robert Wood Johnson Medical School

Presenter: Abhishek Swarup, MD

Discussant: Rachel L. Warner, DO - University of Florida-Jacksonville

Objectives: Fractures of the thoracolumbar (TL) spine are common in trauma and may cause neurologic damage, pain, and reduced quality of life. With CT chest/abdomen/pelvis (CAP) advances, identification of these injuries has improved. TL reconstructions from CT CAP prevent added radiation and are used to screen for TL fractures. The purpose of this study is to determine if we are over utilizing reformatted TL images. We hypothesized that reformatted TL images do not identify additional clinically significant injuries or change outcomes.

Methods: We performed a retrospective review of patients admitted to a Level 1 Trauma Center (2016-2021). Patients ≥18 with TL fractures diagnosed on CT CAP with/without CT TL reformats were included. Data/outcomes were collected from the medical record and trauma registry. Appropriate statistical analysis was performed, and significance was defined as $p<0.05$.

Results: 494 patients with TL fractures had both CT TL/CAP. There were 1394 TL fractures on CT TL and 1265 fractures on CT CAP. Significantly more transverse process fractures were identified on CTTL than CAP ($p<0.01$). Other fracture discrepancies were not significant. No unstable fractures were missed on CT CAP. 66 patients with TL fractures had CT CAP only. Significantly more MRIs were performed in those with both CTCAP&TL (198 vs 9, $p<0.05$). Spine consultation (89%vs67%, $p<0.01$) and operative fixation(11%vs2%, $p=0.01$) were also associated with TL reformats. TL reconstructions were not correlated with differences in mortality, neurologic deficits, or adverse outcomes.

Conclusions: CTCAP alone is sufficient to identify clinically significant TL fractures without impacting neurologic outcomes, morbidity, or mortality. Clinically insignificant injuries on CTTL are associated with increased MRIs and the potential for inefficient use of resources. Selective TL reformats for operative planning or at spine surgeon discretion may optimize care utilization.

	T Spine			L Spine		
Fracture Type	**CT Thoracic Spine**	**Not Detected on CTCAP**	**p**	**CT Lumbar Spine**	**Not Detected on CTCAP**	**p**
Transverse Process	263	21	<0.01	485	44	<0.01
Spinous Process	75	0	0.50	22	3	0.23
Vertebral Body	303	46	0.30	160	5	0.06
Burst	11	2	0.48	21	4	0.11
Facet	21	0	1	5	3	0.17
Pedicle	6	2	0.45	7	2	0.45
Other	11	2	0.48	4	0	0.45
Total	**690**	**73**	**1**	**704**	**61**	**1**

TABLE 1: FRACTURE PATTERN DATA

*CAP= CHEST/ABDOMEN/PELVIS

Outcomes	**CT-CAP AND TL Spine**	**CT-CAP ONLY**	**p**
Hospital Length of Stay (days)	7.15	6.56	0.68
ICU Length of Stay (days)	2.66	2.05	0.57
Ventilator Days (days)	1.29	2.48	0.61
Imaging (%)			
CT Chest	482 (98)	66 (100)	0.38
CT Abdomen/Pelvis	479 (97)	64 (97)	1
CT Thoracic Spine	477 (97)	-	-
CT Lumbar Spine	473 (96)	-	-
MRI Thoracic Spine	102 (21)	3 (5)	<0.01
MRI Lumbar Spine	96 (19)	6 (9)	0.046
MRI resulting in discharge delay (%)	33 (7)	3 (5)	0.79
Spine Consult (%)	441 (89)	44 (67)	<0.01
Neurologic deficits on admission	45 (9)	3 (5)	0.27
Neurologic deficits on discharge	5 (11)	2 (3)	0.19
Unstable fracture (%)	51 (10)	3 (5)	0.18
Operative fixation (%)	52 (11)	1 (2)	0.01
Disposition (%)			
Home	246 (50)	34 (52)	0.89
Acute Rehabilitation	119 (24)	14 (21)	0.76
Subacute Nursing Facility	83 (17)	13 (20)	0.60
Long Term Acute Care Hospital	5 (1)	0 (0)	1
Morgue	31 (6)	2 (3)	0.41
Other	10 (2)	3 (4)	0.19
Spine Injury Rehabilitation (%)	30 (2)	3 (5)	0.79
Mortality (%)	31 (6)	2 (3)	0.41

TABLE 2: OUTCOMES DATA

Scientific Session IV - Cox-Templeton Injury Prevention Paper Competition

Paper #21
January 19, 2023
1:30 pm

STEPPING-ON STEPS-UP: EVALUATION OF THE STEPPING-ON FALL PREVENTION PROGRAM

Laurie Lovedale, MPH, Shane Urban, BSN, RN*, Robyn Wolverton, MSN RN CEN TCRN,
Kathleen Flarity, DNP, PhD, CEN, CFRN, FAEN, FAAN,
Michael W. Cripps, MD, FACS*, Catherine G. Velopulos, MD, MHS, FACS*
UCHealth University of Colorado Hospital

Presenter: Laurie Lovedale, MPH

Discussant: Lisa Allee, MSW, LICSW - Boston Medical Center

Objectives: One third of people ≥ 65 year-old will experience a fall each year, and the elderly account for nearly 70% of fall-related deaths. We sought to evaluate improvement in fall risk and fear of falling in participants of our fall prevention program.

Methods: We have been offering Stepping-On since 2017, a low cost, low resource 7-week fall prevention program for those ≥ 65, or those who fear falling. The Timed-Up-and-Go (TUG) test is a validated tool used to assess the impact of Stepping-On pre-and post-participation. Participants start the test in a chair, stand, walk 10 feet, turn around, return, and sit down, with total time to complete recorded. A TUG time ≥ 12 seconds has previously been defined to represent a higher risk for falling. TUG test is assessed at the first class (TUG1) and at the end of the program (TUG2). Fear of falling is measured with a 1-10 scale at session one and upon completion.

Results: From 1/2017-1/2020 172 people completed Stepping-On. 130 (75%) had both a TUG1 and TUG2 time, and 57% of those (n = 75/130) had both pre and post program fear of falling scale. 97 (74.6%) were initially identified as high-risk (TUG1 time ≥ 12).

We used paired Wilcoxon Rank Sum to compare TUG1 and TUG2 times and pre/post fear of falling. TUG2 time decreased by approximately one second (-0.91, 95% CI -0.53, -1.32, $p < 0.01$), and their fear of falling decreased by -1.49 units (95% CI -2.0, -0.5, $p < 0.01$). There was a 17.6% relative risk reduction in the number of participants classified as high-risk of falling, with NNT of 7.6.

Conclusions: Stepping-On significantly 1) reduced risk for falling measured by TUG time and resulted in a decreased number of participants categorized as high risk, and 2) reduced participants' fear of falling.

Due to the low cost and low resource needs of the program, trauma centers should consider adding Stepping-On as an essential injury prevention program.

N=130	Time	Median Δ	p	% High Risk (TUG≥12)
TUG1 (n=130)	13.98 [11.95,17.91]	-		74.6
TUG2 (n=130)	12.86 [10.81,16.79]	-0.91 [-1.32,-0.53]	<0.01	61.5
N=75	1-10 scale	Median Δ	p	
Fear of Falling (pre)	6 [3.25,7.75]	-		
Fear of Falling (post)	5 [3.00,7.00]	-1.49 [-2.0,-0.49]	<0.01	

Table: Pre- and Post- Assessments of Stepping On

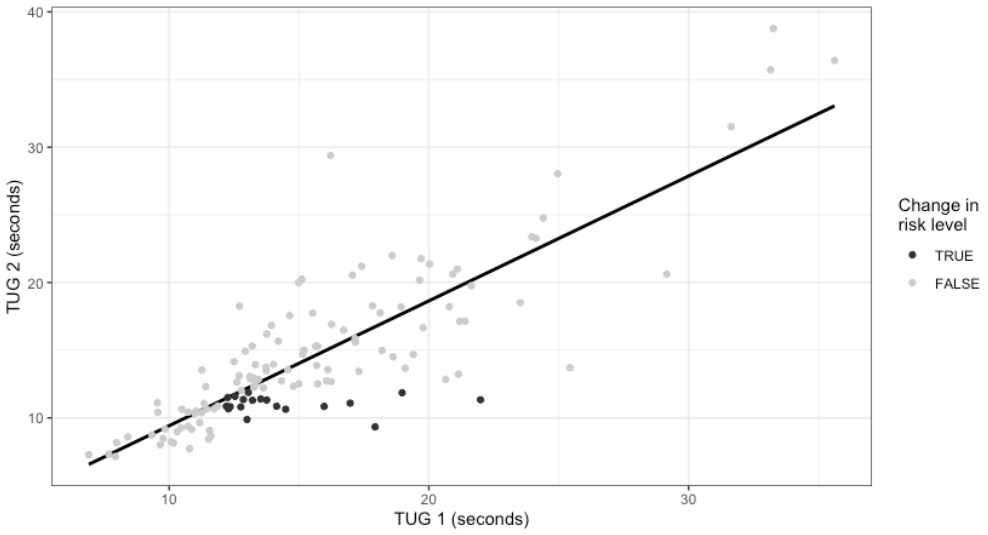


Figure: Change in risk level as measured by Pre/Post TUG times

Scientific Session IV - Cox-Templeton Injury Prevention Paper Competition

Paper #22
January 19, 2023
1:45 pm

A NOVEL TOOL TO IDENTIFY COMMUNITY RISK FOR FIREARM VIOLENCE: THE FIREARM VIOLENCE VULNERABILITY INDEX (FVVI)

Ann M. Polcari, MD, MPH, MSGH*, Lea Hoefer, MD,
Jennifer Cone, MD, MHS*, Mark B. Slidell, MD, MPH*,
Tanya L. Zakrison, MD, MPH, FRCSC, FACS*, Andrew J. Benjamin, MD, MS*
University of Chicago

Presenter: Ann M. Polcari, MD, MPH, MSGH

Discussant: Rebecca Plevin, MD - University of California, San Francisco

Objectives: Vulnerability indices have been used in several fields to provide standard frameworks for identifying at-risk groups in times of crisis. Firearm violence in the U.S. is a public health crisis, yet currently no tool exists to predict which communities are at-risk for high rates of shootings and firearm-related homicides. We sought to create a Firearm Violence Vulnerability Index (FVVI) to forecast urban neighborhood risk for gun violence.

Methods: Open-access 2015-2022 shooting incident data from Chicago, New York City, Philadelphia, Los Angeles, and Baltimore was merged on census tract with 30 social and economic factors from the 2020 American Community Survey (ACS) 5-year estimates. The dataset was split into training (80%) and test (20%) sets; Baltimore data was withheld for a validation set. XGBoost, a decision-tree-based machine learning algorithm, was used to construct a model predicting rates of firearm violence by census tract.

Results: A total of 56,136 shooting incidents over 3,203 census tracts were used to build the model and 17,452 over 198 for validation. The model had strong predictive power for shooting incidence at the census tract level (test set r^2=0.70, RMSE=3.5). The most predictive feature was household income (Figure 1). The modelâ€™s predictability (r^2=0.62, RMSE=4.2) was validated in Baltimore (Figure 2).

Conclusions: The FVVI accurately predicts gun violence in urban communities at a granular geographic level. FVVI can be used to understand disparities in firearm violence and identify communities in most need of risk-reduction efforts. The model can be easily updated over time with new ACS data releases, meaning it may display future changes in rates of violence as community compositions shift. Dissemination of this tool may aid in prevention program planning, resource allocation, and enhance academic research related to firearm violence.

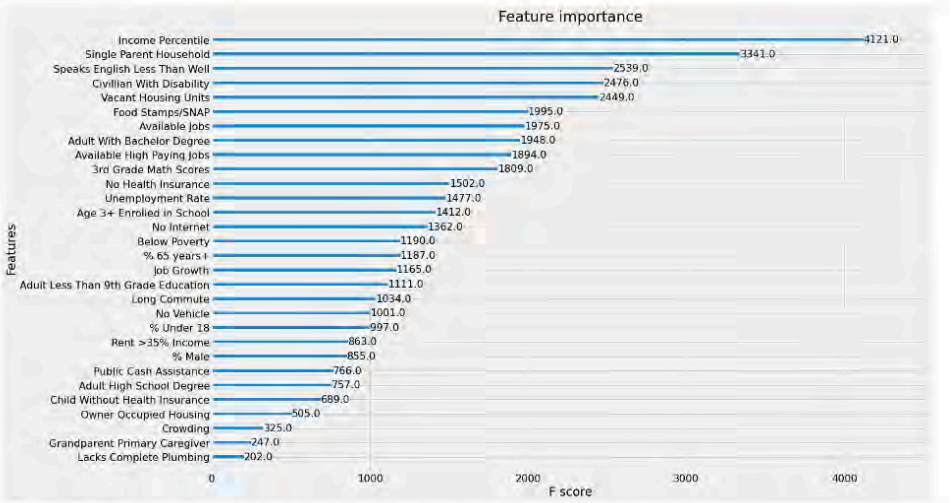


Figure 1. Feature importance scores demonstrating the effect each social and economic factor had on the FVVI model.

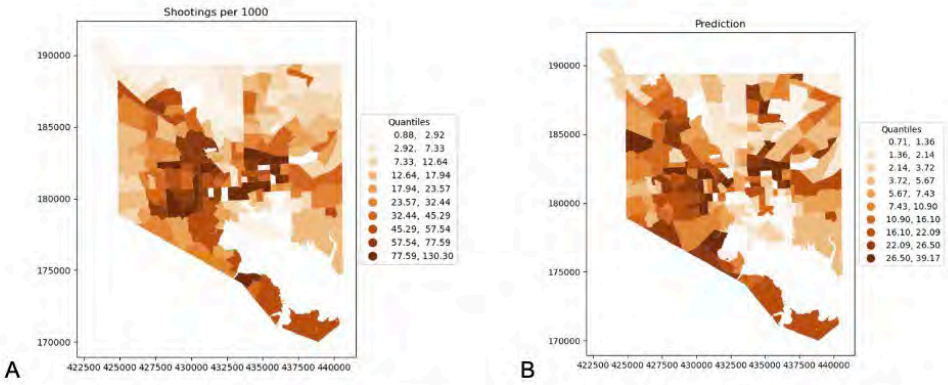


Figure 2. Choropleth maps of (A) Shooting incidents per 1000 population by census tract in Baltimore between 2015 and 2022 compares to (B) FVVI risk prediction score.

Scientific Session IV - Cox-Templeton Injury Prevention Paper Competition

Paper #23
January 19, 2023
2:00 pm

PROJECT INSPIRE PILOT STUDY: A HOSPITAL-LED, COMPREHENSIVE INTERVENTION REDUCES GUN VIOLENCE AMONG JUVENILES DELINQUENT OF GUN CRIMES

Ashley Y. Williams, MD*, Antwan Hogue, M.D., Edmond Naman, JD., Curtis Graves, BA, Andrew Haiflich, MBA, MSN, RN, Jonathan Bernard, MD., Jon D. Simmons, MD*
University of South Alabama

Presenter: Ashley Y. Williams, MD

Discussant: Julius Cheng, MD, MPH - University of Rochester Medical Center

Objectives: Gun violence disproportionately affects young, black males, but the impact extends to families and communities. Those at highest risk are teens delinquent of gun crimes. While there is no nationally accepted juvenile rate of recidivism, previous literature reveals rearrest rates from 50-80% in high-risk youth, and some reports show up to 40% of delinquent juveniles are incarcerated in adult prisons before the age of 25. We hypothesize that Project Inspire, a hospital-led, comprehensive intervention, reduces recidivism among high-risk teens.

Methods: Led by a level 1 trauma center, key community stakeholders including the juvenile court, city, and city police department joined forces to create a community-wide program aimed at curbing gun violence in high-risk individuals. Participants, aged 13-18, are selected by the juvenile gun court. They underwent a rigorous 3-week program with a curriculum incorporating the following: trauma-informed training and confidence building, educational/professional development, financial literacy, entrepreneurship, and career-specific job shadowing and mentorship. Rates of recidivism were measured annually.

Results: Project Inspire has hosted 2 classes in 2018 and 2019, graduating 9 participants aged 14-17 years. 67% were black. All were males. At 1 year, none of the graduates reoffended. At 2 years, 1 participant reoffended. At 3 years, no additional participants reoffended. No graduate reoffended as a juvenile. Thus, the overall rate of recidivism for Project Inspire is 11% to date. 89% of graduates received a diploma, GED, or obtained employment.

Conclusions: Project Inspire is a hospital-led initiative that effectively reduces recidivism among juveniles delinquent of gun crimes. This sets the framework for trauma centers nation-wide to lead in establishing impactful comprehensive, community-based violence intervention strategies.

Scientific Session IV - Cox-Templeton Injury Prevention Paper Competition

Paper #24
January 19, 2023
2:15 pm

DEVELOPMENT OF A NOMOGRAM TO IDENTIFY PATIENTS AT RISK OF SELF-HARM AFTER TRAUMA

Andrew H. Tran, MD*, Chris Towe, Esther S. Tseng, MD, FACS*, Sarah Benuska, PhD, Mary Joan Roach, Douglas Gunzler, PhD, Vanessa P. Ho, MD, MPH, FACS*
MetroHealth Medical Center

Presenter: Andrew H. Tran, MD

Discussant: D'Andrea Joseph, MD - NYU-Langone Long Island

Objectives: Traumatic injury can induce negative psychological consequences such as post-traumatic stress disorder and depression. We hypothesized that life-altering injury patterns (defined as traumatic brain injury, amputation, or spinal cord injury) and prior psychiatric symptoms (including mood disorders or prior self-harm) would be associated with readmission for self-harm.

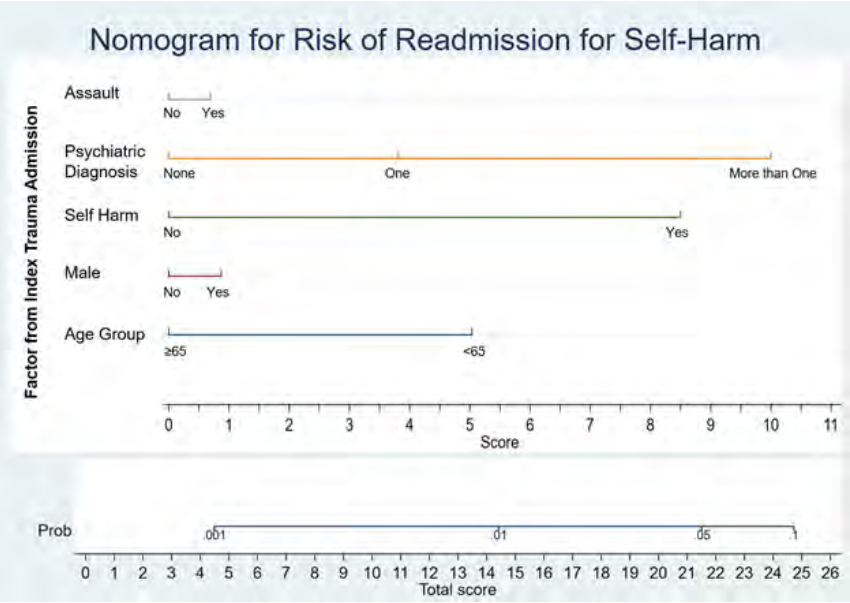
Methods: We studied trauma survivors admitted Jan-Sept 2017 from the Nationwide Readmissions Database; 90-day readmissions were identified. The outcome of interest was an ICD-10 code for intentional self-harm at the first readmission. Factors from the index admission were extracted, including age, male sex, life-altering injury patterns, psychiatric diagnosis (none, 1, or >1), self-harm at the index admission, and injury mechanism. Factors associated with increased likelihood of a self-harm readmission were identified via a survey-weighted multivariable logistic regression and were used to generate a nomogram.

Results: Of 826,337 trauma survivors, 143,114 (16.8%) were readmitted within 90 days. Self-harm occurred in 4,393 (3.1%) of first readmissions. Traumatic brain injury, amputation, and spinal cord injury were not associated with self-harm at readmission. Patients with >1 psychiatric diagnosis and index admission self-harm accounted for nearly half of self-harm readmissions (n=2,160, 49%); these patients had an unadjusted readmission rate of 8%, nearly 25-fold higher than the remainder of the population (0.3%; $p<0.05$). In regression analysis, assault, psychiatric diagnosis, male sex, age<65, and index admission self-harm were associated with readmission for self-harm (Table, Figure).

Conclusions: Prior psychiatric diagnosis and self-harm were strongly associated with future self-harm, but life-altering injury patterns were not. High risk patients can be identified at the index trauma admission using a nomogram to inform treatment.

Table. Survey-Weighted Logistic Regression

Index Admission Factor	Odds Ratio	95% CI	p-value
Age <65 (ref: Age ≥ 65)	3.23	2.88-3.62	<0.0001
Male (ref: Female)	1.23	1.14-1.31	<0.0001
Self-Harm	7.22	6.62-7.89	<0.0001
Psychiatric Dx (ref = None)			
One	2.43	2.05-2.88	<0.0001
More than One	10.26	8.98-11.71	<0.0001
Assault	1.18	1.03-1.35	0.02



Scientific Session IV - Cox-Templeton Injury Prevention Paper Competition

Paper #25
January 19, 2023
2:30 pm

FIREARM LEGISLATION - THE ASSOCIATION BETWEEN NEIGHBORING STATES AND CRUDE DEATH RATES

Majid Chammas, MD, Gerd Daniel Pust, MD*, Jonathan P. Meizoso, MD, MSPH*,
Rishi Rattan, MD*, Nicholas Namias, MBA, MD*, Marie L. Crandall, MD, MPH, FACS*,
D. Dante Yeh, MD, MHPE, FACS, FCCM, FASPEN*
University of Miami Miller School of Medicine

Presenter: Majid Chammas, MD

Discussant: Stephanie Bonne, MD - Hackensack University Medical Center

Objectives: We aim to study the association between neighboring states' firearm legislation with firearm-related crude death rate (CDR).

Methods: The CDC Web-based Injury Statistics Query and Reporting System (WISQARS) was queried for adult all-intent (accidental, suicide, and homicide) firearm-related CDR among the 50 states from 2012 to 2020. States were divided into five cohorts based on the Giffords Law Center Annual Gun Law Scorecard (A, B, C, D, and F) (Figure 1), and two groups were constructed: *Strict* (A, B, and C) and *Lenient* (D and F). We examined the effect of 1) a single incongruent neighbor, defined as "Different" if the state is bordered by ≥1 state with a grade score difference >1, and 2) the average grade of all neighboring states, defined as "Different" if the average of all neighboring states resulted in a grade score difference >1.

Results: Strict states with similar average neighbors had significantly lower CDR compared to Strict states with different average neighbors while Lenient states with similar average neighbors had significantly higher CDR compared to Lenient states with different average neighbors (Table 1). Lenient states surrounded by all similar Lenient states had the highest CDR, which was significantly higher than Lenient states with ≥1 different neighbor. However, Strict states with ≥1 different neighbor did not have higher CDR compared to Strict states surrounded by all similar Strict states.

Conclusions: Strict states with similar average neighbors had the lowest CDR whereas Lenient states with all similar Lenient neighbors had the highest CDR. We report a lopsided neighboring effect whereby Lenient states may benefit from at least 1 Strict neighbor while Strict states may be adversely affected only when surrounded by mostly Lenient neighbors. These findings may assist policymakers regarding the efficacy of their own state's legislation in the context of incongruent neighboring states.

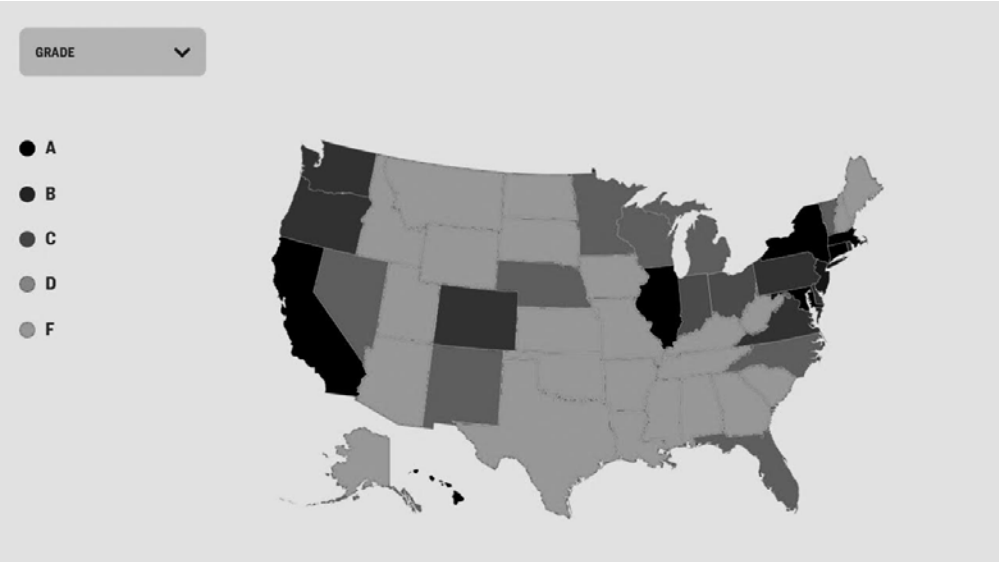


Figure 1 - United States map with Giffords Law Center Gun Law Scorecard Grades

	All Similar	1 Different	P-value
Strict *	3.14 [1.91-5.38]	3.39 [2.17-5.35]	0.50
Lenient †	6.52 [5.09-8.96]	5.19 [3.85-6.61]	<.001
	Similar Average	**Different Average**	**P-value**
Strict	2.98 [1.91-5.06]	3.87 [2.37-5.94]	.02
Lenient	6.02 [4.56-8.11]	4.70 [3.95-5.35]	.002

* Giffords Law Center Annual Gun Law Scorecard (A, B, C)
† Giffords Law Center Annual Gun Law Scorecard (D and F)

Table 1 - Median Crude Death Rates (CDR)

Scientific Session IV - Cox-Templeton Injury Prevention Paper Competition

Paper #26
January 19, 2023
2:45 pm

HISTORY REPEATS ITSELF: IMPACT OF MENTAL ILLNESS ON HOSPITAL REENCOUNTERS AND VIOLENT REINJURY AMONG FEMALE VICTIMS OF INTERPERSONAL VIOLENCE

Miriam Neufeld, MD, MPH, Enzo Plaitano, BSc, Megan Janeway, MD,
Dane R. Scantling, DO, MPH*, Timothy Munzert, MSW LICSW,
Lisa Allee Barmak, MSW, LICSW*, Sabrina Sanchez, MD, MPH*
Boston University School of Medicine

Presenter: Miriam Neufeld, MD, MPH

Discussant: Susan Kartiko, MD, PhD - George Washington University

Objectives: Mental illness (MI) is prevalent among individuals injured from interpersonal violence (IPV) impacting both patients and healthcare systems. Cycles of reinjury and subsequent hospital visits only amplify these impacts. The relationship between pre-existing MI and violent reinjury among women has not been fully characterized. Our objective was to determine if risk of hospital reencounter –all-cause and violent re-injury- was associated with pre-existing MI at time of index injury among female victims of IPV.

Methods: We included all females(≥15y) presenting to a level I trauma center (2002-2019) with IPV injury alive at discharge (N=1056). Exposure was presence of pre-existing MI. Outcomes were hospital reencounters and mean number of encounters within the 1st year. Odds of reencounter for those with and without pre-existing MI were compared with multivariable logistic regression. Mean total visits were compared with multivariable negative binomial regression. P-value of<0.05 considered significant.

Results: 404 women (38.3%) had pre-existing MI at time of index injury. Of these, 63.9% had at least one reencounter compared to 45.7% of those without and had a higher mean number of encounters[4.9(6.5) vs 2.6(3.0), p<0.0001]. Odds of all-cause reencounter for those with pre-existing MI was nearly twice of those without[aOR 1.81(1.36,2.42), p<0.0001]. 11% of patients with pre-existing MI experienced violent reinjury compared to 4.9% of those without and had more than three times the odds of violent reinjury[aOR 3.52(1.57,7.930), p=0.002].

Conclusions: Among female victims of IPV, pre-existing MI is associated with significantly increased risk of both hospital reencounter and violent reinjury within the 1st year. Addressing MI is critical to reducing the burden of trauma on patients and the healthcare system, and ongoing prevention efforts to reduce violent reinjury.

Outcome	No. (%)		Unadjusted model		Adjusted model	
	Mental illness (n=404)	No mental illness (n=652)	OR (95% CI)	p-value	OR (95% CI)	p-value
All-cause reencounter	258 (63.86)	298 (45.71)	2.10(1.63,2.71)	<0.0001	1.81 (1.36,2.42)	<0.0001
Violent reinjury	44 (10.99)	32 (4.91)	2.37 (1.48,3.80)	0.0004	-	-
*Drug/alcohol use	-	-	-	-	0.80 (0.42,1.53)	0.51
No drug/alcohol use					3.52 (1.57,7.93)	0.002

Table 2. Proportion and odds of repeat ED visit or hospitalization for any reason and for violent reinjury within one year of index injury for those with and without pre-existing mental illness.
*When looking specifically at violent reinjury, mental illness found to interact with drug/EtOH use. Therefore, the cohort was stratified by drug/EtOH use in the adjusted model.

Scientific Session V - Traumatic Brain Injury & Coagulation

Paper #27
January 20, 2023
7:45 am

SIMILAR RATE OF VENOUS THROMBOEMBOLISM AND FAILURE OF NON-OPERATIVE MANAGEMENT FOR EARLY VERSUS DELAYED VTE CHEMOPROPHYLAXIS IN ADOLESCENT BLUNT SOLID ORGAN INJURIES: A PROPENSITY-MATCHED ANALYSIS

Areg Grigorian, MD, Sebastian Schubl, MD*, Lourdes Swentek, MD*, Cristobal Barrios, MD*, Michael E Lekawa, Dylan Russell, MD, Jeffry Nahmias, MD, MHPE, FACS, FCCM*
University of California Irvine

Presenter: Areg Grigorian, MD

Discussant: Matthew E. Kutcher, MD, MS - University of Mississippi Medical Center

Objectives: Early initiation of venous thromboembolism (VTE) chemoprophylaxis in adults with blunt solid organ injury (BSOI) has been demonstrated to be safe but this is controversial in adolescents. We hypothesized that adolescent patients with BSOI undergoing non-operative management (NOM) and receiving early VTE chemoprophylaxis (eVTE) (< 48-hours) have a decreased rate of VTE and similar rate of failure of NOM, compared to similarly matched adolescents receiving delayed VTE chemoprophylaxis (dVTE) (> 48-hours).

Methods: The 2017-2019 TQIP database was queried for adolescent (12-17-years of age) patients with BSOI (liver, kidney and/or spleen) undergoing NOM. Patients with traumatic brain injury, pre-trauma anticoagulation/coagulopathy, undergoing exploratory-laparotomy upon arrival, transferred from another hospital, or who died/discharged within48-hours were excluded. We compared eVTE versus dVTE using a 1:1 propensity-score model, matching for age, comorbidities, BSOI grade, injury severity score, hypotension on arrival and need for transfusions.

Results: From 1,022 cases, 417 (40.8%) adolescents received eVTE. After matching, there was no difference in matched variables (all p>0.05). Both groups had a similar rate of VTE (dVTE 0.6% vs. eVTE 1.7%, p=0.16), mortality (dVTE 0.3% vs. eVTE 0%, p=0.32) and failure of NOM (eVTE 5.9% vs. dVTE 5.6%, p=0.87).

Conclusions: The rate of VTE in adolescent trauma is exceedingly rare. Early VTE chemoprophylaxis in adolescent BSOI does not increase the rate of failing NOM. However, unlike adult trauma patients, adolescent patients with BSOI receiving eVTE have a similar rate of VTE and mortality rate, compared to adolescents receiving dVTE.

Table 1. Demographics for 1:1 Propensity-score matched patients of early and delayed VTE chemoprophylaxis

Characteristic	eVTE (n=358)	dVTE (n=358)	p-value
Age, year, median (IQR)	16 (1)	16 (1)	1.000
Male, n (%)	201 (56.1%)	215 (60.1%)	0.289
Comorbidities, n (%)			
Hypertension	1 (0.3%)	1 (0.3%)	1.000
ADHD	15 (4.2%)	19 (5.3%)	0.482
Psychiatric illness	14 (3.9%)	15 (4.2%)	0.850
Smoker	29 (8.1%)	20 (8.4%)	0.892
Substance abuse	18 (5.0%)	18 (5.0%)	1.00
Diabetes	1 (0.3%)	3 (0.8%)	0.316
Angiography, n (%)	18 (5.0%)	18 (5.0%)	1.000
Hypotensive on admission, n (%)	15 (4.2%)	16 (4.5%)	0.854
Received PRBC transfusion within 4-hours, n (%)	60 (16.8%)	60 (16.8%)	1.000
ISS, median (IQR)	21 (13)	19 (13)	0.601
Injury, n (%)			
Kidney	102 (28.5%)	101 (28.2%)	0.934
Spleen	202 (56.4%)	187 (52.2%)	0.260
Liver	165 (46.1%)	176 (49.2%)	0.410
Pelvic fracture	115 (32.1%)	105 (29.3%)	0.418
Long bone fracture (humerus, femur, tibia/fibula)	126 (35.2%)	125 (34.9%)	0.938
AIS-Abdomen grade, n (%)			0.833
2	167 (46.6%)	172 (48.0%)	
3	111 (31.0%)	100 (27.9%)	
4	59 (16.5%)	63 (17.6%)	
5	21 (5.9%)	23 (6.4%)	

VTE = venous thromboembolism, ADHD = attention-deficit hyperactivity disorder, PRBC = packed red blood cells, ISS = injury severity score, AIS

Table 2. Outcomes for 1:1 Propensity-score matched patients of early and delayed VTE chemoprophylaxis

Characteristic	eVTE (n=358)	dVTE (n=358)	p-value
Complications, n (%)			
VTE	6 (1.7%)	2 (0.6%)	0.155
Deep vein thrombosis	4 (1.1%)	1 (0.3%)	0.178
Pulmonary embolism	3 (0.8%)	1 (0.3%)	0.316
LOS, days, median (IQR)	9 (7)	6 (6)	<0.001
ICU, days, median (IQR)	4 (3)	3 (3)	0.164
Failed NOM, n (%)	21 (5.9%)	20 (5.6%)	0.872
Mortality, n (%)	0	1 (0.3%)	0.317

VTE = venous thromboembolism, LOS = length of stay, ICU = intensive care unit, NOM = non-operative management

Scientific Session V - Traumatic Brain Injury & Coagulation

Paper #28
January 20, 2023
8:00 am

TRANSFUSION-RELATED COST COMPARISON OF TRAUMA PATIENTS RECEIVING WHOLE BLOOD VERSUS COMPONENT THERAPY

Angelo V. Ciaraglia, MD, John C. Myers, MD, Maxwell A. Braverman, DO*, John Barry, BS,
Brian J. Eastridge, MD*, Ronald M. Stewart, MD, FACS*,
Susannah Nicholson, MD, MS, FACS*, Donald H. Jenkins, MD, FACS*
University of Texas Health Science Center, San Antonio, TX

Presenter: John C. Myers, MD

Discussant: Linda Dultz, MD, MPH - UT Southwestern Parkland Hospital

Objectives: To determine if there is a difference in transfusion-related charges between trauma patients that received low titer O+ whole blood (WB) and component therapy (CT).

Methods: Retrospective review of a prospective database of adult and pediatric trauma patients who received either LTO+WB or CT from time of injury to within 6 hours of arrival. Annual mean charge per unit of blood product were obtained from the regional blood bank supplier. Pediatric and adult patients were analyzed separately and charges were compared on a per unit and per milliliter (mL) basis. Subgroup analysis was performed on severely injured patients (ISS>15) and patients that underwent massive transfusion (MT).

Results: Prehospital WB transfusion began at this institution in January 2018. Compared to previous years, after the initiation of the whole blood transfusion the mean annual charges decreased 17.3% for all blood products and for each component individually (Figure 1). In adults, WB was associated with a significantly lower charge per patient and per mL compared to CT in the emergency department ($p<0.001$), at 24 hours ($p<0.001$), and overall ($p<0.001$). Similar findings were true in the pediatric cohort (all $p<0.001$). In the severely injured subgroup (ISS > 15), WB was associated with a lower charge per patient and per mL in the ED ($p<0.001$), at 24 hours ($p<0.001$), and overall ($p<0.001$), with no difference in the prehospital setting (Figure 2). In patients that met MT criteria, WB was associated with a decreased cost per mL in the ED ($p=0.007$) and at 24 hours ($p<0.001$).

Conclusions: With increased use of LTO+WB for resuscitation, cost comparison is of significant importance to all stakeholders. Additionally, LTO+WB is also associated with reduced charges and potentially improved logistics in terms of blood management, especially in a MT. Future analyses may improve resource utilization and potentially benefit overall cost.

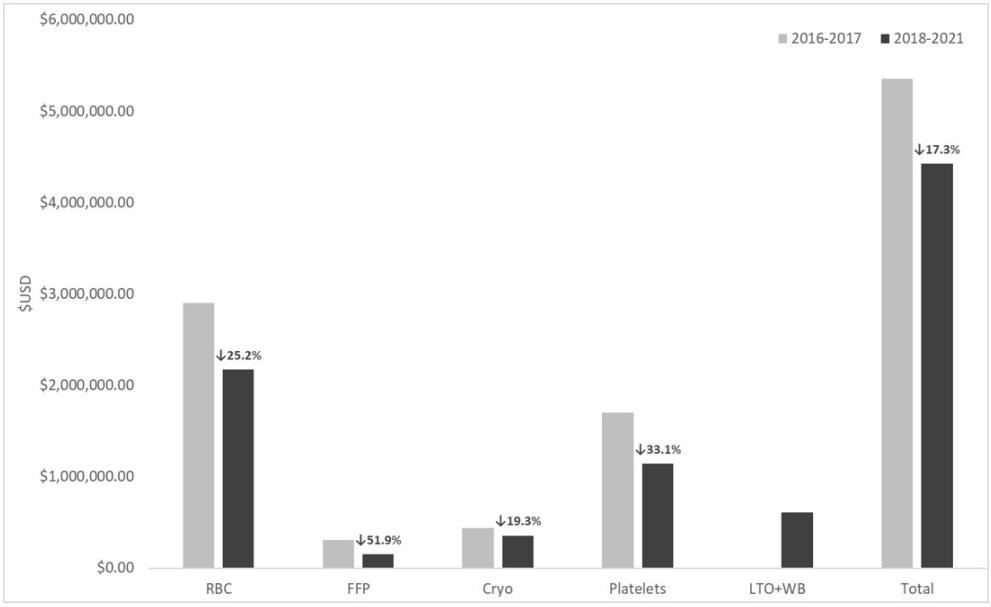


Figure 1. Mean annual charges ($USD) for blood product expenditures before and after initiation of prehospital whole blood transfusion program (January 2018) from 2016-2021.

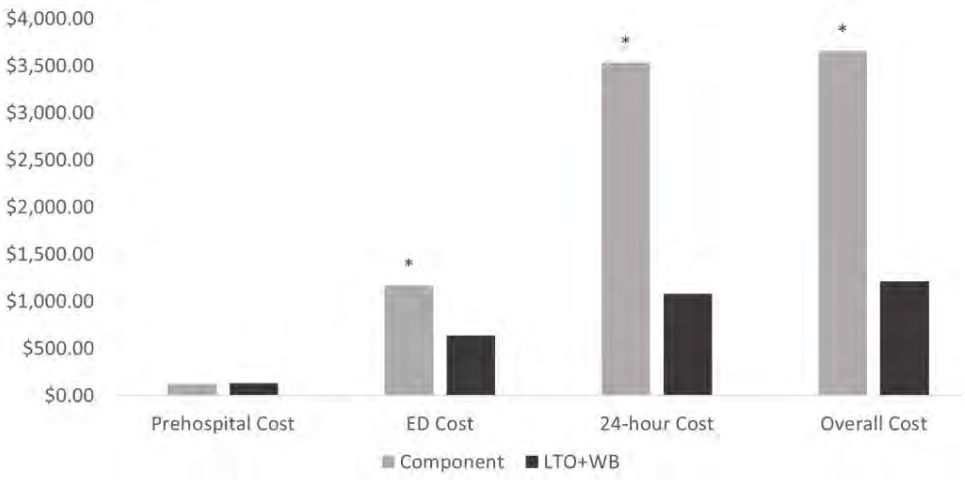


Figure 2. Comparison of transfusion-related charges in severely injured patients (ISS>15) who received LTO+WB versus balanced component therapy at pre-specified time points. (*) indicating significant difference ($p<0.05$).

Paper #29
January 20, 2023
8:15 am

DURA VIOLATION IS ASSOCIATED WITH INCREASED PATHOLOGIC HYPERCOAGLUABILITY IN TRAUMATIC BRAIN INJURY PATIENTS

Julia R. Coleman, MD, MPH*, Sanchayita Mitra, BS, Patrick Lutz, BS,
Ernest Eugene Moore, MD*, Christopher Silliman, MD, PhD, Mitchell Cohen, MD, FACS*
University of Colorado, Aurora

Presenter: Julia R. Coleman, MD, MPH

Discussant: Nicole M. Bedros, MD - Baylor University Medical Center Dallas

Objectives: The coagulopathy of traumatic brain injury (TBI) remains poorly understood. Contradictory descriptions in the literature highlight the distinction between systemic and local coagulation environment, with a classic description of systemic hypercoagulability in TBI patients despite intracranial hypocoagulopathy which is dynamic over time. This perplexing profile has been hypothesized to be due to tissue factor release from the dura. The objective of this study was to assess the dynamic coagulation profile of TBI patients undergoing neurosurgical procedures. We hypothesize that hypercoagulability in TBI is more pronounced after dura violation.

Methods: This is a prospective study of all adult TBI patients at a single, urban, level-1 trauma center who underwent a neurosurgical procedure from 2019 to 2021. Whole blood samples were collected before and then one hour following procedural dura violation. Native and tissue plasminogen activator (tPA) thrombelastography (TEG) were performed.

Results: Overall, 57 patients were included, 42 of whom underwent craniotomy, four underwent extraventricular drain placement, and 10 underwent intracranial bolt. The majority (61%) were male, the median age was 52, and 70% presented after blunt trauma. The median Glasgow Coma Score was 7. Compared to pre-dura violation, post-dura violation blood samples demonstrated hypercoagulability characterized by increased clot strength and decreased fibrinolysis. After dura violation, there was a significant increase in clot strength (median maximum amplitude of 74.4 mm versus 63.5 mm, $p<0.0001$). Similarly, after dura violation, there was a significant decrease in fibrinolysis (LY60 1.4% versus 2.6%, $p=0.04$).

Conclusions: After dura violation, a systemic hypercoagulability is observed in TBI patients, characterized by increased clot strength and decreased fibrinolysis.

Paper #30
January 20, 2023
8:30 am

PREDICTIVE VALUE OF EARLY INFLAMMATORY MARKERS IN TRAUMA PATIENTS

Matthew R. Baucom, MD, Taylor Wallen, MD*, Maura Kopchak, BS, Nick Weissman, BS, Rebecca Schuster, MS, Timothy A. Pritts, MD, PhD*, Michael Goodman, MD*
University of Cincinnati

Presenter: Matthew R. Baucom, MD

Discussant: Taryn Travis, MD - Medstar Washington Hospital Center

Objectives: In a multicenter study of massively transfused patients, seven key inflammatory biomarkers were found to be associated with the risk of mortality. The aim of this prospective single center study was to further determine which of these early inflammatory markers could predict 30-day mortality amongst all critically injured trauma patients.

Methods: Serum samples were collected at 6-, 24-, and 72-hours from 159 consecutive patients admitted to the ICU following traumatic injury. Inflammatory markers syndecan-1, eotaxin, IL-1ra, IL-6, IL-8, IL-10, IP-10, and MCP-1 were analyzed via multiplex ELISA. Subgroup analysis was performed for patients undergoing massive transfusion (>5 RBCs) or sub-massive transfusion (<RBCs) during the first 6 hours following admission.

Results: Patients enrolled in the study were 52.4 ± 21.8 years old, 66% male, 82% blunt mechanism of injury, and had a median ISS of 22 [14, 33]. IL-8 and IP-10 were significantly increased at 6 hours post-injury in non-survivors (n=27) (**Figure 1**). Elevated IL-1ra, IL-6, IL-8, IL-10, and MCP-1 at 24-hours post-injury were also associated with 30-day mortality. By contrast, serum syndecan-1 and eotaxin levels were not associated with mortality at any timepoint. Subgroup analysis of patients undergoing sub-massive transfusion (n=56) revealed that IL-8 and IP-10 were significantly increased at 24 hours in 30-day non-survivors. Further analysis of massively transfused patients (n=16) revealed a significant increase in IP-10 at 6- and 24-hours and an increase in MCP-1 at 6 hours in 30-day non-survivors (**Figure 2**).

Conclusions: Early elevation of IL-1ra, IL-6, IL-8, IL-10, IP-10, and MCP-1 in critically ill trauma patients may predict 30-day all-cause mortality. In addition, an early increase in IP-10 and MCP-1 may also predict mortality for massively transfused patients. Further analysis will be completed to create a mortality risk calculator based on these acute serum biomarkers.

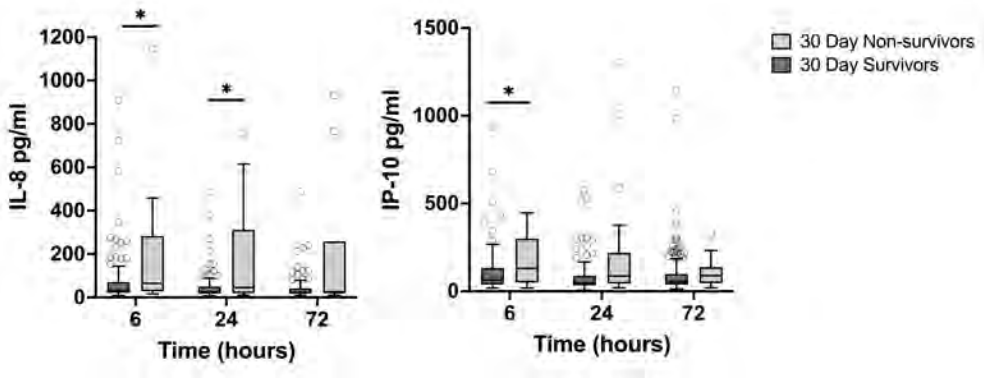


Figure 1: Cytokines among all critically ill trauma patients.

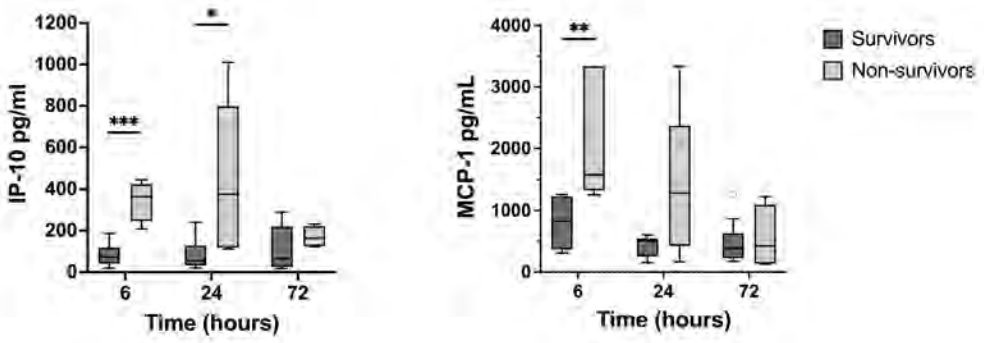


Figure 2: Cytokine serum levels in massively transfused critically ill trauma patients.

Paper #31
January 20, 2023
8:45 am

ANALYSIS OF BIG SCORES AND PLATELET INHIBITION IN PATIENTS WITH TRAUMATIC BRAIN INJURIES

Hunter W. Parmer, BS, MD, M. Victoria P. Miles, EMT-P, MD*, Chace Hicks, MD, Lauren E Favors, MD, Meredith Rippy, Andrew Wilson, MS, Abigail Edwards, MD, Kathryn Stewart, BSN, Robert A. Maxwell, MD*
University of Tennessee-Chattanooga

Presenter: Hunter W. Parmer, BS, MD

Discussant: Purvi Patel, MD - Loyola University Medical Center

Objectives: Platelet inhibition is known to occur after traumatic brain injury (TBI) and is predictive of bleed progression. The relationship between platelet dysfunction and brain injury guideline (BIG) score, however, is unknown. We hypothesized that the higher the BIG score was, the more likely the patient was to show inhibition to thromboelastography with platelet mapping (TEG-PM).

Methods: A practice management guideline was established calling for a TEG-PM on all adult patients with intracranial bleed. Patients were then categorized per the brain injury guidelines (BIG) as 1/2/3. Data was collected from December 2019 to December 2021. Platelet inhibition was considered to be present if the percent arachidonic acid (AA) or percent adenosine diphosphate (ADP) inhibition was ≥ 60%.

Results: Over the study period, 768 patients underwent TEG-PM. Those within the BIG 3 score were more likely to have AA (91.1%), ADP (80.8%), and combined AA/ADP (92.0%) platelet inhibition regardless of platelet inhibiting medication. Those with BIG 3 compared to BIG 1 or 2 scores were also noted to be more likely to require neurosurgery (16.3% vs 3.2% and 3.6%), more likely to expire secondary to their TBI (14.1% vs 0% and 0%), and have a higher head AIS (r_s= 0.151).

Conclusions: Our study suggests that BIG score correlates with platelet inhibition and bleed progression regardless of whether patients were taking platelet inhibiting medications. Patient with BIG 1 and 2 injuries have low likelihood of platelet inhibition and platelet mapping studies are not necessary in these patients.

Table 1: Goodness-of-fit analysis of BIG scores in inhibited groups.[a]

	Total (n=437)	BIG 1 (n=30)	BIG 2 (n=23)	BIG 3 (n=384)	P value
AA Inhibited	192 (43.9%)	10 (5.2%)	7 (3.7%)	175 (91.1%)	<.001*
ADP Inhibited	146 (33.4%)	16 (11.0%)	12 (8.2%)	118 (80.8%)	<.001*
AA and ADP Inhibited	99 (22.6%)	4 (4.0%)	4 (4.0%)	91 (92.0%)	<.001*

Abbreviations: AA, Arachidonic acid; ADP, Adenosine diphosphate
[a]Data are presented as number (%) for categorical variables.
*Statistically significant difference (P<.05)

Table 2: Summary of BIG score distribution among patients that required operative intervention or bleed progression.[a]

		Operative Intervention		Bleed Progression	
	Total (n=768)	No (n=658)	Yes (n=110)	No (n=450)	Yes (n=318)
BIG 1	62 (8.1%)	60 (96.8%)	2 (3.2%)	53 (85.5%)	9 (14.5%)
BIG 2	55 (7.1%)	53 (96.4%)	2 (3.6%)	41 (74.5%)	14 (25.5%)
BIG 3	651 (84.8%)	545 (83.7%)	106 (16.3%)	356 (54.7%)	295 (45.3%)

[a]Data are presented as number (%) for categorical variables.
*Statistically significant difference (P<.05)

Scientific Session V - Traumatic Brain Injury & Coagulation

Paper #32
January 20, 2023
9:00 am

EARLY POST-TBI TXA PREVENTS BBB HYPERPEMERABILITY INDEPENDENT OF PENUMBRAL LEUKOCYTE MOBILIZATION

Matthew Culkin, BS, Alfonso Lopez, MD, Anasthasia Georges, Priyanka Bele, MD,
Grace Niziolek, MD, Christina Jacovides, MD*, Hailong Song, BA,
Victoria Johnson, MBChB, PhD, Lewis J. Kaplan, MD, FACS, FCCM, FCCP*,
Douglas Smith, MD, Jose L. Pascual, MD, PhD, FRCS(C), FACS, FCCM*
Department of Surgery, Perelman School of Medicine, University of Pennsylvania

Presenter: Matthew Culkin, BS

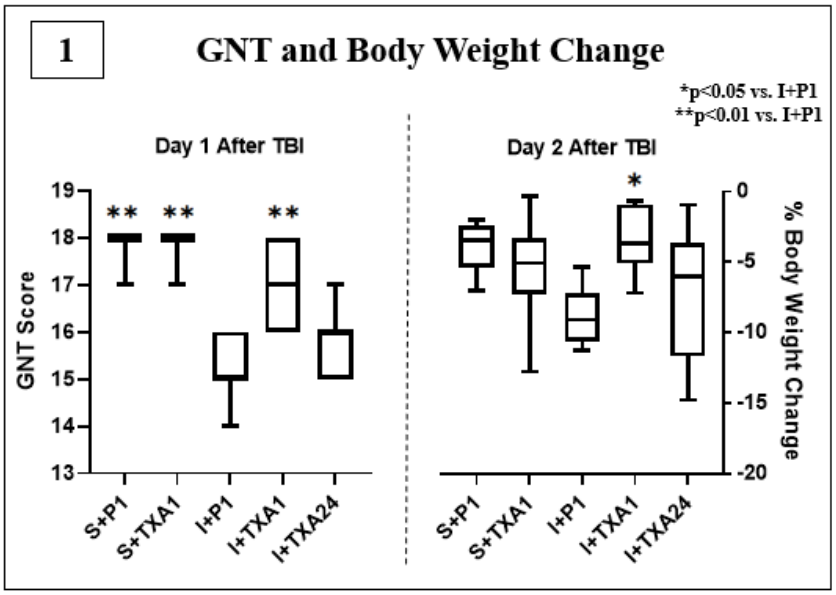
Discussant: Susan Rowell, MD, MBA, MCR - University of Chicago

Objectives: Tranexamic acid (TXA) given early but not late after TBI reduces mortality. This may be partly related to a late administered TXA-driven profibrinolysis and increased leukocyte-mediated inflammation. We hypothesized that compared to late administration (24h post-TBI), early TXA (1h post-TBI), blunts penumbral, blood-brain barrier (BBB) endothelial-leukocyte (EC-LEU) interactions and microvascular permeability, in vivo.

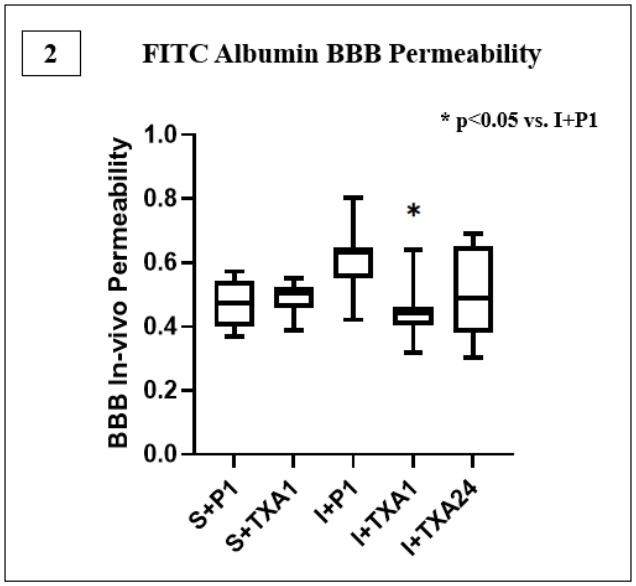
Methods: CD1 male mice (n=35) were randomized to severe TBI (Injury, [I] by controlled cortical impact, I: 6m/sec velocity, 1mm depth, 3mm diameter) or sham craniotomy (S) followed by IV saline (P, placebo) at 1h or TXA (30mg/kg) at 1 or 24h. At 48h, *in-vivo* pial intravital microscopy visualized live penumbral EC-LEU interactions and BBB microvascular fluorescent albumin leakage. Neuroclinical recovery was assessed by the Garcia Neurological Test (GNT: motor, sensory, reflex, and balance assessments) and body weight loss recovery at 24 and 48h. ANOVA with Bonferroni correction assessed intergroup differences ($p<0.05$).

Results: 1-hour but not 24h TXA improved GNT (on day 1 post TBI) compared to placebo (Figure 1). Both TXA administration timings similarly improved 24h weight loss recovery but only 1h TXA significantly improved weight loss recovery at 2 days compared to placebo ($p=0.03$). No intergroup differences were found in LEU rolling, or adhesion. Compared to untreated injured animals (I+P1), only TXA at 1 hour (I+TXA1) reduced BBB permeability (Figure 2, $p=0.04$).

Conclusions: Only early post-TBI TXA consistently improves animal neurological recovery markers. TXA preserves BBB integrity, but only when administered early. This effect is independent of endothelial-leukocyte interactions.



The Garcia neurological scale (GNT) assesses daily activities of rodents including motor, sensory, reflex, and balance abilities with a maximum score of 18. Only TXA at 1hr after TBI significantly improved day 1 GNT scores. Rodent body weight loss occurs after TBI and 2 days after TBI, only TXA administered at 1 hour (I+TXA1) significantly improved weight loss recovery.



In vivo penumbral pial intravital microscopy 2 days after TBI. As compared to untreated injured animals (I+P1) only TXA at 1 hour (I+TXA1) reduced microvascular permeability of fluorescent albumin.

Scientific Session V - Traumatic Brain Injury & Coagulation

Paper #33
January 20, 2023
9:15 am

A RANDOM FOREST MODEL USING FLOW CYTOMETRY DATA IDENTIFIES PULMONARY INFECTION AFTER THORACIC INJURY

Rondi Gelbard, MD, FACS*, Hannah Hensman, Seth Schobel, PhD,
Linda Stempora, Christopher J. Dente, MD*, Timothy G. Buchman, MD*,
Allan Kirk, MD, PhD, Eric Elster, MD, FACS
Emory University School of Medicine

Presenter: Rondi Gelbard, MD, FACS

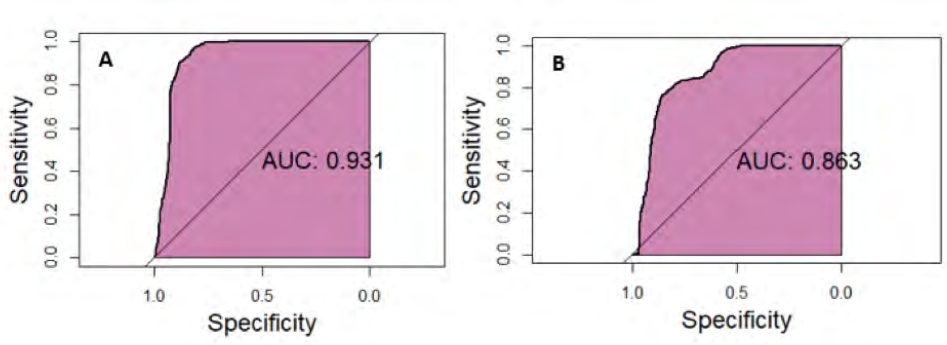
Discussant: Mark Hoofnagle, MD, PhD - Washington University

Objectives: Thoracic injury can cause impairment of lung function leading to respiratory complications such as pneumonia. There is increasing evidence that central memory T cells of the adaptive immune system play a key role in pulmonary immunity. We sought to explore whether assessment of cell phenotypes using flow cytometry (FCM) could be used to identify pulmonary infection after thoracic trauma.

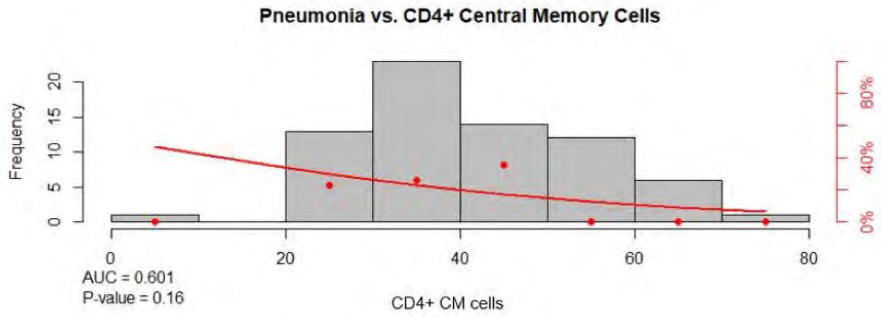
Methods: We prospectively studied trauma patients with thoracic injuries who survived >48h at a Level 1 trauma center from 2014-2020. Clinical and FCM data from serum samples collected within 24h of admission were considered as potential variables. Random forest (RF) and logistic regression (LR) models were developed to estimate the risk of hospital-acquired and ventilator-associated pneumonia (PNA). Variables were selected using backwards elimination and models were internally validated with leave-one-out.

Results: Seventy patients with thoracic injuries were included (median age 35y (IQR: 25.25 - 51), 62.9% (44/70) male, 61.4% (42/70) blunt trauma). The most common injuries included rib fractures (52/70, 74.3%) and pulmonary contusions (26/70, 37%). The incidence of PNA was 14/70 (20%). Median ISS was similar for patients with and without PNA (30.5 (IQR 22.8 - 39.3) vs 26.5 (IQR 21.8 - 33.3). The final RF model selected three variables (APACHE score, highest pulse rate in first 24h, and frequency of CD4+ central memory (CM) cells) that identified PNA with an AUC of 0.93, sensitivity of 0.91, and specificity of 0.88. A logistic regression with the same features had an AUC of 0.86, sensitivity of 0.76, and specificity of 0.85.

Conclusions: Clinical and FCM data have diagnostic utility in the early identification of patients at risk of nosocomial pneumonia following thoracic injury. Signs of physiologic stress and lower frequency of CM cells appear to be associated with higher rates of pneumonia after thoracic trauma.



Receiver operating characteristic (ROC) curve for the (A) random forest model and (B) logistic regression model.



Histogram of CD4+ CM cells with percentage of pneumonia patients per bin represented by red dots.

Scientific Session V - Traumatic Brain Injury & Coagulation

Paper #34
January 20, 2023
9:30 am

ARE DATA DRIVING OUR AMBULANCES? LIBERAL USE OF TRANEXAMIC ACID IN THE PREHOSPITAL SETTING.

Alexandra MP Brito, MD*, Madeline Fram, MD Candidate,
Gregory R Stettler, MD*, James Winslow, MD, Robert Shayn Martin, MD*
Wake Forest University Medical School

Presenter: Alexandra MP Brito, MD

Discussant: Avi Bhavaraju, MD - University of Arkansas for Medical Sciences

Objectives: Current data on tranexamic acid (TXA) supports early administration for severe hemorrhagic shock. Administration by EMS has been facilitated by developing protocols and standing orders informed by these data. In this study, patterns of TXA use by EMS agencies serving a large level 1 trauma center were examined. We hypothesize that current widespread TXA use often includes administration outside of standard and data driven indications.

Methods: The trauma registry at a level 1 trauma center was queried for patients who received TXA in the course of their management. To determine the practice patterns and appropriateness of administration of TXA, patients' physiologic state in the prehospital environment based on EMS records, physiologic state on arrival to hospital, and interventions performed in both settings were examined. More than 20 separately managed EMS systems that administer TXA transport patients from scene to this trauma center, allowing for a broad survey of practices.

Results: From 2016-2021 1089 patients received TXA, with 406 (37.3%) having treatment initiated by EMS services. Of these, the average prehospital systolic blood pressure (SBP) was 108.2mmHg and initial ED SBP was 107.8mmHg. Only 58.4% of these patients received blood transfusion after arrival to this trauma center. Compliance with standard indications are summarized in Table 1. Similar levels of compliance were seen across high volume EMS services.

Conclusions: TXA use has become common in trauma and has been adopted by many EMS systems. However, these results indicate TXA in the prehospital setting is over-used as administration is not being limited to indications that have shown benefit in prior data.

SBP indication standard	Source of SBP indication standard	Percentage of patients **NOT** meeting standard
<90mmHg	Common practice	70.4
≤75mmHg	Mortality benefit in CRASH-2	85.4
<70mmHg	Mortality benefit in STAAMP Trial	88.1

Table 1. Compliance with standard or data driven indications for TXA.

Scientific Session VI - Multicenter Trials

Paper #35
January 20, 2023
7:45 am

RETHINKING PROTOCOLIZED COMPLETION ANGIOGRAPHY FOLLOWING EXTREMITY VASCULAR TRAUMA: A PROSPECTIVE OBSERVATIONAL MULTICENTER TRIAL.

Grace Niziolek, MD, Jane Keating, MD*, Joanelle A. Bailey, MD, MPH*, Nathan J. Klingensmith, MD*, Alexis M. Moren, MD, MPH*, Fabio Saccomanno, BS, David J. Skarupa, MD, FACS, FCCM*, Anthony Loria, MD, Zoe Maher, MD*, Sarah Ann Moore, MD*, Michael C. Smith, MD*, Robert Jean, MD, Amanda Leung, BA, Kevin M. Schuster, MD, MPH*, Mark J. Seamon, MD, FACS*
University of Pennsylvania

Presenter: Grace Niziolek, MD

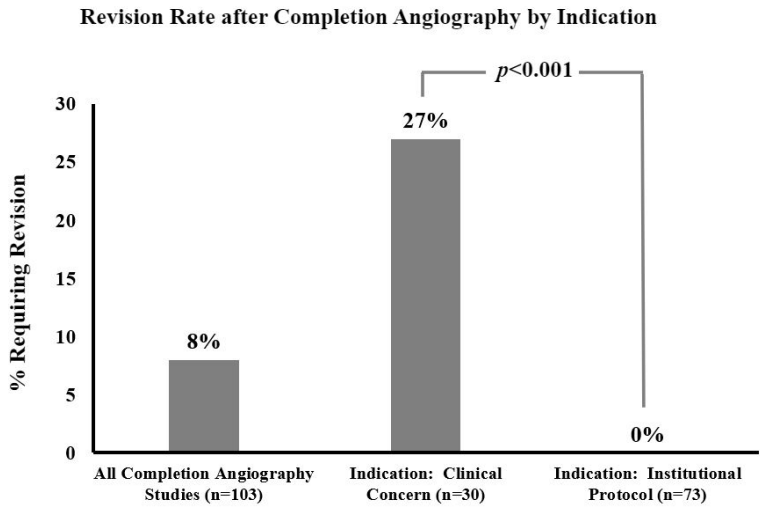
Discussant: Joseph J. DuBose, MD - Dell School of Medicine, University of Texas-Austin

Objectives: Completion angiography (CA) is commonly utilized following repair of extremity vascular injury and is recommended by the EAST extremity trauma PMG despite limited data. We hypothesized that CA would lead to early recognition of inadequate repairs and sought to determine which patients would benefit from CA.

Methods: This prospective, observational multicenter (18LI, 2LII) analysis included patients ≥15yrs with extremity vascular injuries requiring operative management. Clinical variables and outcomes were compared by CA and indication, then analyzed with respect to with our primary study endpoint, need for secondary vascular intervention.

Results: Of 437 patients, 103 (24%) underwent CA after extremity vascular operative management (Table). Those who underwent CA more often had artery and vein injuries requiring bypass or interposition repairs (all $p<0.001$) than those who did not undergo CA, although no differences between study group measured outcomes were appreciated. Institutional protocol (71%) was cited as the most common reason to perform CA compared to concern for inadequate repair (29%). When CA patients were compared by these indications, no differences in physiology, injuries, or repairs were appreciated (Table, all $p>0.05$). Importantly, no patients required redo extremity vascular surgery if CA was performed per institutional protocol; however, 27% required redo vascular surgery if the CA was performed due to a concern for inadequate repair (Figure).

Conclusions: Our data suggests that CA should be used in a case-by-case basis after extremity vascular injury repair based on clinical concerns rather than protocol. Limiting CA to those with concern for inadequate vascular repairs may decrease unnecessary procedures and potential morbidity.



Differences observed in need for redo vascular surgery based on the indication for completion angiogram.

	Completion Angiography At Initial Surgery			*Completion Angiography Indication*		
	Performed (n=103)	**NOT Performed (n=334)**	***p* value**	**Institutional Protocol (n=73)**	**Clinical Concern (n=30)**	***p* value**
Age (years)	27 (22-37)	32 (25-43)	0.013	27 (23-37)	29 (20-36)	0.432
Male	84%	87%	0.394	85%	80.0%	0.54
Penetrating injury	62%	55%	0.227	66%	53%	0.238
Initial SBP (mmHg)	117 (98-140)	126 (96-146)	0.096	118 (95-140)	116 (100-140)	0.466
MTP activation	24%	25%	0.930	78%	70%	0.385
Extremity AIS	3 (3-4)	3 (2-4)	0.024	3 (3-4)	3 (3-4)	0.441
ISS	16 (9-27)	16 (9-24)	0.981	16 (9-26)	13 (9-29)	0.923
Primary surgeon, trauma	63%	54%	0.099	59%	73%	0.168
Primary lower extremity injury	84%	75%	0.161	83.6%	85.7%	0.791
Arterial injury	93%	67%	<0.001	95%	90%	0.408
Arterial injury repair type						
Primary	3%	16%		5%	0%	
Patch	4%	6%		6%	0%	
Bypass/interposition	71%	54%	<0.001	66%	81%	0.542
Shunt	1%	5%		2%	0%	
Ligation	6%	18%		6%	4%	
Venous injury	55%	36%	<0.001	56%	53 %	0.793
Venous injury repair type						
Primary	26%	23%		23%	33%	
Patch	6%	0%		9%	0%	
Bypass/interposition	9%	4%	<0.001	9%	8%	0.866
Shunt	2%	1%		3%	0%	
Ligation	53%	69%		51%	58%	
Postop therapeutic AC	58%	52%	0.263	64%	43%	0.049
Postop fasciotomies	13%	8%	0.101	77%	60%	0.087
Postop amputation	7%	7%	0.969	6%	10%	0.408
Hospital LOS (days)	12 (7-23)	10 (5-20)	0.192	12 (7-24)	14 (7-21)	0.600
Hospital survival	95%	95%	0.822	4%	7%	0.583

Differences in demographics, injury characteristics, surgical management, and in-hospital outcomes based on a) whether or not completion angiography was performed and b) the clinical indication for the completion angiogram.

Scientific Session VI - Multicenter Trials

Paper #36
January 20, 2023
8:00 am

MOVING THE NEEDLE ON TIME TO RESUSCITATION: AN EAST PROSPECTIVE MULTICENTER STUDY OF VASCULAR ACCESS IN HYPOTENSIVE INJURED PATIENTS USING TRAUMA VIDEO REVIEW

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University of Texas Southwestern Medical Center

Presenter: Ryan P. Dumas, MD

Discussant: Allyson M. Hynes, MD - University of New Mexico

Objectives: Vascular access in hypotensive trauma patients is challenging. Little evidence exists on the time required and success rates of vascular access types. We hypothesized that intraosseous (IO) access would be faster and more successful than peripheral IVs (PIVs) or central venous catheters (CVCs) in hypotensive patients.

Methods: An EAST prospective multicenter trial was performed; 19 centers provided data. Trauma video review (TVR) was used to evaluate the resuscitations of all hypotensive (SBP <90 mm Hg) patients. Highly granular data from video recordings were abstracted including attempt type, attempt locations, success rates, and procedural duration. Times to completion and success rates were compared. Time to resuscitation initiation and other outcomes were evaluated.

Results: 1,410 access attempts occurred in 581 patients with a median age of 40[27-59], Injury Severity Score of 22[10-34]. 70% of access attempts were successful but were significantly less likely to be successful in females (64% vs. 71%, p=0.01). Median time to any access was 5.0[3.2-8.0] minutes. IO had higher success rates than PIVs or CVCs (93% vs. 67% vs. 59%, p<0.001) and remained higher after subsequent failures (second attempt 85% vs. 59% vs. 69%, p=0.08; third attempt 100% vs 33% vs. 67%, p=0.002). Duration varied by access type (IO 36[23-60]sec; PIV 44[31-61]sec; CVC 171[105-298]sec) and was significantly different between IO vs. CVC (p<0.001) and PIV vs. CVC (p<0.001) but not PIV vs. IO. Time to resuscitation initiation was shorter in patients whose initial access attempt was IO 402 vs. 349 sec (p=0.015).

Conclusions: IO is as fast as PIV and more likely to be successful in hypotensive patients. Patients whose initial access attempt was IO were resuscitated more expeditiously. IO access should be considered a first line therapy for hypotensive trauma patients.

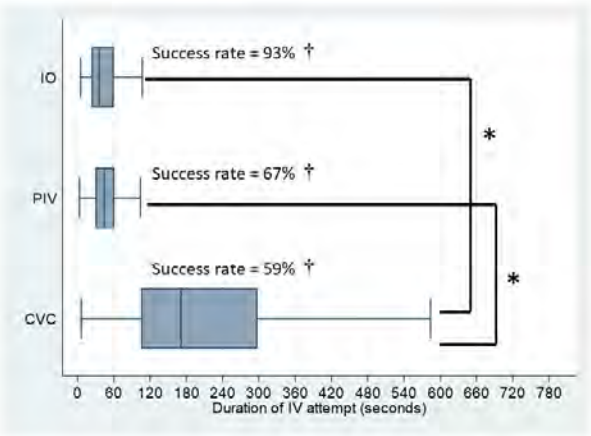

Figure 1: Time to completion and success rates of IV access attempts in hypotensive trauma patients. Abbreviations: IO – Intraosseous; PIV = Peripheral IV; CVC = Central Venous Catheter. * = $p<0.001$, Kruskal-Wallis test; †= $p<0.001$ Fischer's Exact test.

Scientific Session VI - Multicenter Trials

Paper #37
January 20, 2023
8:15 am

OUTCOMES AMONG TRAUMA PATIENTS WITH DUODENAL LEAK FOLLOWING PRIMARY VS COMPLEX REPAIR OF DUODENAL INJURIES: AN EAST MULTICENTER TRIAL

Rachel L. Choron, MD, FACS*, Amanda Teichman, MD*, Christopher G Bargoud, MD, Jason D. Sciarretta, MD, FACS*, Randi Smith, MD, MPH*, Dustin Hanos, MD, Iman Afif, MD, Jessica H Beard, MD, MPH*, Navpreet K. Dhillon, MD*, Ashling Zhang, Mira Ghneim, MD*, Rebekah J. Devasahayam, MD, FACS *, Oliver L. Gunter, Jr., MD, FACS*, Alison A. Smith, MD, PhD*, Brandi Sun, Chloe S. Cao, Medical Student*, Jessica Reynolds, MD*, Lauren Hilt, Daniel N. Holena, MD, MSCE, FACS*, Grace Chang, MD*, Meghan Jonikas, MD, Karla Echeverria-Rosario, MD*, Nathaniel S. Fung, MD*, Aaron Anderson, MD, Caitlin A. Fitzgerald, MD*, Ryan P. Dumas, MD*, Jeremy H. Levin, MD*, Christine T. Trankiem, MD, FACS *, JaeHee Yoon, MD, MS*, Jacqueline J Blank, MD*, Joshua P. Hazelton, DO, FACS*, Christopher J McLaughlin, MD*, Rami Al-Aref, Jordan M. Kirsch, DO*, Daniel Howard, Dane R. Scantling, DO, MPH*, Kate V. Dellonte, RN, MBA, BSN*, Michael Vella, MD*, Brent Hopkins, Chloe Shell, BA, Pascal O. Udekwu, MD, MBA, MHA*, Evan G Wong, MD, MPH, FRCSC, FACS*, Bellal Joseph, MD, FACS*, Howard Lieberman, MD, Walter A Ramsey, MD, Collin H. Stewart, MD*, Claudia Alvarez, John D. Berne, MD*, Jeffry Nahmias, MD, MHPE, FACS, FCCM*, Ivan Puente, MD*, Joe H. Patton, Jr., MD*, Ilya Rakitin, MD*, Lindsey Perea, DO, FACS*, Odessa Pulido, DO, Hashim Ahmed, MBBS, Jane Keating, MD*, Lisa M. Kodadek, MD*, Jason Wade, Reynold Henry, Martin A. Schreiber, MD, FACS*, Andrew J. Benjamin, MD, MS*, Abid Khan, MD*, Caleb J. Mentzer, DO*, Vasileios Mousafeiris, Francesk Mulita, Shari Reid-Gruner, MD*, Joshua A. Marks, MD*, Christopher Foote, MD, Carlos H Palacio, MD, FACS.*, Dias Argandykov, Haytham Kaafarani, MD, MPH*, Susette Coyle, Marie Macor, Michelle Bover Manderski, PhD MPH, Mark J. Seamon, MD, FACS*
Rutgers Robert Wood Johnson Medical School

Presenter: Rachel L. Choron, MD, FACS

Discussant: Sydney Radding, MD – Virginia Commonwealth University

Objectives: Duodenal leak is a feared complication of repair and innovative, complex repairs with adjunctive measures(CRAM) were developed to decrease both leak occurrence and severity when leaks occur. Data on the association of CRAM and duodenal leak is sparse and its impact on duodenal leak outcomes nonexistent. We hypothesized CRAM would 1) be associated with decreased duodenal leak rates and 2) improve recovery and outcomes when leaks do occur.

Methods: A retrospective, multicenter analysis from 35 L1 centers included patients(>14yr) with operative, traumatic duodenal injuries (1/2010-12/2020). The study sample compared duodenal operative repair strategy: primary repair alone(PRA) vs CRAM(any repair plus pyloric exclusion, gastrojejunostomy, triple tube drainage, duodenectomy). Measured study endpoints included duodenal leaks and markers of leak sequelae and recovery.

Results: The sample(n=861) was primarily young(33 years) male(84%) with penetrating injuries(77%); 523 underwent PRA, 338 CRAM. Although CRAM were more critically injured(Table 1) than PRA, CRAM did not correlate with improved leak rates (PRA 8% v CRAM 21%, $p<0.001$). In turn, adverse outcomes were more common after CRAM with more IR drains, prolonged NPO and LOS, greater mortality, and more 30-day readmissions than PRA(all $p<0.05$). Importantly, CRAM also had no positive impact on leak recovery(Table 2). There were no differences in number of operations, drain duration, NPO duration, need for IR drainage, HLOS, readmissions or mortality between PRA leak vs CRAM leak patients(all $p>0.05$). CRAM leaks had longer antibiotic duration, more GI complications and *longer* duration until duodenal leak resolution(all $p<0.05$).

Conclusions: CRAM did not prevent duodenal leaks and moreover, did not reduce adverse sequelae when leaks did occur. Our results suggest that CRAM is not a protective operative duodenal repair strategy.

Table 1. Clinical variables, entire study sample and duodenal leak subset compared by repair type (PRA vs CRAM)								
	All Patients (n=861)	All Primary Repair Patients (PRA) (n=523)	All Complex Repair Patients (CRAM) (n=338)	p value	**All Patients with Duodenal Leaks (n=113)**	Duodenal Leaks s/p PRA (n=43)	Duodenal Leaks s/p CRAM (n=70)	p value
Age (mean ± SD)	33 ± 29	32 ± 14	35 ± 43	0.499	39 ± 72	30 ± 12	44 ± 90	0.418
Male	84%	83%	85%	0.405	83%	86%	81%	0.524
Penetrating injury	77%	80%	72%	**0.006**	81%	88%	77%	0.136
Systolic Blood Pressure (mmHg)	119 [98–137]	121 [99–138]	114 [96–133]	**0.024**	113 [94–134]	113 [100–131]	112 [93–135]	0.916
Injury Severity Score	22 [14-29]	19 [11-29]	25 [16-30]	**0.001**	24 [16–29]	22 [16–29]	25 [16–29]	0.941
AIS abdomen	4 [3–4]	4 [3–4]	4 [3–5]	**<0.001**	4 [3-4]	4 [3–4]	4 [3–4]	0.128
Massive Transfusion Protocol	39%	35%	46%	**0.002**	44%	37%	49%	0.193
Pancreatic injury	32%	25%	43%	**<0.001**	39%	23%	49%	**0.007**
Multiple duodenal Injuries	23%	20%	27%	**0.008**	34%	35%	33%	0.825
Duodenal injury AAST grade *I*	18%	21%	15%	**0.022**	6%	12%	3%	0.103
II	40%	50%	24%	**<0.001**	38%	49%	31%	0.064
III	34%	28%	44%	**<0.001**	43%	40%	46%	0.520
IV	4%	1%	10%	**<0.001**	10%	0%	16%	**0.006**
V	3%	1%	7%	**<0.001**	3%	0%	4%	0.287

Table 1. Clinical variables, entire study sample and duodenal leak subset compared by repair type (PRA vs CRAM)

PRA = Primary Repair Alone

CRAM = Complex Repair with Adjunctive Measures

Table 2. Duodenal injury operative management and outcomes, entire study sample and duodenal leak subset compared by repair type (PRA vs CRAM)								
	All Patients with Operative Duodenal Injuries (n=861)	All Primary Repair Patients (PRA) (n=523)	All Complex Repair Patients (CRAM) (n=338)	p value	**All Patients with Duodenal Leaks (n=113)**	Duodenal Leaks s/p PRA (n=43)	Duodenal Leaks s/p CRAM (n=70)	p value
Primary Repair Alone (PRA)	61%				38%			**<0.001**
Complex Repairs with Adjunctive Measures (CRAM)	39%				62%			
Pyloric Exclusion with Gastrojejunostomy			23%				36%	
Duodenectomy with Enteric Anastomosis			22%				16%	
Duodenal Diverticulization			1%				0%	
Retrograde Duodenostomy Tube and Feeding Jejunostomy Tube			4%				7%	
Whipple			11%				11%	
Combination of complex repairs/Other			39%				30%	
Total Number of Abdominal Operations	2 [1–3]	2 [1–3]	2 [1–4]	**<0.001**	3 [2–7]	3 [2–5]	4 [2–7]	0.084
IR Drain Placement for Duodenal Leak					42%	35%	46%	0.257
Duration of drains (days)	12 [6–29]	11 [5–23]	17 [7–67]	**<0.001**	38 [15–58]	34 [15–43]	43 [16–66]	0.098
Duration of Antibiotic Therapy (days)					10 [8–21]	9 [7-14]	12 [10–25]	**<0.001**
Days until fistula/duodenal leak resolution					14 [4–42]	11 [2–19]	21 [6–58]	**0.020**
Days NPO	8 [5–16]	7 [5–13]	11 [6–21]	**<0.001**	23 [9–48]	23 [8–38]	22 [10–54]	0.575
GI Related Complication (abscess, GI bleed, ulcer, ileus, abdominal compartment syndrome, EC fistula, anastomotic leak)	43%	39%	50%	**0.001**	81%	65%	91%	**0.001**
Hospital Length of Stay (days)	16 [9–30]	14 [8–26]	20 [10–34]	**<0.001**	38 [22–54]	36 [21–50]	38 [23–48]	0.544
Mortality	11%	9%	15%	**0.002**	10%	5%	13%	0.201
30-day Readmission	20%	17%	23%	**0.003**	33%	35%	31%	0.879

Table 2. Duodenal injury operative management and outcomes, entire study sample and duodenal leak subset compared by repair type (PRA vs CRAM)

PRA = Primary Repair Alone

CRAM = Complex Repair with Adjunctive Measures

Scientific Session VI - Multicenter Trials

Paper #38
January 20, 2023
8:30 am

EARLY VTE PROPHYLAXIS IN SEVERE TRAUMATIC BRAIN INJURY: A PROPENSITY SCORE WEIGHTED EAST MULTICENTER TRIAL

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Crozer Chester Medical Center

Presenter: Daniel Kim, MD

Discussant: Christina Colosimo, DO, MS - University of Arizona, Tucson

Objectives: Patients with TBI are at high risk of venous thromboembolism events (VTE). We hypothesized that early chemical VTE prophylaxis initiation (≤24 hours of a stable head CT) in severe TBI would reduce VTE without increasing risk of intracranial hemorrhage expansion (ICHE).

Methods: A retrospective review of patients ≥18 years of age with isolated severe TBI (AIS≥3) who were admitted to 24 level 1 and level 2 trauma centers from January 1st 2014 to December 31st 2020 was conducted. Patients were divided into those who did not receive any VTE prophylaxis (NO VTEP), who received VTE prophylaxis ≤24 hours after stable head CT (VTEP ≤24) and who received VTE prophylaxis > 24 hours after stable head CT (VTEP>24). Primary outcomes were VTE and ICHE. Covariate balancing propensity score weighting was utilized to balance demographic & clinical characteristics across three groups. Weighted univariate logistic regression models were estimated for VTE & ICHE with patient group as predictor of interest.

Results: Of 3,936 patients, 2,659 met inclusion criteria. VTEP≤24 had a significantly lower incidence of VTE ($p<0.001$) compared to VTEP>24 and NO VTEP, with no difference in ICHE after VTE prophylaxis initiation ($p=0.590$) [Table 1]. After propensity score weighting, logistic regression modeling demonstrated VTEP>24 had more than two-fold odds of VTE compared to VTEP≤24 (Table 2; $p=0.059$). NO VTEP had 31% decreased odds of VTE compared to VTEP≤24 group ($p=0.389$). In comparison to VTEP≤24, NO VTEP had 36% decreased odds of ICHE ($p=0.001$) & VTEP>24 had 4% decreased odds of ICHE ($p=0.757$).

Conclusions: In this large multi-center analysis, there were no significant differences in VTE based on timing of initiation of VTE prophylaxis. Patients who never received VTE prophylaxis had decreased odds of ICHE. Further evaluation of VTE prophylaxis in larger randomized studies will be necessary for definitive conclusions.

Table 1. Demographics and Characteristics of Patients with Severe TBI

		No VTEP (N=1477)	VTEP≤24 (N=395)	VTEP >24 (N=787)	P-Value[1]
Age, Median (Q1, Q3)		66 (50, 81)	64 (45.9, 82)	62 (45, 78)	**0.001**
Sex, n(%)	Female	588 (39.8%)	154 (39.0%)	294 (37.4%)	0.522
Race, n(%)	African American	303 (20.5%)	69 (17.5%)	184 (23.4%)	**0.013**
	White	1000 (67.7%)	283 (71.6%)	510 (64.8%)	
	Hispanic	88 (6.0%)	14 (3.5%)	36 (4.6%)	
	Asian	43 (2.9%)	9 (2.3%)	18 (2.3%)	
	Other	43 (2.9%)	20 (5.1%)	39 (4.9%)	
AIS Head, n(%)	3	723 (49.0%)	201 (50.9%)	352 (44.7%)	**<0.001**
	4	455 (30.8%)	124 (31.4%)	220 (28.0%)	
	5	299 (20.2%)	70 (17.7%)	215 (27.3%)	
Mechanism of Injury, n(%)	Blunt	1435 (97.1%)	384 (97.2%)	752 (95.5%)	0.074
	Penetrating	32 (2.2%)	8 (2.0%)	32 (4.1%)	
Mechanism of Blunt Injury, n(%)	Fall	1095 (76.4%)	284 (74.2%)	534 (71.0%)	**0.023**
	MVC	126 (8.8%)	33 (8.6%)	58 (7.7%)	
	MCC	15 (1.0%)	7 (1.8%)	14 (1.9%)	
	Assault	74 (5.2%)	20 (5.2%)	48 (6.4%)	
	Auto vs. Peds	38 (2.6%)	11 (2.9%)	41 (5.4%)	
Mechanism of Penetrating Injury, n (%)					0.096
	GSW	26 (83.9%)	7 (100.0%)	32 (100.0%)	
	SW	1 (3.2%)	0 (0.0%)	0 (0.0%)	
ICH characteristics					
	Presence of SAH, n (%)	278 (31.3%) *(n=887)*	105 (44.1%) *(n=238)*	196 (.5%) *(n=431)*	**<0.001**
	SDH, n (%)	*(n=1019)*	*(n=284)*	*(n=555)*	**0.011**
	SDH > 8mm	348 (34.2%)	72 (25.4%)	193 (34.8%)	
	SDH ≤ 8mm	671 (65.8%)	212 (74.6%)	362 (65.2%)	
	EDH Bleed > 8mm, n (%)	28 (50.9%) *(n=55)*	9 (81.8%) *(n=11)*	23 (44.2%) *(n=52)*	0.076
	Presence of IVH, n (%)	36 (2.4%)	8 (2.0%)	29 (3.7%)	0.142
	IPH Bleed > 2cm, n (%)	79 (28.2%) *(n=280)*	25 (34.7%) *(n=72)*	88 (40.2%) *(n=219)*	**0.019**
	Multifocal contusions, n (%)	208 (17.3%) *(n=1203)*	63 (20.3%) *(n=310)*	199 (32.2%) *(n=618)*	**<0.001**
	Abnormal CTA head, n (%)	25 (2.1%) *(n=1203)*	5 (1.6%) *(n=306)*	23 (3.8%) *(n=609)*	0.052
Complications, n (%)		77 (5.2%)	39 (9.9%)	140 (17.8%)	**<0.001**
	UTI, n (%)	29 (2.0%)	19 (4.8%)	35 (4.5%)	**<0.001**
	MI, n (%)	3 (0.2%)	0 (0.0%)	5 (0.6%)	0.149
	Unplanned return to OR, n (%)	16 (1.1%)	4 (1.0%)	12 (1.5%)	0.619
	Unplanned readmission to the ICU, n (%)	17 (1.2%)	7 (1.8%)	35 (4.5%)	**<0.001**
	Pneumonia, n (%)	17 (1.2%)	11 (2.8%)	55 (7.0%)	**<0.001**
Time to 1st Stable Head CT, Median (Q1, Q3)		14 (8.7, 22) *(n=1325)*	14 (8.2, 24) *(n=388)*	12 (7.4, 21.9) *(n=776)*	**<0.001**
Time to VTEP from Stable Head CT, Median (Q1, Q3)		--	11 (5.8, 16.5)	44.6 (32.3, 71.7)	
VTE, n (%)		18 (1.2%)	7 (1.8%)	34 (4.3%)	**<0.001**
	DVT, n (%)	16 (1.1%)	4 (1.0%)	26 (3.3%)	**<0.001**
	PE, n (%)	2 (0.1%)	5 (1.3%)	10 (1.3%)	**<0.001**
ICHE, n (%)		244 (16.5%)	92 (23.3%)	216 (27.5%)	**<0.001**
ICHE after VTEP, n (%)		--	10 (2.5%)	26 (3.3%)	0.590
Time to ICHE from VTEP, Median (Q1, Q3)		--	165.1 (71, 177.2) *(n=9)*	52.0 (32.2, 107.9) *(n=25)*	0.105
ICU LOS, Median (Q1, Q3)		1 (0, 2) *(n=1416)*	1 (0, 3) *(n=393)*	3 (1, 7) *(n=781)*	**<0.001**
Hospital LOS, Median (Q1, Q3)		3 (1.9, 5)	4 (2, 8)	8 (4, 14)	**<0.001**
Ventilator days, Median (Q1, Q3)		0 (0, 0) *(n=1384)*	0 (0, 0) *(n=393)*	0 (0, 3) *(n=773)*	**<0.001**
Mortality, n (%)		73 (4.9%)	13 (3.3%)		

Table 1: Demographics and Characteristics of Patients with Severe TBI

Table 2: Summary of Weighted* Univariate Logistic Regression Model Results for VTE and ICHE in Severe TBI Patients (N=2,659)

Model	*Outcome**	*Predictor*	*Odds Ratio (95% CI)*	*p-value*
1	VTE	Patient Group		
		No VTEP	0.69 (0.30, 1.59)	0.389
		VTEP >24	2.14 (0.97, 4.72)	0.059
		VTEP ≤24	-Reference-	
2	ICHE	Patient Group		
		No VTEP	0.64 (0.49, 0.83)	0.001
		VTEP >24	0.96 (0.73, 1.26)	0.757
		VTEP ≤24	-Reference-	

CI: Confidence Interval; *Variables included in CBPS weighting were: patient age, admission HR, admission SBP, admission GCS, initial platelet count, hemoglobin, international normalized ratio, PRBC given at admission, FFP given at admission, platelets given at admission, cryo given at admission, TXA given at admission, PCC given at admission, gender, race, AIS, HTN, CAD, DM-1 or DM-2, COPD, CKD, coagulopathy, liver disease, cancer, mechanism of blunt injury, MTP at admission, multiple contusions per lobe, subarachnoid hemorrhage, SAH with abnormal CTA, subdural hematoma > 8mm and presence of intraventricular hemorrhage.

Table 2: Summary of Weighted* Univariate Logistic Regression Model Results for VTE and ICHE in Severe TBI Patients (N=2,659)

Scientific Session VI - Multicenter Trials

Paper #39
January 20, 2023
8:45 am

ANTICOAGULATION IN EMERGENCY GENERAL SURGERY: WHO BLEEDS MORE? THE EAST ACES MULTICENTER TRIAL

Lindsay O'Meara, CRNP*, Ashling Zhang, Jeffrey N. Baum, MD*, Amanda Cooper, MD, Cassie Decker, BS, Jenny Cai, MD*, Daniel C. Cullinane, MD*, Richard D. Catalano, MD*, Nikolay Bugaev, MD*, Christina Feather, MD, Katherine McBride, MD, Valerie Sams, MD*, Pak Shan Leung, MD, MS, FACS*, Devon S Callahan, MD*, Joseph Posluszny, MD*, Jordan Estroff, MD*, Beth Hochman, MD*, Anna Goldenberg-Sandau, DO*, Jeffry Nahmias, MD, MHPE, FACS, FCCM*, Jason D. Pasley, DO, FACS*, Leah Hustad, MD, Jessica Reynolds, MD*, Michael Truitt, MD*, Roumen Vesselinov, PhD, Mira Ghneim, MD*
R Adams Cowley Shock Trauma Center, University of Maryland School of Medicine

Presenter: Lindsay O'Meara, CRNP

Discussant: Tasce Bongiovanni, MD, MPP, MHS - Zuckerberg San Francisco General Hospital

Objectives: To determine the intra-operative (IO) and postoperative (PO) bleeding risk in those taking direct oral anticoagulants (DOACs) vs. warfarin and antiplatelet therapy (AC/AP) and requiring urgent/emergent operative intervention in the emergency general surgery (EGS) population.

Methods: This was a prospective observational trial, conducted between 2019-2022, across 21 centers. Inclusion criteria were age ≥18, confirmed DOAC, AC/AP use within 24 hours of requiring urgent/ emergent abdominal surgical intervention. Chi-squared and ANOVA were used to conduct the analysis.

Results: Of the 413 patients enrolled in the study, 261 (63.2%) reported AC/AP use and 152 (36.8%) reported DOAC use. Patient demographics, indications for surgery, surgical approach, IO and PO transfusion requirements, and bleeding risk are reported in Table 1. The overall bleeding risk was similar between the two groups. The AP/AC group were more likely to have a laparoscopic procedure when compared to the DOAC group (44.4% vs. 31.6%, p=0.01). Conversely, the DOAC were more likely to undergo open procedures (38% vs. 56.6%, p=0.001). There was no difference in the conversion from laparoscopic to open intervention between the two groups. (Table 1) IO transfusion requirements and hemostatic agents use did not differ between the two groups. PO bleeding, transfusion requirements, and hematoma formation, were also similar between the two groups. While there was a trend towards increased mortality in the DOAC group, this did not reach statistical significance

Conclusions: The perioperative bleeding risk in the EGS patients taking DOACs and requiring urgent/emergent intervention is similar to those taking AP and AC. Therefore, acute surgical intervention should not be delayed in the setting of DOAC use.

Table 1: Demographics, Indication for Surgery, Surgical Approach and Transfusion Requirements, N=413

	AC/AP (n=261)	DOAC (n=152)	p-value
Age, mean (SD)	69.2 (12.5)	71.2 (12.6)	0.12
Female, n (%)	115 (44.1%)	72 (47.4%)	0.51
Indication for surgery, n(%)			
Obstruction/hernia	62 (23.8%)	68 (44.7%)	0.001*
Ischemia/Intestinal arterial ischemia	36 (13.8%)	19 (12.5%)	
Diverticulitis/Infectious colitis/PUD	22 (8.4%)	11 (7.3%)	
Other/Pancreatitis/Bleeding	28 (10.7%)	16 (10.5%)	
Appendicitis/Cholecystitis	113 (43.3%)	38 (25%)	
Surgical approach, n(%)			
Laparoscopic	116 (44.4%)	48 (31.6%)	0.01*
Open	99 (38%)	86 (56.6%)	0.001*
Laparoscopic converted to open	46 (17.6%)	18 (11.8%)	0.12
IO transfusion requirements, n (%)	48 (18.4%)	20 (13.2%)	0.17
PO transfusion requirements, n (%)	42 (16.1%)	30 (19.7%)	0.3
Postoperative bleeding, n(%)	81 (31%)	47 (30.9%)	0.9
Mortality, n (%)	20 (7.7)	20 (13.2)	0.07

*AC/AP: Warfarin, anti-platelet; DOAC: direct oral anticoagulant; IO: intra-operative (fresh frozen plasma, packed red blood cells, platelets, cryoprecipitate); PO: post-operative (fresh frozen plasma, packed red blood cells, platelets, cryoprecipitate)

Scientific Session VI - Multicenter Trials

Paper #40
January 20, 2023
9:00 am

DOES FRACTURE FIXATION TECHNIQUE INFLUENCE COGNITIVE OUTCOMES IN TRAUMATIC BRAIN INJURY (TBI)? THE EAST BRAIN VS. BONE MULTICENTER TRIAL

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R Adams Cowley Shock Trauma Center, University of Maryland School of Medicine

Presenter: Mira Ghneim, MD

Discussant: Abid Khan, MD - University of Chicago

Objectives: To determine whether lower extremity (LE) fracture fixation technique impacts cognitive outcomes in patients with TBI.

Methods: A prospective observational study was conducted, from 2019-2022, across 29 centers. Inclusion criteria were age ≥18, head abbreviated injury scale (AIS) score>2, and a femur or tibia diaphyseal fracture requiring external fixation (ex-fix), intramedullary nailing (IMN) or open reduction internal fixation (ORIF). Analyses were conducted using ANOVA, Kruskal-Wallis, and multivariable regression models. Cognitive outcome was measured by discharge Rancho Los Amigos Score (RLAS) and change in motor score (MS) between admission and discharge.

Results: Of the 520 patients enrolled, 358 underwent ex-fix, IMN or ORIF as definitive management. Demographics, hospital course and outcomes are shown in Table 1 and 2. Head AIS was similar among all groups. The ex-fix group experienced more severe LE injury (AIS 4-5) compared to the IMN group (16% vs 3%, p=0.01). Time to operative intervention was significantly shorter for the ex-fix group compared to the IMN and ORIF groups. (Table 2) The ORIF group experienced a decrease in MS at discharge more often than the IMN group (13% vs 5%, p=0.02). RLAS distribution was similar across all groups. After adjusting for confounders, LE fixation technique was not significantly associated with RLAS or decreased MS at discharge. Conversely, increasing age, and increasing head AIS score were associated with worse RLAS (OR 1.04, 95%CI 1.02-1.05 and OR 2.2, 95%CI 1.7-2.9) and a decrease in MS at discharge (OR 1.06, 95%CI 1.02-1.09 and OR 3.7, 95%CI 2-7.2).

Conclusions: Cognitive outcomes in TBI are impacted by head injury severity and not fracture fixation technique. Therefore, the strategy of definitive LE fracture fixation may not need to be delayed or modified due to concern for worsening neurologic outcomes in TBI patients.

Table 1: Demographics, Injury Characteristics, and Hospital Course of Patients Presenting with a TBI and Concomitant Lower Extremity Fracture

	Ex-Fix n=45	IMN n=171	ORIF n=142	p-value
Age, mean (SD)	47.9 (19.3)	39.9 (18.2)	43.8 (18.7)	0.02
Male, n (%)	34 (76.6)	131 (76.6)	101 (71.1)	0.5318
MOI, n (%)				0.6427
Motor vehicle collision	18 (40)	67 (39.2)	49 (34.5)	
Pedestrian struck	11 (24.4)	46 (26.9)	44 (31)	
Motorcycle collision	10 (22.2)	31 (18.1)	20 (14)	
Other	6 (13.3)	27 (15.8)	29 (20.4)	
ISS, n (%)				0.053
<16	4 (9.1)	6 (3.5)	11 (7.8)	
16-24	7 (15.9)	50 (29.2)	49 (34.8)	
>25	33 (75)	115 (67.3)	81 (57.5)	
Head AIS, n (%)				
2-3	24 (55.8)	94 (55.3)	88 (62.4)	0.7176
4-5	18 (42.9)	74 (43.5)	51 (36.2)	
Lower Extremity AIS, n (%)				
2-3	37 (84.1)	165 (96.5)	131 (94.24)	0.0167
4-5	7 (15.9)	5 (2.9)	8 (5.76)	
6	0	1 (0.58)	0	
GCS, n (%)				0.233
3-8	25 (55.6)	95 (55.6)	64 (45.1)	
9-12	10 (22.2)	35 (20.4)	29 (20.4)	
3-15	10 (22.2)	41 (24)	49 (34.5)	
Motor GCS at admission, n (%)				0.0019
1-3	26 (57.8)	69 (40.4)	37 (26.1)	
4-5	10 (22.2)	58 (33.9)	64 (45.1)	
6	9 (20)	44 (25.7)	41 (28.9)	
Femur Fracture, n(%)				0.98
Bilateral	2 (10)	8 (7)	6 (8)	
Left	10 (50)	57 (49.6)	39 (52)	
Right	8 (40)	50 (43.5)	30 (40)	
Tibia Fracture, n(%)				0.039
Bilateral	8 (20.5)	3 (3.9)	6 (6.9)	
Left	15 (38.5)	33 (42.9)	34 (39.1)	
Right	16 (41)	41 (53.2)	47 (54)	

MOI: mechanism of injury, ISS: injury severity score, AIS: abbreviated injury score, GCS: Glasgow Coma Scale

Table 2: Outcomes of Patients Presenting with a TBI and Concomitant Lower Extremity Fracture

	Ex-Fix n=45	IMN n=171	ORIF n=142	p-value
OR ≤ 24 hours, n (%)	32 (71.1)	79 (46.2)	64 (45.1)	0.006
Hour to OR, median (IQR)	15 (8-24)	31 (12-70)	25.5 (12-85)	<0.001
Hospital LOS, median (IQR)	23 (14-38)	18 (10-30)	17 (9-29)	0.19
ICU LOS, median (IQR)	11 (4-18)	9 (4-16)	8 (3-16)	0.36
Mechanical ventilator, median (IQR)	5 (1-13)	5 (1-13)	5 (1-13)	0.91
RLAS				0.0675
1-3	10 (22.2)	23 (13.5)	19 (13.4)	
4-6	8 (17.8)	56 (32.8)	57 (40.1)	
7-10	27 (60)	92 (53.8)	66 (46.5)	
Decreased Motor GCS at Discharge, n(%)	3 (6.7)	8 (4.7)	19 (13.4)	0.02
Mortality, n (%)	8 (17.8)	12 (7)	11 (7.8)	0.065

OR: operating room, LOS: length of stay, ICU: intensive care unit, RLAS: Ranchos Los Amigos Score

Scientific Session VI - Multicenter Trials

Paper #41
January 20, 2023
9:15 am

CRYSTALLOID VOLUME IS ASSOCIATED WITH SHORT TERM MORBIDITY IN CHILDREN WITH SEVERE TRAUMATIC BRAIN INJURY: AN EASTERN ASSOCIATION FOR THE SURGERY OF TRAUMA MULTICENTER TRIAL POST-HOC ANALYSIS

Taleen A. MacArthur, MD, Adam M. Vogel, MD*, Amy E. Glasgow, M.H.A, Suzanne Moody, MPA, Meera Kotagal, MD, MPH*, Regan Williams, MD, MSE*, Mark L. Kayton, MD*, Emily C. Alberto, MD, Randall S. Burd, MD*, Thomas J. Schroeppel, MD*, Joanne E. Baerg, MD, Amanda Munoz, MD, William B. Rothstein, MD, Laura A. Boomer, MD, Eric M. Campion, MD, FACS*, Caitlin Robinson, MPH, CRA, Rachel M Nygaard, PhD*, Chad J. Richardson, Denise I. Garcia, MD, MEd, Christian J. Streck, Jr., MD*, Michaela Gaffley, MD, John Petty, MD*, Mark Ryan, MD, Samir Pandya, MD*, Alicia M. Waters, MD, Robert T. Russell, MD, MPH, Brian K. Yorkgitis, DO, FACS*, Jemnnifer Mull, MSN, RN, CCRC, Jeffrey Pence, MD, Matthew T. Santore, MD, Denise B. Klinkner, MD, MEd, Megan Cunningham, MD, Shawn Safford, MD, MAS*, Tanya Trevilian, MSN, RN, CCRN-K, CPN, Christa Black, MPH, Jessica N. Rea, MD, Aaron Jensen, MD, MEd, MS, FACS*, Bethany J. Farr, MD, David P. Mooney, MD*, Bavana Ketha, MD, Melvin S. Dassinger III, MD, Anna Goldenberg-Sandau, DO*, Janika L. San Roman, MPH, Richard A. Falcone, Jr., MD, MPH*, Stephanie F. Polites, MD, MPH*
Mayo Clinic

Presenter: Taleen A. MacArthur, MD

Discussant: Molly Deane, MD - Harbor UCLA Medical Center

Objectives: This study examined the association between crystalloid volume and short-term outcomes during the resuscitation of injured children with severe traumatic brain injury (sTBI).

Methods: We performed a *post-hoc* analysis from a 24-center prospective, observational study of injured children <18 years old (2018-2019) transported from the scene, with elevated age-adjusted shock index on arrival and head Abbreviated Injury Scale (AIS) score ≥3. Timing and volume of resuscitation products were assessed using Fisher's exact t-test, Kruskal-Wallis, and multivariable logistic regression analyses.

Results: There were 154 patients with sTBI and 550 with non-TBI injuries. sTBI patients had lower hemoglobin, higher INR, higher ISS, longer duration of ventilator and ICU use, and more inpatient complications (**Table 1**). sTBI patients received more pre-hospital crystalloid (28% vs.16%, p=.003), â‰¥1 crystalloid boluses (52% vs.24%, p<.001), and blood transfusion (47% vs.13%, p<.001) than non-TBI patients. Among sTBI patients, receipt of ≥1 crystalloid bolus (n=80) was associated with greater ICU need (93% vs.63%, p<.001), longer median ICU (5.5 vs.4 days, p<001) and hospital stay (9 vs.4 days, p<.001), and more in-hospital complications (25% vs. 8.1%, p< .001) than those who received <1 bolus (n=74). These findings persisted after adjustment for injury severity which accounts for other injuries (**Table 2**).

Conclusions: Pediatric trauma patients with sTBI received more crystalloid than those without sTBI despite being more coagulopathic at presentation and requiring more blood products. Excessive crystalloid may be associated with worsened outcomes seen among pediatric sTBI patients who received ≥ 1crystalloid bolus. Further attention to an early transfusion approach to resuscitation of children with sTBI is warranted.

Table 1: **Demographic and Clinical Characteristics of Patients with Severe Traumatic Brain Injury (sTBI) vs. Those without TBI**

	sTBI (Head AIS ≥ 3) n= 154	No TBI (Head AIS< 3) n= 550	p-value
Age (years)	6.0	7.0	.058
Sex (% male) ^	85 (55%)	273 (52%)	.052
Injury type (% blunt)	140 (91%)	459 (87%)	.259
Initial GCS	9.0	15	**< .001**
ISS	26	5.0	**< .001**
Initial hemoglobin	11.3	12.4	**< .001**
INR (mean, SD)	1.4 (0.5)	1.1 (0.2)	**< .001**
ICU admission	121 (79%)	146 (26%)	**< .001**
Ventilator requirement	93 (60%)	64 (12%)	**< .001**
Ventilator days (mean, SD)	8.5 (16)	3.3 (3.1)	**.001**
Hospital Days (mean, SD)	12.2 (17.4)	4.0 (7.4)	**<.001**
Any complication	26 (17%)	18 (3.5%)	**<.001**
In-hospital mortality*	29 (19%)	9 (1.8%)	**<.001**

Table 1: Results presented as median or n (%) unless otherwise specified. ^Sex not available for 24 of the non-TBI patients; *mortality not available for 41 non-TBI patients. GCS = Glasgow coma score, ISS = injury severity score, INR = international normalized ratio, ICU = intensive care unit

Table 2: Multivariable Analysis of Clinical Outcomes in Severe TBI (sTBI) Patients Based on Crystalloid Volume Administered and Injury Severity

All sTBI Patients (Head AIS ≥ 3) n = 154	Odds Ratio	95% Confidence Interval	p-value
ICU Admission			
≥ 1 Crystalloid Bolus	5.0	1.8-14.3	**.002**
ISS	1.1	1.1-1.2	**>.001**
Extended Hospital Stay (> 15 Days) *			
≥ 1 Crystalloid Bolus	3.7	1.6-8.9	**.002**
ISS	1.0	1.0-1.1	**.043**
Any In-Hospital Complication			
≥ 1 Crystalloid Bolus	3.7	1.4-9.9	**.009**
ISS	1.0	0.9-1.0	.758

Table 2: ICU = intensive care unit, ISS = injury severity score, *hospital stay of > 15 days is the upper 75th percentile for sTBI patients.

Scientific Session VI - Multicenter Trials

Paper #42
January 20, 2023
9:30 am

WOUND INFECTION RATE AFTER SKIN CLOSURE OF DAMAGE CONTROL LAPAROTOMY WITH WICKS OR INCISIONAL NEGATIVE WOUND THERAPY: AN EAST MULTICENTER TRIAL

John Cull, MD, FACS*, Katherine Pellizzeri, MD*, Daniel C. Cullinane, MD*, Meghan Cochran-Yu, MD, Eric Trevizo, MD, Anna Goldenberg-Sandau, DO*, Ryan Fields, BS, Jordan M. Kirsch, DO*, Jessica K. Staszak , MD, MS*, Jeffrey J Skubic, DO*, Raul Barreda, MD, FACS, William M Brigode, MD*, Faran Bokhari, MD, MBA, FACS, FACP*, Christopher A. Guidry, MD*
Prisma Health Upstate

Presenter: John Cull, MD

Discussant: Ali F. Mallat, MD, MS - Cleveland Clinic Foundation

Objectives: To determine if skin closure using wicks or incisional wound vacs after damage control laparotomy (DCL) can be performed safely with acceptable rates of wound infections.

Methods: This is a prospective multicenter observational trial performed by 8 institutions from July 2020 to April 2022. The study included all adult patients who underwent DCL who had their fascia and skin closed with wicks or the use of an incisional wound vac. Patients who died within seven days of their skin closure were excluded. Wound infection was defined as superficial or deep surgical site infections. Patient demographics, mechanism of injury, wound classification, antibiotics given, surgical site infections, interventions, and mortality were collected. Fisher's Exact test was used for categorical data and Wilcoxon Rank Sum test for continuous data. Mean days to closure was assessed using Student's t-test for independent groups. P-value <0.05 was considered indicative of statistical significance.

Results: Of the 257 patients enrolled in the study, 135 patients did not meet inclusion criteria for a total of 122 patients analyzed. Most patients were male (n=77, 63%) with average age of 50.7 years. The average days of the open abdomen was 2.6. A majority of the DCLs were performed on acute care patients (n=77, 63.1%) and 95 patients (77.9%) had a wound classification of contaminated or dirty. Most of the patientsâ€™ skin were closed with wicks in place (n=82, 67%). There was no difference in infection rate in patients closed with wicks or those with an incisional wound vac. The rate of superficial and deep wound infections was 12.3% (n=15), surgical site occurrence rate was 29.5% (n=36), and organ space 12.3% (n=15).

Conclusions: Primary closure of incisions after damage control laparotomies are feasible with acceptable rates of wound infection.

Characteristic	Wound Infection No	Wound Infection Yes	p-value
Number of Patients	107	15	---
Demographics			
Age – Years	50 (32, 66)	56 (40, 65)	0.495
Gender Male	68 (63.6)	9 (60.0)	0.782
Body Mass Index (kg/m2)	26.9 (23.4, 31.3)	22.1 (21.2, 28.9)	0.169
History/ Comorbidities:			
Current Smoker	28 (26.4)	7 (46.7)	0.131
Alcohol Use disorder	8 (7.6)	3 (20.0)	0.138
Hypertension	42 (39.3)	6 (40.0)	1.000
Diabetes	16 (15.0)	3 (20.0)	0.703
COPD	15 (14.2)	3 (20.0)	0.697
CHF	16 (15.0)	4 (20.0)	0.268
Chronic Renal Failure	9 (8.6)	0	0.600
PAD	11 (10.3)	2 (13.3)	0.662
Myocardial Infarction	10 (9.4)	0	0.610
CVA	5 (4.7)	1 (6.7)	0.553
Disseminated Cancer	4 (3.8)	1 (6.7)	0.490
Dementia	1 (0.9)	1 (6.7)	0.234
Angina	3 (2.8)	2 (13.3)	0.114
Cirrhosis	2 (1.9)	0	1.000
Bleeding disorder	2 (1.9)	1 (6.7)	0.328
Closure Group			
Negative Pressure Wound Therapy	33 (30.8)	7 (46.7)	0.248
Wicks	74 (69.2)	8 (53.3)	
Medical Condition			
Acute Care	65 (60.8)	12 (80.0)	0.252
Trauma	42 (39.3)	3 (20.0)	
Blunt	17	2	
Penetrating	25	1	
Days to Closure:			
Median (25th, 75th)	2 (1, 3)	3 (2, 3)	0.222
Mean ± SD	2.6 ± 2.9	2.4 ± 1.2	0.639
Wound Class			
Clean	13 (12.2)	2 (13.3)	0.749
Clean contaminated	11 (10.3)	1 (6.7)	
Contaminated	36 (33.6)	7 (46.7)	
Dirty	47 (43.9)	5 (33.3)	

Patient and Clinical Characteristics by Wound Infection

	No. (%) of 122 patients
Surgical Site Infection	
Superficial	10 (8.2)
Deep	5 (4.1)
Organ Space	15 (12.3)
Surgical Site Occurrences	
Seroma	4 (3.3)
Hematoma	6 (4.9)
Skin dehiscence	16 (13.1)
Enteric fistula	4 (3.3)
Fascial dehiscence	6 (4.9)
Procedural Interventions	
Wound opening	17 (13.9)
Wound debridement	4 (3.3)
Percutaneous drainage	20 (16.4)
Negative pressure therapy	22 (18.0)
Mortality	13 (10.7)

Complications and Additional Interventions

Quick Shots Session I

Quick Shot #1
January 19, 2023
8:45 am

RURAL TRAUMA TEAM DEVELOPMENT COURSE POSITIVELY IMPACTS ITS DESIRED OBJECTIVES: A PROSPECTIVE, OBSERVATIONAL STUDY

Zachary M. Bauman, DO, MHA*, Paige Phillips, MD*, Ashley Raposo-Hadley, MPH,
Hason Khan, BS, Mark E. Hamill, MD, FACS, FCCM*, Kevin Kemp, MD,
Charity Evans, MD, MS*, Emily F. Cantrell, MD*
University of Nebraska Medical Center

Presenter: Zachary M. Bauman, DO, MHA

Objectives: The Rural Trauma Team Development Course (RTTDC) is designed to help rural hospitals better organize and manage trauma patients with their limited resources in a timely fashion. Although RTTDC is a well-established course, limited literature exists regarding improvement in the overall objectives for which the course was designed. The aim of this study was to analyze the goals of RTTDC, hypothesizing improvements in course objectives after the course was provided.

Methods: This was a prospective, observational study from 2015 to present. All hospitals completing the RTTDC led by our Level 1, academic trauma hospital were included. Our institutional database was queried for individual patient data. Cohorts were delineated before and after RTTDC was provided to the rural hospital. Basic demographics were obtained. Outcomes of interest included: ED dwell time, time to decision to transfer, number of images obtained, and number of CT scans obtained. Chi square and non-parametric median test were used for analysis. Significance was set at $p<0.05$.

Results: 16 rural hospitals were included with a total of 472 patients transferred (240 before and 232 after). Patient demographics were similar before and after RTTDC with blunt trauma the main mechanism of injury. Outcomes of interest are seen in the table.

Conclusions: The execution of RTTDC demonstrated improvements in ED dwell time, decision time to transfer, transfer time and number of images obtained. Although times were still longer than preferred, RTTDC positively impacts its desired objectives.

Demographics	Before RTTDC	After RTTDC	*P*
Age, mean (SD)	57.9 (23.9)	53.4 (24.8)	0.712
Gender, female (%)	172 (36.4)	97(40.2)	0.073
ISS, median (IQR)	9 (4, 14)	9 (4.5, 13)	0.912
ICU Days, median (IQR)	2 (2, 4)	2 (2, 4)	0.916
Ventilator Days, median (IQR)	2 (2, 4.75)	2 (4.5)	0.611
Outcomes			
ED Dwell Time (min), mean (SD)	195.9 (322.1)	132 (77.1)	0.003
Decision to Transfer (min), mean (SD)	142.9 (317.5)	81.1 (65.4)	0.004
Total # Images Obtained, mean (SD)	2.8 (1.9)	2.2 (1.5)	0.000
Total # CT Scans Obtained, mean (SD)	1.6 (1.5)	1.2 (1.2)	0.002

Demographics and Outcomes (SD = Standard Deviation; IQR = Interquartile Range; CT = Computed Tomography)

Quick Shot #2
January 19, 2023
8:51 am

USING TRAUMA VIDEO REVIEW TO FIND THE GOLDILOCKS PRE-ACTIVATION TIME

Daniel Jafari, MD, MPH*, Ella Rastegar, BS, EMT-B, Manuel Beltran del Rio, PhD,
Cristy Meyer, RN, MSN, CEN, Daniel Rolston, MD, Eric N Klein, MD*,
Matthew Bank, MD*, Maria Sfakianos, MD, Daniel Jafari, MD, MPH*
North Shore University Hospital

Presenter: Ella Rastegar, BS, EMT-B

Objectives: We sought to determine the optimal time prior to patient arrival for trauma team activation which resulted in the greatest team efficiency. The time to complete critical events (TCCE) during resuscitation was used as a surrogate for trauma team efficiency. We hypothesized that there exists a time window for trauma team pre-activation which minimizes TCCE.

Methods: This is a retrospective analysis of all video recorded traumas at our level 1 trauma center from 1/1/2018 through 2/28/2022 who received the highest level of trauma team activation and had a prearrival notification. The trauma video review is an integrated quality improvement process that allows experienced personnel to identify the TCCEs for all patients. A total of 11 critical events were selected (listed in the Figure 1 legend), and TCCEs were determined using video timestamps. To be able to compare TCCEs from the different events listed in the Figure 1 legend, a normalized TCCE (nTCCE) was calculated by dividing each TCCE by its mean time for that event among all patients. Pre-activation times were categorized into 1-minute intervals and nTCCEs for each category were compared individually using one-sided Mann-Whitney U test.

Results: A total of 460 trauma pre-activations were included, which bore 1734 TCCEs. The majority (91%) of pre-activations occurred within 8 minutes of patient arrival. As depicted in Figure 1, pre-activation times in the 4 to 6 minute range yielded the most consistently efficient trauma teams, with no TCCE taking more than 15 minutes. Additionally, Mann-Whitney U tests revealed that nTCCEs corresponding to pre-activation times between 4 and 7 minutes were significantly shorter than those of <4 ($p < 0.05$), and those in the >7 category were larger than those in the minute 7 group ($p<0.01$) (Figure 2).

Conclusions: A pre-activation time of 4 to 7 minutes is associated with the best team efficiency, as evidenced by the shortest nTCCEs. This timeframe may be an optimal window for trauma team activations.

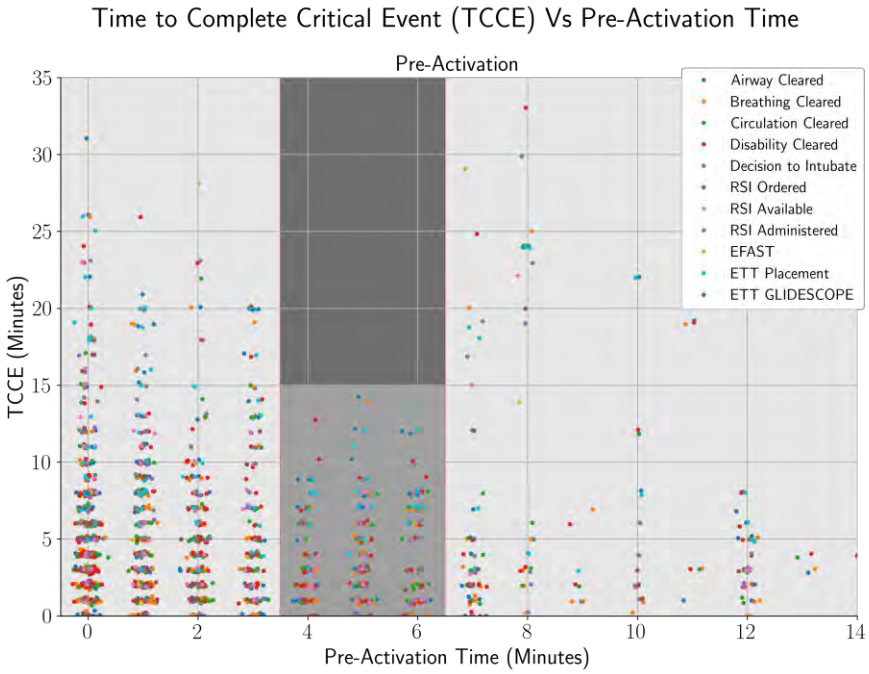

Fig-1 Time to Complete Critical events Vs Pre-activation times. Different types of events are shown in different colors. A slight jitter has been applied to show density. Shaded region indicates apparent concentration of shorter Time to Complete Critical Events.

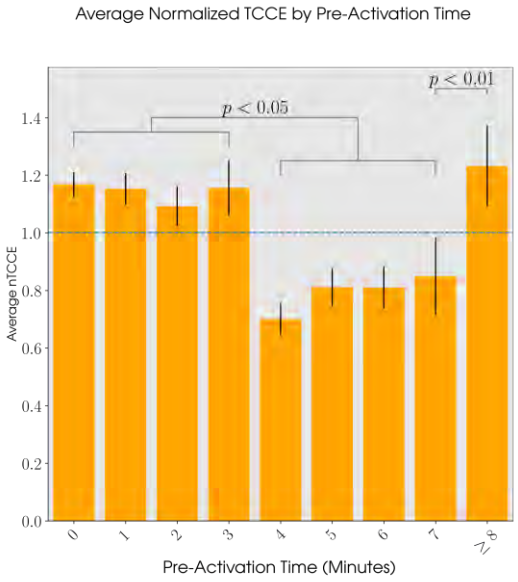

Fig-2 Average normalized Time to Complete Critical Events Vs Pre-activation time. Values under 1 indicate above-average performance. Black vertical lines are Standard Error of Means. P-value brackets indicate individual comparisons between elements in either group.

Quick Shot #3
January 19, 2023
8:57 am

CONTEMPORARY MANAGEMENT AND OUTCOMES OF PENETRATING COLON INJURIES USING THE 2020 AAST ORGAN INJURY SCALE

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Presenter: Ahmad Zeineddin, MD

Objectives: The AAST OIS colon scoring system was updated in 2020 and for the first time included penetrating colon injuries. While the original OIS described anatomic injury, updated OISs are used to guide treatment. We sought to validate the 2020 OIS system for isolated penetrating colon injures in a large multicenter study.

Methods: This was a retrospective study of patients presenting to 12 Level 1 trauma centers with penetrating colon injuries and AIS<3 in other body regions from 2016-2020. Primary outcomes were surgical management and complications; secondary outcome was association of operative OIS with preoperative imaging. Bivariate analysis was done with chi-square, ANOVA, and Kruskal Wallis, where appropriate. Multivariable models were constructed in a stepwise selection fashion.

Results: We identified 576 patients with penetrating colon injuries. Patients were young and predominantly male with moderate-severe injuries [Table 1]. OIS grade was 1 (12%), 2 (32%), 3 (29%), 4 (13%), or 5 (15%). Higher OIS (Grades 3-5) was associated with a lower likelihood of primary repair and higher likelihood of resection with anastomosis or diversion, need for damage control, abscess, wound infection, leak, acute kidney injury (AKI), and lung injury. After adjusting for confounders on multivariable regression, higher OIS remained associated with lower chance of primary repair and a higher incidence of leak, wound infection, and AKI [Table 2]. Pre-operative imaging was done in 173 (30%) cases with a low-moderate correlation (Spearman Coeff. 0.45).

Conclusions: This is the largest study of penetrating colon injuries and the first multicenter validation of the new OIS specific to these injuries. While imaging criteria alone lacked strong prediction value, AAST OIS colon grade strongly predicted type of intervention and correlated with infectious and non-infectious outcomes.

	Total (n=576)	Grade 1 (n=71)	Grade 2 (n=185)	Grade 3 (n=142)	Grade 4 (n=54)	Grade 5 (n=61)	p-value*
Age	32±13	34±14	32±12	30±12	34±14	34±13	0.29
Male	88%	89%	86%	91%	85%	89%	0.7
ISS	12±7	8±5	10±5	14±9	13±6	15±7	<0.01
Hypotension	18%	6%	15%	17%	29%	27%	<0.01
Primary Repair	35%	92%	49%	24%	13%	11%	<0.01
Resection & Anastomosis	36%	6.3%	28%	43%	49%	47%	<0.01
Ileostomy/Colostomy	29%	2.1%	23%	33%	38%	42%	<0.01
Damage Control Laparotomy	32%	15%	20%	42%	36%	50%	<0.01
Total Blood Products (units)	1 [0-4]	0 [0-2]	0 [0-2]	0 [0-3]	3 [0-7]	2 [0-6]	<0.01
Intra-abdominal abscess	26%	0	20%	32%	39%	38%	<0.01
Wound infection	13%	5.6%	11%	9%	23%	20%	<0.01
Anastomotic leak	5.4%	0	2.2%	7.2%	11%	8.5%	<0.01
Acute Kidney Injury	19%	10%	14%	18%	36%	25%	<0.01
ARDS	4.7%	1.4%	2.2%	4.2%	8.8%	11%	<0.01

Table 1. Patient demographics, injury characteristics, operative intervention, and clinical outcomes per AAST grade

AAST Grade	1	2	3	4	5	ROC
Primary repair	Ref.	0.6 [0.34-1.07]	0.34* [0.18-0.64]	0.11* [0.04-0.29]	0.12* [0.05-0.32]	0.72
Resection & Anastomosis	Ref.	4.9* [1.8-12.9]	12* [4.5-32]	17.6* [6.1-51]	15* [5.3-43]	0.76
Ileostomy/Colostomy	Ref.	19* [2.5-144]	24* [3.2-179]	33* [4.2-262]	27* [3.5-213]	0.77
Intra-abdominal abscess	-	Ref.	1.2 [0.66-2]	1.6 [0.78-3.1]	1.3 [0.64-26]	0.78
Wound infection	Ref.	2.1 [0.67-6.8]	1.1 [0.3-4]	3.7* [1.02-13.4]	2.2 [0.6-8.4]	0.7
Anastomotic leak	-	Ref.	4.1* [1.3-13.1]	5.7* [1.6-20]	4.4* [1.2-15.6]	0.73
Acute Kidney Injury	Ref.	1.65 [0.61-4.5]	1.4 [0.5-3.9]	3.1* [1.1-9.2]	1.9 [0.63-5.8]	0.82
Acute Respiratory Distress Syndrome	Ref.	1.57 [0.17-15]	3 [0.33-27]	6.2 [0.68-56]	6 [0.67-54]	0.9

Ref. : Reference, *statistically significant

Adjusted for age, ISS, hypotension, total blood products, EBL, degree of contamination/spillage, and damage control in a stepwise selection model

Table 2. Adjusted odds ratio and 95% confidence intervals of operative intervention and clinical outcomes per AAST grade

Quick Shot #4
January 19, 2023
9:03 am

DANGEROUS PASSAGE: THE UTILITY AND ACCURACY OF MODERN CHEST COMPUTED TOMOGRAPHY IN PENETRATING INJURIES WITH POTENTIAL TRANSMEDIASTINAL TRAJECTORY

Marco Sozzi, MD, Kenji Inaba, MD, Brian Williams, MD, Morgan Schellenberg, MD, MPH*, Kazuhide Matsushima, MD*, Matthew J. Martin, MD, FACS, FASMBS*
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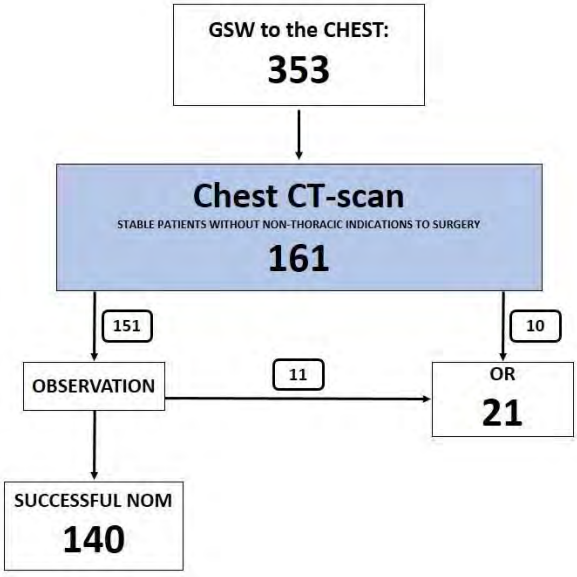
Presenter: Marco Sozzi, MD

Objectives: Evaluation of transmediastinal penetrating injuries often includes multiple studies as CT, endoscopy, esophagography and angiography. No large series have evaluated utility and reliability of chest CT as a standalone screening modality.

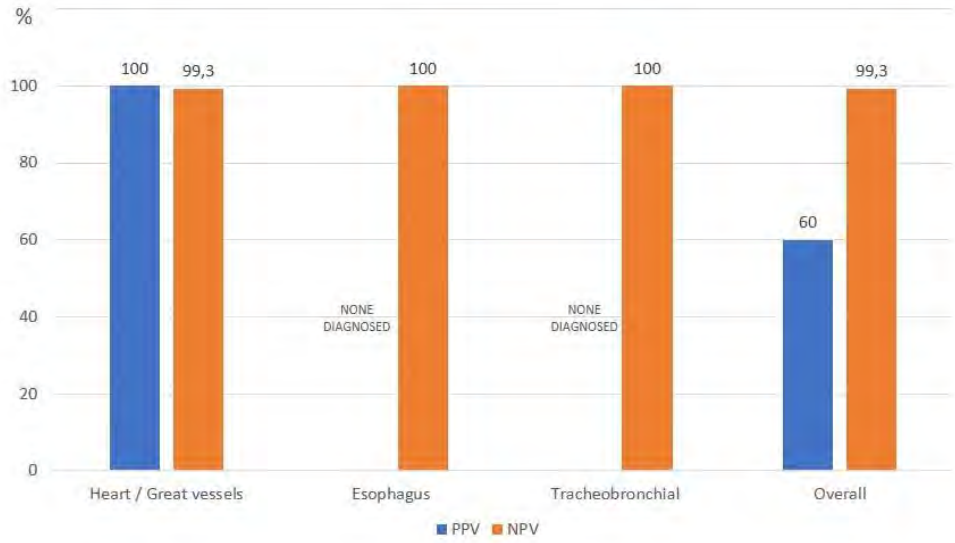
Methods: All patients with thoracic GSWs over a 5-year period were identified. Unstable patients requiring immediate surgery were excluded and remaining underwent chest CT with intravenous contrast. Sensitivity and specificity for clinically significant injuries were tested against an aggregate gold standard of discharge diagnosis including imaging, operative and clinical findings.

Results: Among 353 penetrating chest patients, 161 met inclusion criteria and underwent chest CT. After imaging, 10 (6.3%) had indication for immediate surgery (7 large hemothorax, 1 pericardial bleeding, 2 great vessel pseudoaneurysms) while 151 (94%) were selected for nonoperative management (NOM). 11 (6.8%) required a delayed thoracic operation, none due to injuries missed on CT. The remaining 140 (87%) underwent successful NOM (Figure 1). Only 7% required additional imaging [esophageal studies (5.6%) or bronchoscopy (1.2%)], all negative. Figure 2 shows the performance metrics for chest CT. In 3 cases CT identified a cardiac injury confirmed by surgery, while one thoracic IVC injury missed on CT was found intraoperatively (accuracy 99.4%, NPV 99.3%). 2 patients had CT suspicious for esophageal injury, ruled out intraoperatively or by EGD (accuracy 98.8%, NPV 100%). No CT diagnosed tracheal injuries (accuracy 100%, NPV 100%). There was one death in the total cohort, none in the NOM group.

Conclusions: Modern high-quality CT provides highly accurate and reliable screening modality for penetrating chest and mediastinal injuries and can be used as a standalone study in most patients or to guide further tests. Chest CT facilitated successful NOM.



Management of chest GSW patients included in the study population.



Positive and Negative Predictive Values of chest CT-scan in diagnosis of thoracic injuries.

Quick Shot #5
January 19, 2023
9:09 am

TRAUMA QUALITY OF LIFE FOLLOW UP CLINIC FOR GUN VIOLENCE SURVIVORS: A MULITDISCIPLINARY ONE-STOP SHOP

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Medical College of Wisconsin

Presenter: Colleen M. Trevino, NP, PhD

Objectives: Gun violence survivors experience poor global physical and mental health. To date, trauma follow-up care lacks a comprehensive multidisciplinary approach to treat firearm injury. A post discharge clinic for firearm injured patients was developed to provide comprehensive care. We hypothesized that a collaborative multidisciplinary clinic would show attendance and utilization of resources above the benchmark for post-discharge follow up of 60%.

Methods: This is an observational study of a Trauma Quality of Life Clinic (TQOL) designed to focus on physical, mental, and social recovery. Appointments included collaborative care between the patient, nurse practitioner, psychologist, physical therapist (PT), social worker (SW), and hospital-based violence interrupter (HBVI) within 3-10 days post hospital discharge. Demographic characteristics and screening for Post-Traumatic Stress Disorder (PTSD), chronic pain, and depression were completed during the first post-hospital follow up visit. Interventions completed by the HBVI were documented.

Results: There were 163 unique referrals to TQOL between 11/2020-12/2021 with an overall attendance rate of 78%. Other medical specialists involved in the management of injury that required follow up appointments, also had an 88% attendance rate. Those who initially no-showed to TQOL were rescheduled and 90% attended that appointment. Screenings in clinic found 78% risk positive for PTSD, 48% risk positive for depression, and 78% risk positive for chronic pain that moderately interfered with daily living. Retaliation, financial insecurity, and family support were addressed by HBVI and SW in clinic.

Conclusions: A comprehensive multidisciplinary follow up clinic for gun violence survivors showed high engagement and increased access to follow up care in a population at extreme risk for the development of poor long term mental health outcomes and chronic pain.

Top Categories of HBVI Interventions	
1	Retaliation
2	Financial
3	Family Support

Quick Shot #6
January 19, 2023
9:15 am

HYPOFIBRINOGENEMIA FOLLOWING INJURY IN 186 CHILDREN AND ADOLESCENTS: PATIENT CHARACTERISTICS, TRANSFUSION PATTERNS, AND OUTCOMES

Justin Gerard, MD*, Christian Gage, Michael Van Gent, Jessica Cardenas,
Charles E. Wade, PhD, David E Meyer, MD, MS*, Charles Cox, Bryan A. Cotton, MD, MPH
University of Texas Health Science Center at Houston

Presenter: Justin Gerard, MD

Objectives: We set out to evaluate presentation characteristics of hypofibrinogenemia and whether fibrinogen replacement should remain an “on-demand” product in pediatric trauma or if it should be incorporated into existing massive transfusion protocols.

Methods: We queried our registry of all patients <16 years of age presenting to an ACS-verified pediatric level-1 trauma center and receiving emergency-release blood products. Patients admitted between 11/17-4/21 were included. We defined patients as hypofibrinogenemic (HYPOFIB) if admission fibrinogen r-TEG angle <60 degrees or NORMAL if 60 or greater. Univariate and multivariate analyses were then conducted to define risk factors for presenting with HYPOFIB, the impact on outcomes, and whether early fibrinogen replacement improved mortality. All data was run using STATA 17.0. Statistical significance was set at $p<0.05$.

Results: 186 patients met inclusion; 18 (10%) were HYPOFIB. HYPOFIB patients were younger, had lower field and arrival GCS, higher head AIS, arrived with worse global coagulopathy, and died from brain injury (TABLE). NORMAL were more likely to have positive FAST (40 vs 14%, $p<0.05$), severe abdominal injuries, and died from hemorrhage. The 12% of patients who received early cryoprecipitate (0-2 hours) had higher mortality by univariate analysis (55 vs 31%, $p=0.045$) and no difference on multivariate analysis (OR 0.36, 95% C.I. 0.07-1.81, $p=0.221$). Those receiving early cryoprecipitate who survived to PICU had lower median PICU fibrinogen (133 vs. 210) and r-TEG angle values (56 vs. 68) than those who did not receive cryoprecipitate.

Conclusions: In pediatric trauma, HYPOFIB patients are more likely to be younger and have severe brain injury, with an associated mortality of over 80%. Given the absence of bleeding-related deaths in HYPOFIB pediatric patients, on-demand correction of hypofibrinogenemia appears warranted.

	HYPOFIB (n=18)	NORMAL (n=168)	p-value
Median age	11 (2.7, 14)	14 (8.8, 16)	0.058
Median weight (kg)	32.5 (24.5, 63.1)	59.0 (34.0, 70.0)	0.037
Male sex	68%	65%	0.781
Blunt mechanism	69%	68%	0.954
Head AIS	5 (5, 5)	3 (0, 5)	0.001
Chest AIS	2 (0, 3)	3 (0, 3)	0.753
Abd AIS	0 (0, 2)	3 (0, 4)	0.029
ISS	30 (27, 38)	28 (17, 38)	0.038
ED SBP	91 (75, 108)	106 (82, 122)	0.301
ED HR	118 (102, 146)	120 (94, 138)	0.508
ED GCS	3 (3, 3)	3 (3, 15)	0.029
ED r-TEG ACT	183 (156, 206)	113 (105, 121)	<0.001
ED r-TEG angle	47 (36, 52)	72 (66, 75)	<0.001
ED Lactate	6.5 (4.0, 10.3)	3.9 (2,5, 6.0)	0.004
24-hr Total Blood (cc/kg)	128 (105, 184)	40 (16, 83)	<0.001
30-day mortality	82%	28%	<0.001
Cause of death, TBI	79%	62%	0.083
Cause of death, Hemorrhage	0%	18%	0.049
Time to death, hours	36 (31, 47)	12 (0.2, 35)	0.014

Comparison of pediatric patients presenting with and without hypofibrinogenemia

Quick Shot #7
January 19, 2023
9:21 am

EMERGENCY GENERAL SURGERY IN THE ELDERLY: FACTORS ASSOCIATED WITH FRAGMENTED CARE

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Charudutt N. Paranjape, MD, George Velmahos, MD, PhD, MSEd,
Haytham Kaafarani, MD, MPH*, John O. Hwabejire, MD, MPH*
Massachusetts General Hospital

Presenter: Jefferson Proaño-Zamudio, MD

Objectives: Care fragmentation (CF) has been shown to lead to increased morbidity and mortality in elderly surgical patients. However, determinants of CF are less defined. This study aims to examine factors related to CF after hospital discharge in geriatric emergency general surgery (EGS) patients.

Methods: We designed a retrospective study of the nationwide readmissions database (NRD) 2019. We included patients ≥65 years old admitted with a diagnosis within the American Association for the Surgery of Trauma EGS definition who were discharged alive from the index admission. The primary outcome was 90-day CF, as defined by unplanned readmission to a different hospital from the one that initially discharged the patient. Univariable analysis and multivariable logistic regression were performed, adjusting for patient and hospital characteristics.

Results: A total of 783,799 elderly EGS patients were included, the main diagnostic category was colorectal (22.6%), and 78.2% of patients underwent non-operative management during the index hospitalization. By 90 days post discharge, 189,622 (24.2%) had an unplanned readmission. The readmitted patients' mean (SD) age was 77.5(7.8) years, and 54.9% were female. Of those readmitted, 20.9% had CF (Figure 1). Predictors of CF were living in a noncore county (Odds-ratio [OR]=1.76,95% confidence interval [CI]:1.57-1.97, p<0.001), discharge to SNF (OR=1.29,95%CI:1.24-1.34), initial non-operative management (OR=1.18,95%CI:1.12-1.23, p<0.001), leaving AMA (OR=2.60,95%CI:2.29-2.95, p<0.001), being discharged from a private investor-owned hospital, and living in a low-median income ZIP code (Figure 2).

Conclusions: Elderly patients who survive an EGS admission frequently experience care fragmentation. The burden of unplanned readmissions in these patients is therefore currently underestimated. Factors associated with access to care are paramount to maintain care continuity.

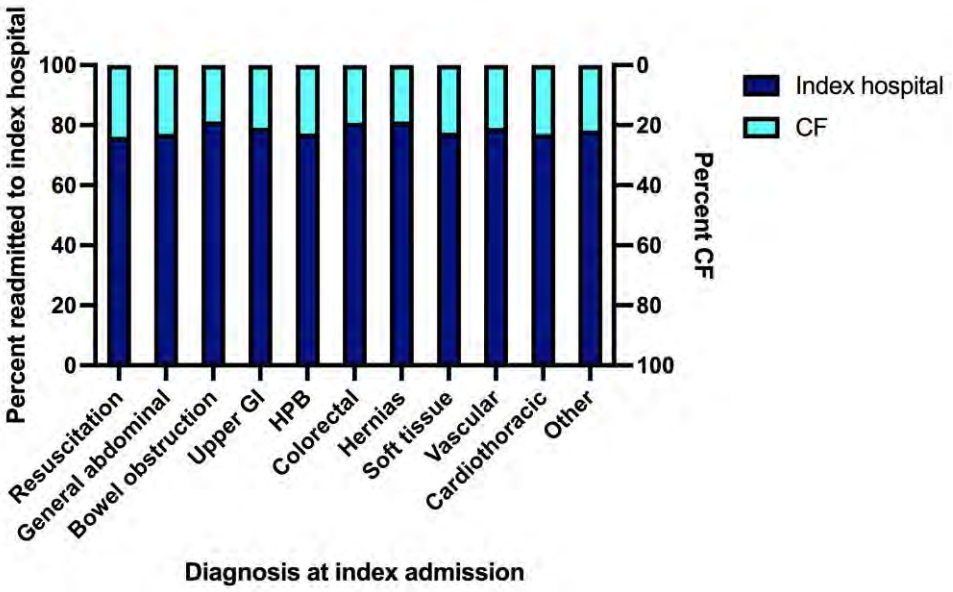

Figure 1. Proportion of care fragmentation at readmission

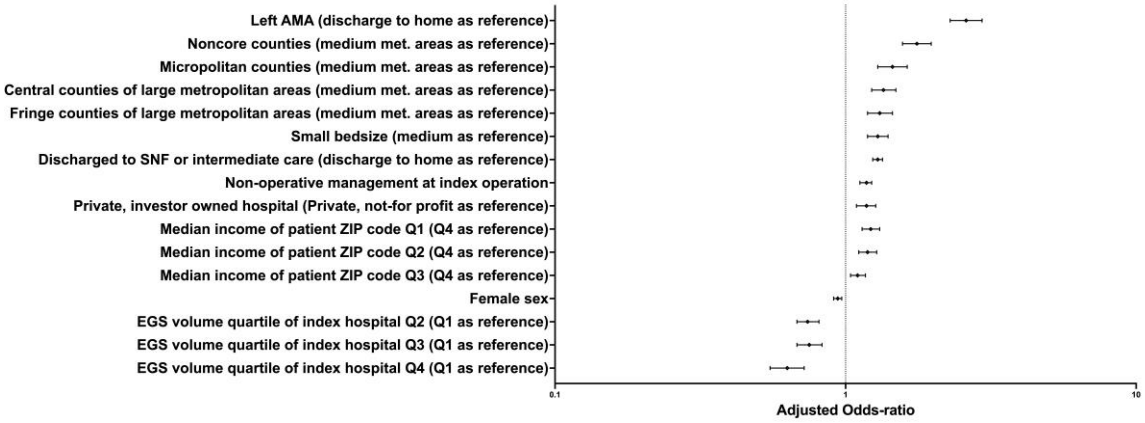

Figure 2. Predictors of care fragmentation

Quick Shot #8
January 19, 2023
9:27 am

UP AND OVER: CONSEQUENCES OF RAISING THE US-MEXICO BORDER WALL HEIGHT

William A. Marshall, MD, Vishal Bansal, MD, Andrea Krzyzaniak, Laura N. Godat, MD, FACS *,
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Benjamin Keller, MD, Jay Doucet, MD, Todd Costantini, MD
University of California San Diego

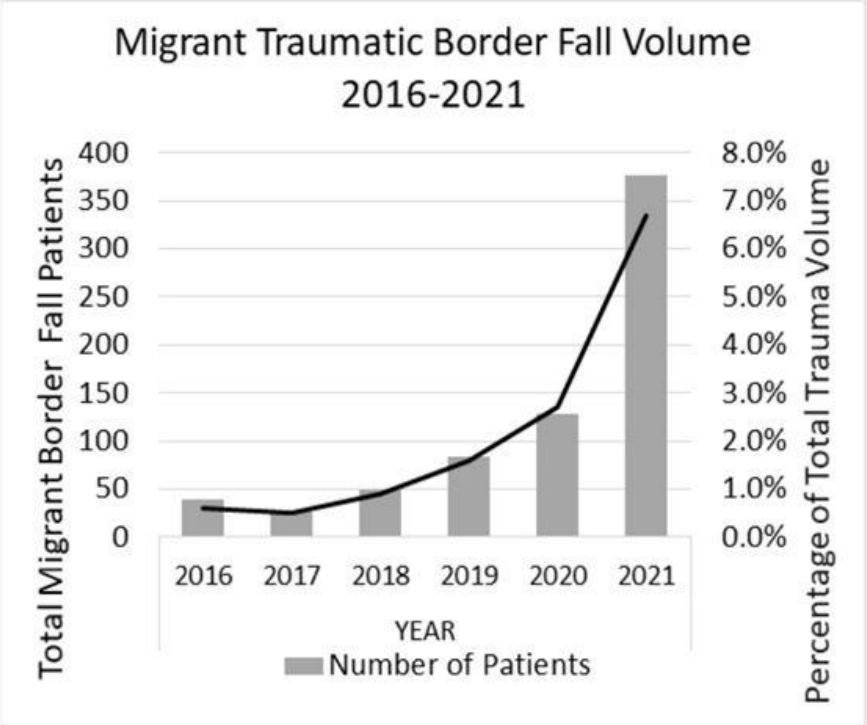
Presenter: William A. Marshall, MD

Objectives: Metropolitan San Diego's geographic location lends a unique demographic of migrant patients injured by falls at the US-Mexico border. For years, the number of patients injured from border wall falls remained static. In an effort to prevent migrant crossings, a 2017 Executive Order increased the southern California border wall height to 30 feet. We hypothesized that elevated border wall height is associated with increased major trauma, resource utilization, and healthcare costs.

Methods: We combined trauma registry data of two southern California level 1 trauma centers equally responsible for treating injured border wall patients from 2016-2021. Patient demographics, operative interventions, length of stay (LOS), discharge disposition, and hospital charges were assessed.

Results: Injuries from border wall falls grew 967% from 2016 to 2021 (39 vs. 377 patients; Figure). Operating room utilization (19 vs. 235 total operations) and median hospital charges per patient ($68,663 vs. $177,251) have risen dramatically over the same time period. The majority (76%) of these patients are under-insured at admission with charges largely government subsidized (57%) or unfunded (19%). Inpatient resources are utilized until safe for discharge with a median LOS of 5 days (IQR [2, 11]).

Conclusions: The increased height of the US-Mexico border wall has resulted in record numbers of injured migrant patients. Despite this increase in wall height, border crossings are surging, placing novel financial and resource burdens on already stressed trauma systems. To address this public health crisis, legislators and healthcare providers must conduct collaborative, apolitical discussions regarding the border wall's efficacy as a means of deterrence as well as its impact on traumatic injury and disability.



Migrant Border Fall Volume by Year, 2016-2021.

Quick Shot #9
January 19, 2023
9:33 am

EVALUATION OF A TRAUMA-FOCUSED MEDICAL SCHOOL COURSE

Marshall W. Wallace, BS*, Jeffery Chen, BS, Eric Mace, MD, Shayan Rakhit, MD, Raeanna Adams, MD*, Mayur B. Patel, MD, MPH, FACS*, Shannon Eastham, MD*
Vanderbilt University Medical Center

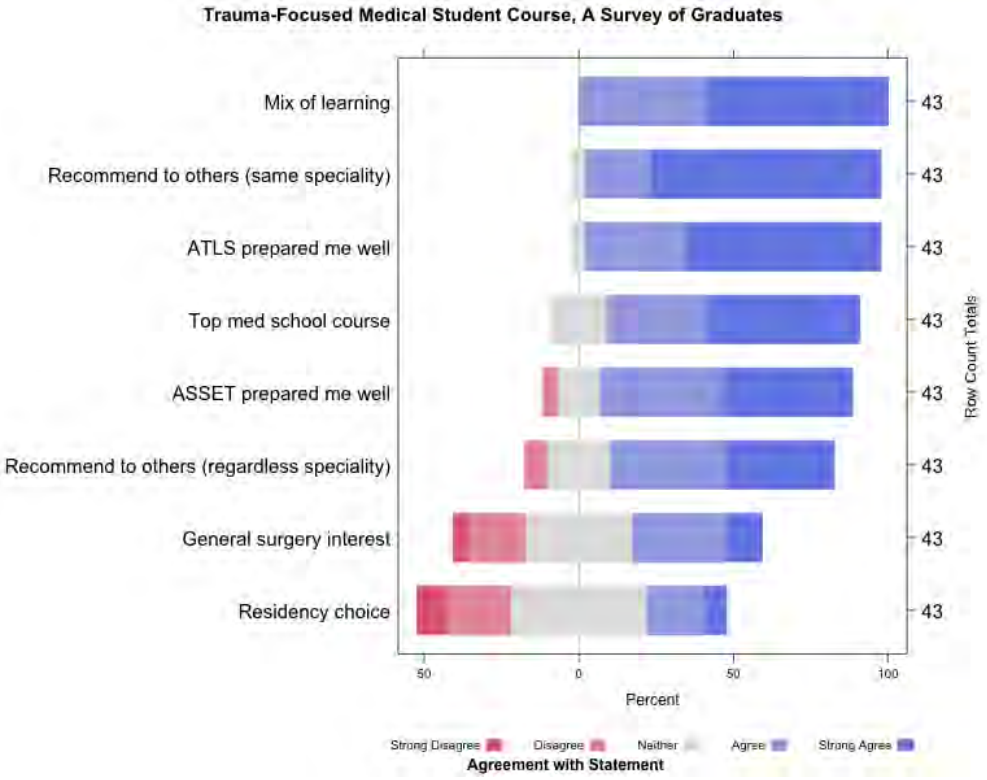
Presenter: Marshall W. Wallace, BS

Objectives: Standardized trauma courses such as ATLS and ASSET have improved physician competency in caring for trauma patients. However, medical student trauma education varies between institutions and is often limited to absent. We hypothesized that our institution's trauma-focused medical student course would improve graduates' future confidence in caring for injured patients.

Methods: We distributed a 19-question Likert scale survey over 2 months to past participants of our month-long trauma-focused medical school course offered quarterly from 2015-2020, who had finished at least one year of residency. We assessed specialty, training year, and how the course prepared them for managing trauma patients, among other questions assessing confidence in trauma care. For context, this course delivered ATLS (9^{th} & 10^{th} editions) and ASSET (audit) courses, alongside foundational basic science and clinical skills across domains of injury, repair, and rehabilitation.

Results: In total, 43 of 84 graduates (51%) responded (see Figure). Of 43 respondents, 4 (9%) were attending physicians, 2 (5%) were fellows, and 37 (86%) were residents. General Surgery (26%), Orthopedic Surgery (23%), and Emergency Medicine (19%) were the most common specialties. Of respondents, 18 (42%) agreed that the course increased their interest in a trauma-related career. The majority agreed that ATLS and ASSET [35 (81%) and 41 (95%), respectively] helped prepare them to care for trauma patients as a resident, and 37 (86%) perceived more confidence caring for trauma patients than their co-residents. Only 4 (9.3%) of respondent graduates were required to retake ATLS as residents; all others' medical student ATLS training were honored.

Conclusions: This trauma-focused medical student course positively influenced future provider confidence. Similar to basic and advanced life support courses, it may be appropriate to promulgate physician-level trauma courses like ATLS to medical student learners.



Stacked bar chart presenting the distribution of Likert-scale responses for 43 respondents to eight key questions. All respondents found the mix of learning opportunities beneficial. A vast majority would recommend the course to other students, felt that ATLS and ASSET helped prepare them to care for trauma patients, and felt that this was in the top 10% of medical school courses they took.

Quick Shot #10
January 19, 2023
9:39 am

VARIATION IN CT IMAGING OF PREGNANT TRAUMA PATIENTS ACROSS SOUTHERN CALIFORNIA TRAUMA CENTERS

Alexa Lucas, MD, MBA, Sigrid Burruss, MD FACS, Walter L. Biffl, MD*, Diane Wintz, MD*, Jarrett Santorelli, MD*, Morgan Schellenberg, MD, MPH*, Kenji Inaba, MD, Thomas K. Duncan, DO, FACS, FICS*, Navpreet K. Dhillon, MD*, Jeffry Nahmias, MD, MHPE, FACS, FCCM*, Erika Tay, MD, Danielle Zezoff, MD, MBA, Katharine Kirby, MS, Alden Dahan, BS, Arianne Johnson, PhD, William Ganske, MD, Dunya Bayat, MPH, Matthew Castelo, BS, Dennis Zheng, MD, Areti Tillou, MD, Raul Coimbra, MD, PhD, Rahul Tuli, BS, Brent Emigh, MD, Graal Diaz, PhD, Nicole Fierro, MD, Eric Ley, MD
University of California, Irvine

Presenter: Alexa Lucas, MD, MBA

Objectives: Evaluate computed tomography (CT) imaging practices for pregnant trauma patients (PTPs) hypothesizing significant variability between trauma centers, suggesting the need to develop PTP CT imaging guidelines.

Methods: A multicenter retrospective study (2016-2021) was performed at 12 Level-I/II trauma centers. All adult (≥18 years old) PTPs involved in motor vehicle collisions (MVCs) were included with no patients excluded. The primary outcome was incidence of CT imaging of the head, cervical spine, chest, and abdomen/pelvis at each center. Patient demographics, injury profile, and outcomes were compared. Chi-square tests were used to compare the distributions of categorical variables across centers. ANOVA was used to compare the means of normally distributed continuous variables.

Results: 729 PTPs sustained MVCs (73% high speed, defined as ≥25 mph). There was no difference in mean age or Glasgow Coma Scale score between centers (both $p>0.05$). Across centers, patients were mildly injured; however, there was a significant difference in injury severity score (range: 1.1-4.6, $p<0.001$) between centers. There was also variation in imaging rates of CT head (range: 11.8%-62.5%, $p<0.001$), cervical spine (11.8%-75%, $p<0.001$), chest (4.4%-50.2%, $p<0.001$), and abdomen/pelvis (0%-57.3%, $p<0.001$). Similarly, in high speed MVCs there was significant variation for CT head (12.5%-64.3%, $p<0.001$), cervical spine (16.7%-75%, $p<0.001$), chest (5.9%-83.3%, $p<0.001$), and abdomen/pelvis (0%-60%, $p<0.001$). There was a difference in mortality (0%-2.9%, $p=0.04$); however, no center had more than one death.

Conclusions: There was significant variability in CT imaging for the assessment of PTPs after MVCs across 12 trauma centers, including within a subset of high-speed MVCs. This supports the need for standardization of CT imaging for PTPs to minimize radiation exposure while ensuring optimal injury identification and outcomes.

Table 1: Pregnant trauma patients involved in motor vehicle collisions at Southern California Trauma Centers (TCs)

Total N=729	TC- A	TC-B	TC-C	TC-D	TC-E	TC-F	TC-G	TC-H	TC-I	TC-J	TC-K	TC-L	Total	p-value
Age (years)	30.9	30.7	27.2	27.3	29.6	27.6	28.2	28.1	26.7	28.1	27.4	28.0	28.0	0.1
ISS	2.8	--	3.8	1.0	3.9	1.6	0.8	3.2	2.1	2.1	2.5	2.4	2.0	**<0.001**
CT head	33.3%	23.3%	33.9%	62.5%	11.8%	11.9%	26.1%	41.4%	28.1%	32.3%	30.9%	62.5%	28.7%	**<0.001**
CT C-spine	33.3%	23.3%	37.3%	75.0%	11.8%	20.9%	46.2%	41.4%	32.8%	42.9%	36.8%	58.3%	38.2%	**<0.001**
CT chest	25.0%	13.3%	28.8%	12.5%	5.8%	4.5%	50.3%	48.2%	21.9%	6.02%	29.4%	29.2%	26.6%	**<0.001**
CT abd/pelvis	16.7%	23.3%	28.8%	0.0%	14.7%	4.5%	57.3%	55.2%	28.1%	8.3%	45.6%	16.7%	31.4%	**<0.001**
Length of stay (days)	3	1.1	3.9	1.9	1.6	1.2	2.7	4.6	1.2	1.3	3.3	1.3	2.2	**<0.001**
In-hospital mortality	0.0%	0.0%	0.0%	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	**0.04**

MVC= motor vehicle collision ISS=injury severity score; abd/pelvis= abdomen/pelvis

Pregnant trauma patients involved in motor vehicle collisions at Southern California Trauma Centers (TCs)

Table 2: Pregnant trauma patients involved in high-speed (>25mph) motor vehicle collisions at SoCal trauma centers (TCs)

N=480	TC- A	TC- B	TC- C	TC- D	TC- E	TC- F	TC- G	TC- H	TC- I	TC- J	TC- K	TC- L	Total	p-value
Age (years)	-	-	27.1	27.3	29.8	27.2	28.2	28.6	26.0	28.3	26.5	27.6	27.6	0.20
ISS	-	-	3.9	1.0	4.7	1.7	1.1	4.1	2.4	2.5	2.9	1.9	2.4	**<0.001**
CT-head	-	-	35.7%	62.5%	12.5%	15.7%	29.5%	45.0%	31.4%	47.9%	35.7%	64.3%	33.8%	**<0.001**
CT C-spine	-	-	30.4%	12.5%	83.3%	5.9%	54.3%	55.0%	25.5%	7.0%	35.7%	35.7%	35.7%	**<0.001**
CT-chest	-	-	39.3%	75.0%	16.7%	27.5%	47.3%	45.0%	35.3%	54.8%	39.3%	64.3%	42.5%	**<0.01**
CT abd/pelvis	-	-	30.4%	0.0%	20.8%	5.9%	59.7%	60.0%	33.3%	11.3%	50.0%	14.3%	35.2%	**<0.001**
Length of stay (days)	-	-	3.4	1.9	1.8	1.3	3.1	5.7	1.1	1.5	3.5	1.4	2.5	0.03
In-hospital mortality	-	-	0.0%	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.14

MVC= motor vehicle collision; ISS=injury severity score; abd/pelvis= abdomen/pelvis

Table 2: Pregnant trauma patients involved in high-speed (>25mph) motor vehicle collisions at SoCal trauma centers (TCs)

Quick Shots Session II

Quick Shot #11
January 19, 2023
8:45 am

ASSOCIATION OF ON-SCENE ADVANCED LIFE SUPPORT INTERVENTIONS WITH RETURN OF SPONTANEOUS CIRCULATION FOLLOWING TRAUMATIC OUT-OF-HOSPITAL CARDIAC ARREST

Tanner Smida, BS, NREMT-A, Brad Price, PhD, James Scheidler, MD,
Alison M. Wilson, MD, FACS*, James M. Bardes, MD*
West Virginia University

Presenter: Tanner Smida, BS, NREMT-A

Objectives: Traumatic out-of-hospital cardiac arrest (tOHCA) has a mortality rate over 95%. Many current protocols dictate rapid intra-arrest transport of these patients. We hypothesized that on-scene ALS would increase the odds of arriving at the emergency department with ROSC in comparison to performance of no ALS or ALS en route.

Methods: We utilized the 2018-2021 ESO Research Collaborative public use datasets for this study, which contain patient care records from ~2,000 EMS agencies across the US. All OHCA patients with an etiology of “trauma” or “exsanguination” were screened (n=15,691). The time of advanced airway management (AAM), vascular access (VA), and chest decompression (CD) was determined for each patient. Multivariable logistic regression using Utstein variables was used to evaluate the association of ALS intervention and time to intervention with ROSC at ED.

Results: 5,088 patients met inclusion criteria. 778 (15.3%) of all patients had ROSC at ED. In comparison to no VA, scene VA was associated with a 117% increase in the odds of having ROSC at ED (aOR: 2.17 [1.33,3.52]). The odds of ROSC at ED decreased by 3.1% (aOR: 0.969 [0.943, 0.996]) for every 1-minute increase in time to VA and by 4.7% (aOR: 0.953 [0.932, 0.975]) for every 1-minute increase in time to epinephrine. When modeled continuously, timing of AAM and CD were not associated with ROSC at ED. Blunt mechanism, initial PEA, time to VA, time to epinephrine, IV access (vs. IO), scene time, and fluid resuscitation (>250 mL vs. <250 mL non-blood product fluid) were significantly associated with ROSC at ED.

Conclusions: On-scene ALS interventions were associated with increased ROSC at ED in our study. These data suggest that initiating ALS prior to rapid transport to definitive care in the setting of tOHCA may increase the number of patients with a palpable pulse at ED arrival.

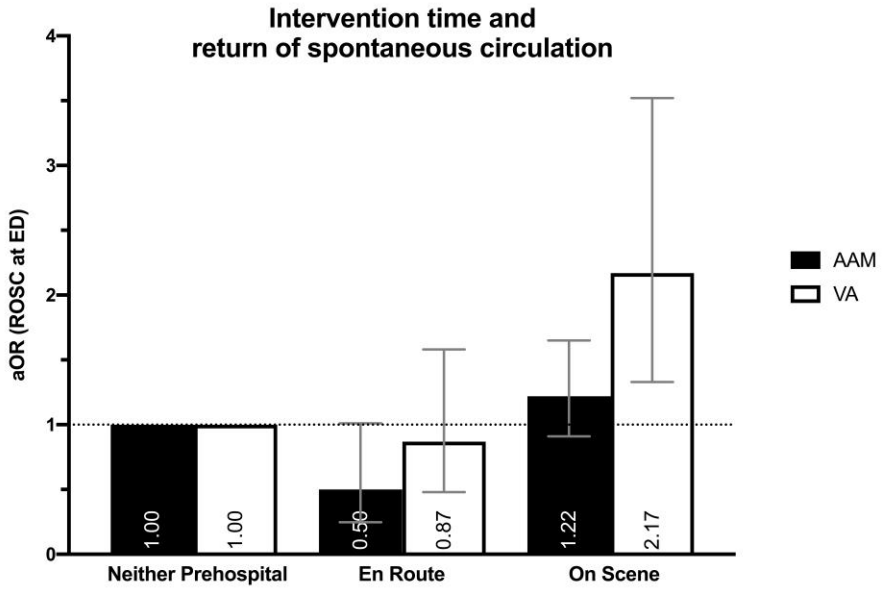


Figure 1. ALS intervention interval vs. ROSC at ED.

On scene VA is associated with increased adjusted odds of having ROSC at ED arrival in comparison to en route VA and no prehospital VA. Error bars indicate upper and lower bounds of 95% confidence intervals.

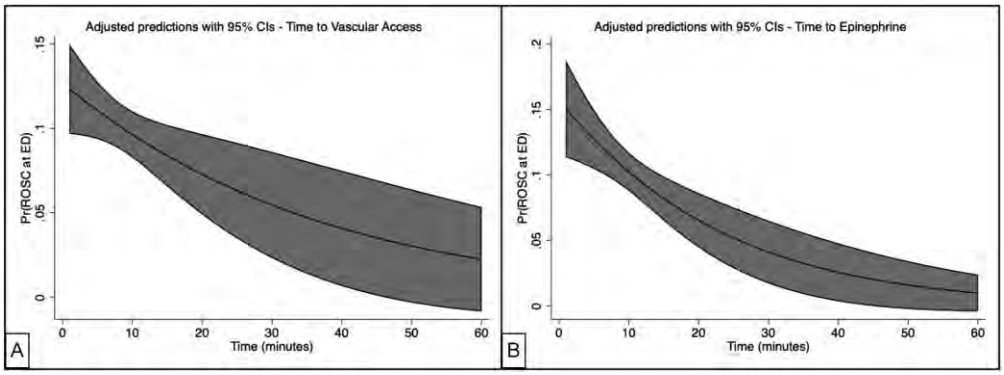


Figure 2. Time to VA and time to epinephrine vs. ROSC at ED.

Increased time to VA (panel A) and time to 1 milligram epinephrine administration (panel B) were significantly associated with decreased odds of having ROSC at ED arrival in our multivariable logistic regression model. The shaded regions represent 95% confidence intervals.

Quick Shot #12
January 19, 2023
8:51 am

SEE NONE, DO THREE: REPETITIVE INTENTIONAL TRAINING ON HIGH FIDELITY CADAVERIC SIMULATION RAPIDLY IMPROVES CHEST TUBE PROCEDURAL PERFORMANCE IN EARLY SURGICAL RESIDENTS

Hahn Soe-Lin, MD, MS*, Kayla Gray, MS, CCRP, Brooke McGill, BS, Nicole Kaley, BS, Mikaela Mahrer, BS, Ceili Olney, BS, Jim Mankin, MD, Suhail Zeineddin, MD, James N. Bogert, MD*, Kristina Chapple, PhD., Jordan A. Weinberg, MD*
Creighton University School of Medicine - Phoenix Campus

Presenter: Hahn Soe-Lin, MD, MS

Objectives: Tube thoracostomy is often a time sensitive procedure. Interns on trauma services struggle with early proficiency at emergent chest tubes due to patient acuity and sporadic opportunity. Complication rates specific to general surgery resident placed chest tubes approach 7%. We previously demonstrated that high-fidelity whole body donors (WBD) allowed medical students to gain proficiency with chest tubes with clustered training. In this study, we aim to validate whether intentional repetitive training can rapidly improve performance in incoming surgical interns.

Methods: Fifteen surgical interns at a University affiliated level I trauma center performed three chest tubes each as part of their orientation. 3 WBDs were used in a simulated operating room. An attending trauma surgeon proctored all chest tubes. Interns were measured on critical steps of the procedure and times measured from prep to securing tube with suture. Pre and post training surveys were collected.

Results: 45 chest tubes were placed. Mean times in minutes rapidly improved over three repetitions (4.3, 3.3, 2.4, $P<0.001$) and standard deviation rapidly narrowed (Fig. 1). By the third attempt, all interns passed the critical steps of the procedure and aggregate performance exceeded PGY-2 and PGY-3 residents measured previously on the same platform (median 2.8 minutes). Intern survey feedback overwhelmingly demonstrated improved procedural confidence.

Conclusions: Incorporating WBDs early in training accelerates confidence and competence with no patient safety risk. Interns gain proficiency rapidly with clustered repetitive training. After only a few repetitions performance exceeds residents with one to two years of additional experience. This platform may serve as a model for training other high acuity trauma and general surgical operations and procedures.

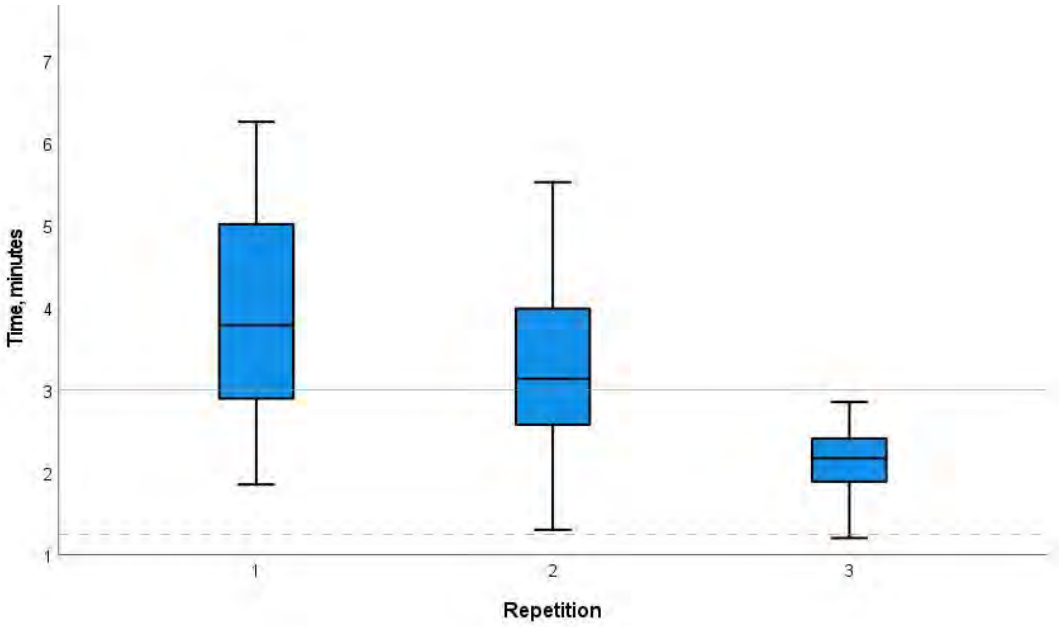


Figure 1. Distribution of time to complete chest tube placement

Quick Shot #13
January 19, 2023
8:57 am

AUTOMATED PARTIAL REBOA REDUCES HEMORRHAGE AND HYPOTENSION IN A LETHAL PORCINE LIVER INJURY

Gabriel Cambronero, MD, Lucas Neff, MD, Nathan Patel, MD, Aravindh Ganapathy, MD, Magan Lane, BS, Aidan Wiley, BS, Jacob Neibler, BS, Guillaume Horeau, DVD, PhD, Joseph J. DuBose, MD*, Austin Johnson, MD, PhD, Timothy Williams, MD
Wake Forest University Medical School

Presenter: Gabriel Cambronero, MD

Objectives: Partial and intermittent resuscitative endovascular balloon occlusion of the aorta (pREBOA/iREBOA) are techniques to extend therapeutic duration, mitigate ischemia, and bridge patients to definitive hemorrhage control. We hypothesized that automating pREBOA balloon titration would reduce blood loss and hypotensive episodes over 90-min intervention without increasing ischemic burden compared to iREBOA in an uncontrolled liver hemorrhage swine model.

Methods: Fourteen pigs underwent uncontrolled hemorrhage by liver transection and were randomized to automated pREBOA (N=4), iREBOA (N=5), or control (N=5). Once in hemorrhagic shock, controls had the catheter removed and received blood products only. The REBOA groups received 10min of complete REBOA followed by 80min of pREBOA or iREBOA with automated blood transfusion. At T90, surgical hemostasis was obtained, hemorrhage volume was quantified, and animals were transfused to euvolemia with 1.5hrs of automated critical care.

Results: Liver injury was highly lethal (3/5 control animals dying in <15min). All REBOA animals survived to the end of study. iREBOA animals spent greater time at full occlusion (38±17%) vs pREBOA (19±6%), p=0.02. From T0-90, mean transfusion requirements trended higher for iREBOA (12.9±7.0ml/kg) vs pREBOA (8.78±2.5ml/kg), p=0.10. At surgical hemostasis, iREBOA trended towards a greater percentage of blood volume lost (75.8±20.5%) vs pREBOA (46.6±12.4%), p=0.06. iREBOA had more time at hypotension MAP<60mmHg (59±6%) than pREBOA (11±7%), p=0.02. Peak lactate was higher for iREBOA (p=0.03).

Conclusions: Compared with iREBOA, automated pREBOA reduced hypotension, time at complete REBOA, and peak lactate without increasing total blood loss or transfusion requirements. Both techniques prevented immediate death compared to control. Further refinement of automated pREBOA and the addition of automated transfusion may enhance endovascular resuscitation.

Automated REBOA catheter is capable of complete, partial and intermittent modes of operation.

Quick Shot #14
January 19, 2023
9:03 am

THE RACE TO TAMPONADE JUNCTIONAL NON-COMPRESSIBLE HEMORRHAGE AND SUSTAIN HEMOSTASIS FOR 72-HOUR PROLONGED FIELD CARE

Adam J. Kishman, DSc, MPAS, PA-C, LT, MSC, USN, Gilbert A. Pratt III, MS,
Cecilia Castro, BS, Alejandra L. Lorenzen, BS, Leslie E. Neidert, PhD,
Clifford G. Morgan, PhD, Sylvain Cardin, PhD
Naval Medical Research Unit San Antonio

Presenter: Adam J. Kishman, DSc, MPAS, PA-C, LT, MSC, USN

Objectives: Hemorrhage control in prolonged field care (PFC) presents unique challenges requiring personnel to maintain patient stability beyond the Golden Hour. Operations in austere environments, battlefield resource depletion, and area access denial for MEDEVAC drive the need for enhanced point of injury treatment capabilities. To address hemorrhage control in PFC, we evaluated Combat Gauze (CG) and XSTAT for speed of deployment and monitored hemostatic efficacy.

Methods: The left subclavian artery and subscapular vein were isolated in male Yorkshire swine (70-85 kg) and injured by a 50% transection; followed by 30-seconds of hemorrhage. CG (n=4) or XSTAT (n=4) was administered until bleeding stopped and remained within subjects for 72-hours; with Surgical Shams (n=3) as control. Results were analyzed using unpaired two-tailed t-test, and Two-way ANOVA with Tukey's post-hoc analysis. Data is represented as mean±standard deviation with significance as $p<0.05$.

Results: Similar outcomes were seen in hemorrhage volume and total blood loss between experimental groups, though XSTAT sponges absorbed significantly more blood than CG (Fig 1A-1C), was significantly faster to administer (Fig 1D), and required similar number of devices as CG (Fig 1E). There were no significant differences between groups in prothrombin time, International Normalized Ratio or activated clot time (Fig 2A-C). All subjects displayed benign serosanguineous drainage with no indications of sanguineous, hemorrhagic or purulent exudate.

Conclusions: While CG and XSTAT demonstrated equivalent hemostatic ability through 72-hours, XSTAT offered significantly faster administration and the ability to absorb more blood. Taken together, XSTAT may be superior to CG for junctional non-compressible hemorrhage control in operational PFC environments.

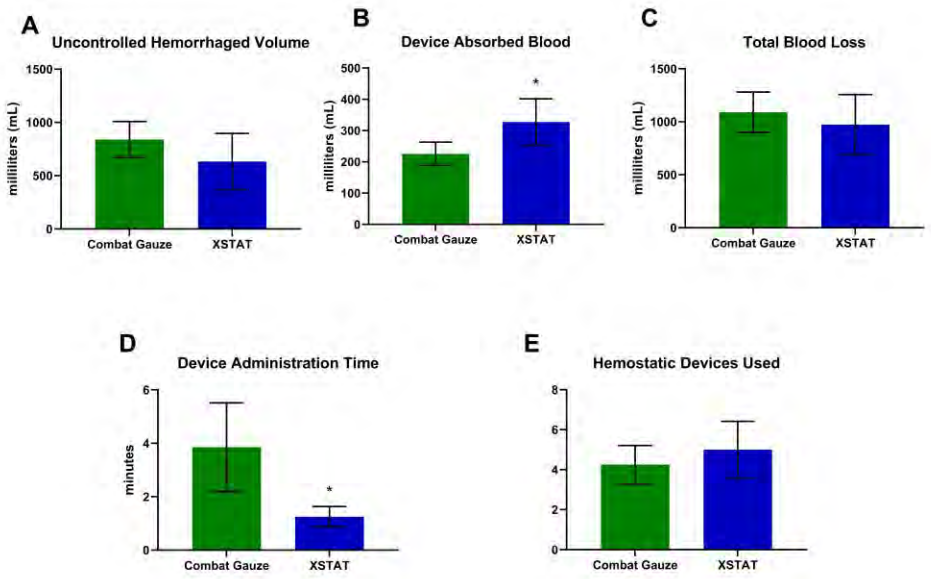


Figure 1. Intervention Performance Assessment. Combat Gauze (Green) and XSTAT (Blue) were evaluated for hemorrhage volume (A), absorbed blood volume in device (B), and combined total volume (C). Device application was assessed for application time (D) and device count to achieve hemostasis (E). Significant difference in XSTAT compared to Combat Gauze denoted via *.

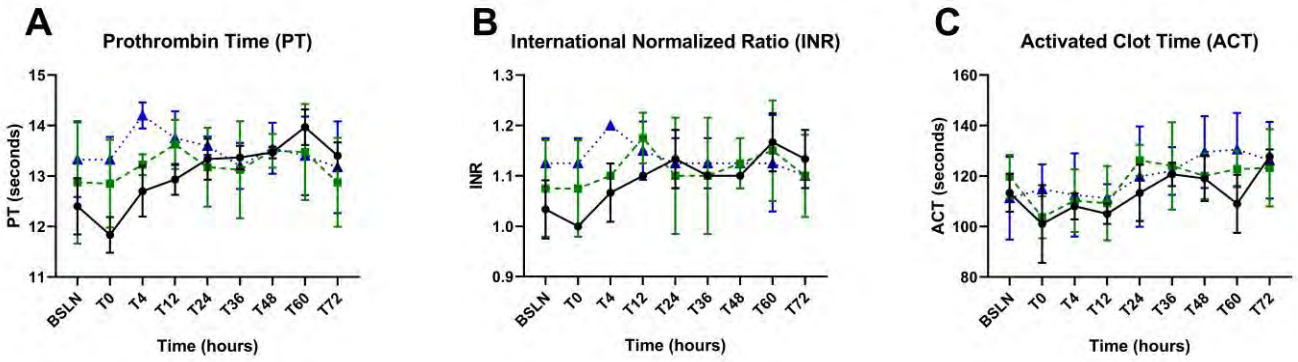


Figure 2. Coagulation Function. Combat Gauze (Green) and XSTAT (Blue) were compared against each other and a Surgical Sham (Black) at designated time points following hemostasis (T0), for changes in Prothrombin Time (A), International Normalized Ratio (B), and Activated Clot Time (C). No significant group effect was identified for each of these parameters.

Quick Shot #15
January 19, 2023
9:09 am

A SIMPLE ENGINEERING ALTERATION TO IO ACCESS DEVICE ELECTRONICS CAN LEAD TO IMPROVED PLACEMENT ACCURACY CONFIRMATION

Rohan Vemu, Tshepo Yane, BA, Patrick Paglia, BA, Gregory Glova, BA, Kaiser Okyan, BA, David Meaney, Kristen Chreiman, MSN, Lewis J. Kaplan, MD, FACS, FCCM, FCCP*, Jose L. Pascual, MD, PhD, FRCS(C), FACS, FCCM*
Perlman School of Medicine, School of Engineering, University of Pennsylvania

Presenter: Rohan Vemu

Objectives: Intraosseous (IO) catheterization is the ideal emergency access for patients when intravenous cannulation fails. Optimal IO fluid delivery requires placement in cancellous bone which can be challenging in pediatric, muscular, and obese patients. We hypothesized that commercial Arrow® EZ-IO (EZIO) device electronics can be readily altered to provide confirmation of appropriate cancellous bone placement, thereby removing IO placement subjectivity.

Methods: After deconstructing the casing and contents of an EZIO, we reorganized the battery compartment and added a Raspberry Pi microcontroller and LED light indicator discriminating changes in normal rotational force (Newtons, N) and drill bit rotations per minute (RPMs) (Fig 2). The LED was programmed to illuminate only when the needle tip passed from high to low RPMs and low to high force readings. Using USB connection of the microcontroller to an external monitor we verified drill force and RPM readings in IO placement in fresh goat tibia bones (n=25) and commercial bone models (n=50) wrapped in bovine muscle. Mean ± SEM readings obtained while directly visualizing cross section drill tip entry from soft tissue to cortical bone, to cancellous bone were compared with Tukey-Kramer testing. Correlation of LED illumination with needle entry into cancellous bone was assessed with direct observation.

Results: Both RPM and force varied significantly with penetration of different tissues in models and goat bones (Fig. 1, *$p<0.05$ vs cortical, respectively). Insertion accuracy (LED lighting) in model and goat bones were 94.0% (47/50) & 92.0% (23/25), respectively.

Conclusions: A readily deployable engineering modification of commercial IO devices reproducibly signals cancellous bone access using integrated changes in drill RPM and force. Such modifications may be incorporated in future IO devices to improve insertion accuracy and safety.

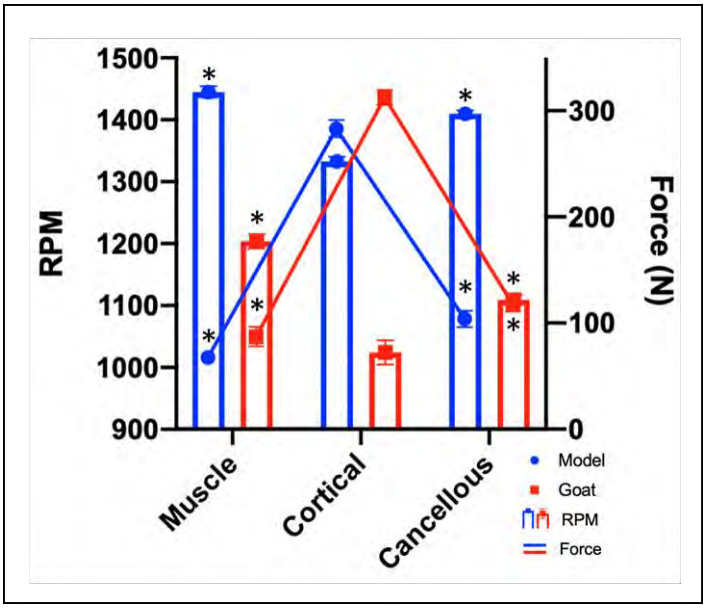


Figure 1: Cortical bone (Cortical) in both commercial model and goat bones consistently demonstrated less drill revolutions per minute (RPM) and more force (Newtons, N) than both muscle and cancellous bone. (*p<0.05 vs cortical bone in respective parameter comparisons)

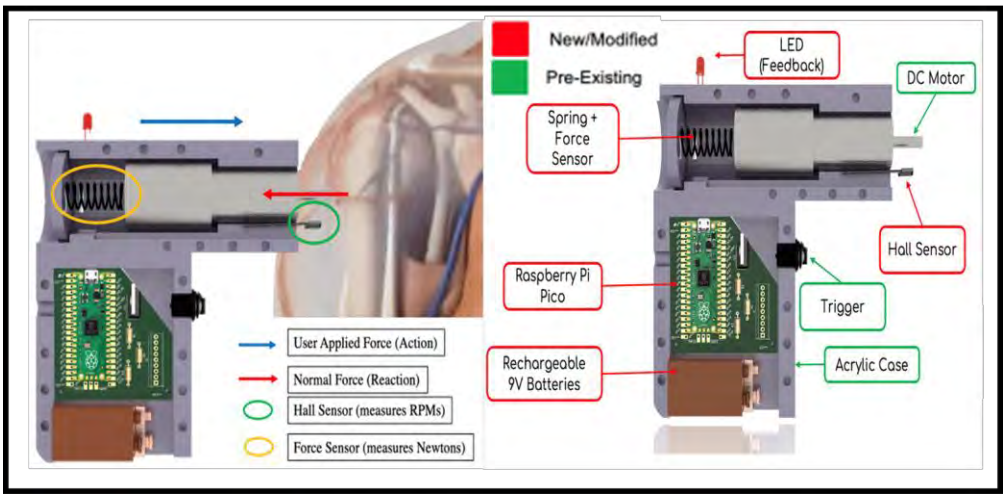


Figure 2: Modified casing and contents of the the adapted EZIO access device indicating computerized method to obtain drill force and RPMs to indicate when cancellous bone has been reached by the tip of the drill needle. parts labeled in green boxes are preexisting and in red boxes are new or modified.

Quick Shot #16
January 19, 2023
9:15 am

ASSOCIATION OF EARLY RIB PLATING ON CLINICAL AND FINANCIAL OUTCOMES: A NATIONAL ANALYSIS

Zachary K. Tran, MD*, Nicole DePolo, MD, Nam Yong Cho, BS, Shayan Ebrahimian, BS, Kaushik Mukherjee, MD, MSCI, FACS*, Peyman Benharash, MD, Sigrid Burruss, MD, FACS
Loma Linda University Medical Center

Presenter: Kaushik Mukherjee, MD, MSCI, FACS

Objectives: With reported improvements in patient outcomes, surgical stabilization of rib fractures (SSRF) has been increasingly adopted. While institutional series have sought to define the role of early SSRF, large scale analysis remains lacking. The present study evaluated clinical and financial outcomes of SSRF in a nationally-representative cohort.

Methods: Patients (≥16 years) who underwent SSRF within 7 days following trauma-related admission were identified using the 2016-2019 National Inpatient Sample. Those transferred in or with spinal, cranial or intraabdominal injuries were excluded. Patients who underwent SSRF within 2 days of hospitalization were classified as *Expedited*. Multivariable regressions were used to evaluate the impact of timing for SSRF on outcomes of interest. The primary endpoint was prolonged mechanical ventilation (>96 hours) while mortality, in-hospital complications, home discharge and resource utilization were secondarily considered.

Results: Of an estimated 4,375 patients, 2,470 (56.4%) were considered *Expedited.* Distributions of age, race, chronic lung disease and flail chest were similar between *Expedited* and others. However, *Expedited* patients had greater rates of hemothorax but lower rates of concomitant lung injury. After adjustment, *Expedited* had lower odds of prolonged ventilation, tracheostomy and ICU admission but similar risk of mortality, respiratory failure and pneumonia (Figure). *Expedited* was associated with a decrement in hospitalization duration (β: -3.5 days, 95% CI: -4.3- -2.7) as well as costs (β: -$10.0K, 95% CI: -14.5- -5.5) and were more likely to be discharged to home (AOR: 1.54, 95% CI: 1.06-2.23).

Conclusions: Early SSRF appears to reduce likelihood of prolonged ventilation and tracheostomy. While patient selection criteria may limit our findings, expeditious SSRF may limit morbidity while enhancing value of care.

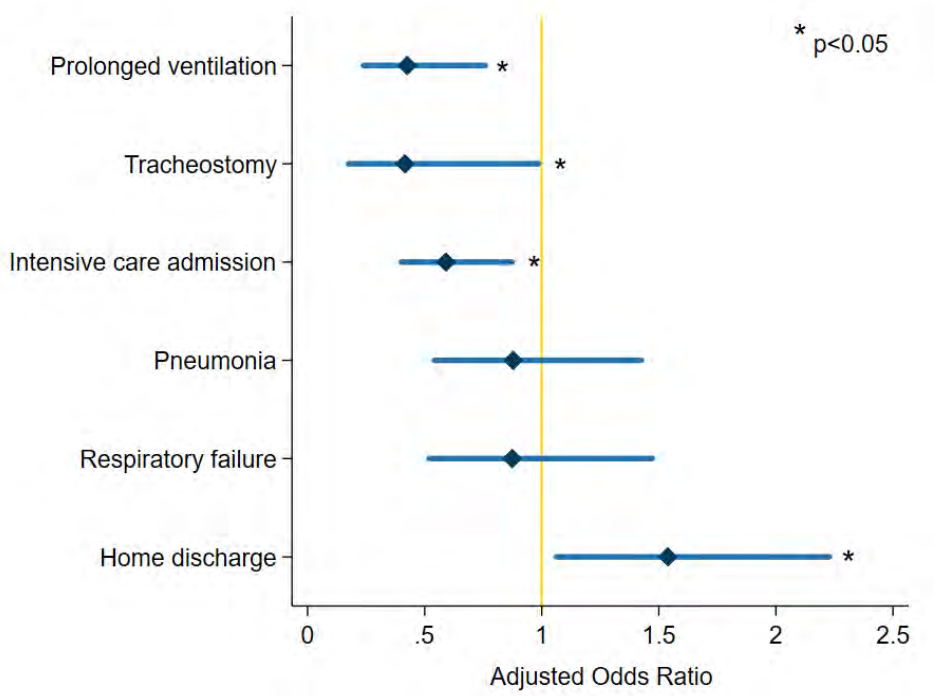


Figure. Risk-adjusted outcomes for *Expedited* on several acute endpoints with others as reference.

Quick Shots Session II

Quick Shot #17
January 19, 2023
9:21 am

DAMAGE CONTROL THORACOTOMY: TRENDS, TECHNIQUES, AND OUTCOMES: AN EAST MULTICENTER TRIAL

Anthony D. Douglas, MD, Thaddeus J. Puzio, MD*, Patrick B Murphy, MD, MPH, MSc*, Jeffry Nahmias, MD, MHPE, FACS, FCCM*, Nikolay Bugaev, MD*, Haytham Kaafarani, MD, MPH*, Leah C Tatebe, MD, FACS*, Bryce R.H. Robinson, MD, MS, FACS, FCCM*, Matthew M. Carrick, MD*, Jordan Finch, BS, Gabriel Kinnaman, BS, Harrison Smith, BS, Lea Hoefer, MD, Robert C Keskey, MD, Andrew Snyder, BS, David Turay, MD, PhD*, Meghan Cochran-Yu, MD, Gweniviere K. Capron, MD*, Dillon Cheung, MD, Atli Valgardsson, MD, Brittany Bankhead, MD, MS*, Anna Liveris, MD*, Kiah Andrews, MD, John V. Taylor, MB, ChM, FRCSEd*, Dominic Cromer, MBChB, Anna Goldenberg-Sandau, DO*, Taylor Evangelisti, MS, BA, Asanthi M. Ratnasekera, DO, FACS*, Sirivan S. Seng, MD*, Juan F. Figueroa, MD, Francesk Mulita, Georgios-Ioannis Verras, MD, Juan Pablo Ramos, MD, Analia Acosta, MD, Nicole Frederick, DNP, APRN, ACCNS-AG, Lauren E. Favors, MD, Robert A. Maxwell, MD*, M. Chance Spalding, DO, PhD, FACS*, Kimberly Sperwer, MD, Lara Senekijan, MD, Anthony Gebran, MD, Mina Attia, BS, Megan T. Quintana, MD*, TJ Mack, RN, Satya Dalavayi, Joy Kimbrough, Gillian Hoshal, DO, Ashely D. Meagher, MD, MPH
Indiana University

Presenter: Anthony D. Douglas, MD

Objectives: The trends in utilization, techniques of closure, and outcomes of Damage control thoracotomy (DCT) in injured patients remain unclear. This EAST multi-center trial aimed to examine DCT usage over the last decade, evaluate types of temporary closure, and assess associated outcomes.

Methods: An international retrospective cohort study of thoracotomies from 2008-2019 at 26 centers was performed. Patients age ³ 16 undergoing thoracotomy within 24 hours of admission who survived to ICU/floor admission were included. Mixed logistic regression was used to assess complications associated with closure type, trends in DCT utilization, and mortality. Competing risk regression model was used to determine trends in ICU free days for DCT over time.

Results: 926 thoracotomy operations were performed, of those 406 (44%) were DCT. Most injuries were penetrating (n=609,66%) and the most common mechanism was gunshot wound. DCT patients were significantly more injured and ill on presentation (Table 1). 54% of DCT began in the emergency department. Most common temporary closure types included skin only (n=103,25%), commercial vacuum device (n=123,30%), and adhesive dressing (n=129,32%). Frequent complications following DCT were pneumonia (n=57,14%), acute renal failure (n=53,13%), and sepsis (n =41,10%). Mortality rate in the DCT group was 61%, versus 17% for definitive thoracotomy (n<0.001). Utilization of DCT has increased in a linear fashion during the study period, as well as ICU-free days out of 30 (OR:1.66 95%CI [1.18,2.33]); however, mortality has not changed over time (OR:0.61, 95%CI [0.22,1.98]. After mixed logistic regression, there was no difference in complications based on closure type (Table 2).

Conclusions: The use of DCT is increasing over-time with improved ICU-free days, but without improved mortality. Mechanism of temporary closure should be determined based on operator's experience, and institutional resources.

Quick Shot #18
January 19, 2023
9:27 am

ANGIOEMBOLIZATION FOR HIGH-GRADE BLUNT SPLENIC INJURIES WITH HEMODYNAMIC INSTABILITY: WHERE IS THE SWEET SPOT?

Makoto Aoki, MD, PhD, Kazuhide Matsushima, MD*,
Shokei Matsumoto, MD, Toshikazu Abe, MD, MPH
Japan Red Cross Maebashi Hospital

Presenter: Makoto Aoki, MD, PhD

Objectives: Our aim was to compare splenic angioembolization (SAE) with splenectomy in unstable high-grade blunt splenic injury (BSI) patients and identify potential candidates for SAE in this patient cohort.

Methods: The ACS-TQIP database was searched between 2013–2019 to identify patients (age ³16 years) with isolated high-grade BSI (Grade 3–5) and hemodynamic instability. Hemodynamic instability was defined as a systolic blood pressure (SBP) at admission of <90 mmHg, heart rate (HR) >120 bpm, or lowest SBP <90 mmHg within 1 h after admission, and ³1 unit of blood transfusion. In-hospital mortality in SAE and splenectomy groups was compared using 1:2 propensity-score (PS) matching. The characteristics of PS-unmatched and PS-matched splenectomy patients were also compared.

Results: A total of 493 patients were included (147 SAE/346 splenectomy). After PS matching, 84 SAE and 168 splenectomy patients were compared (**Figure**). Approximately 80% of PS-matched patients sustained Grade 3 or 4 BSI and often presented with normal SBP and HR before becoming hemodynamically unstable. The median time to intervention (splenectomy or SAE) was 139 min (interquartile range: 96-183). No significant difference in in-hospital mortality between SAE and splenectomy groups was observed (4.8% vs. 6.5%, $p = 0.779$). More than half of 178 PS-unmatched splenectomy patients sustained Grade 5 BSI and 65.2% of those presented to hospital with SBP <90 mmHg and/or HR >120 bpm (**Table**). The median time to splenectomy in these patients was significantly shorter than in PS-matched splenectomy patients (66 vs. 137 min, $p < 0.001$).

Conclusions: Our results suggest early SAE (within 2-3 h) as a feasible adjunct to non-operative management for Grade 3 or 4 BSI with hemodynamic instability. Splenectomy remains the mainstay of treatment for Grade V BSI presenting with SBP <90 mmHg and/or HR >120 bpm.

Variable	PS-matched Patients			PS-unmatched Patients	
	Splenectomy (n=168)	SAE (n=84)	*P*-value	Splenectomy (n=178)	*P*-value*
Demographics					
Age, y	52 (33-62)	56 (32-65)	0.422	42 (30-59)	0.008
Sex, male	102 (60.7)	52 (61.9)	0.892	107 (60.1)	0.842
Vital signs at hospital arrival					
SBP	102 (84-125)	100 (85-131)	0.856	90 (77-110)	<0.001
HR	95 (77-111)	95 (78-111)	0.800	101 (83-123)	0.023
GCS	15 (15-15)	15 (15-15)	0.510	15 (14-15)	<0.001
Lowest sBP	77 (67-85)	79 (69-86)	0.440	75 (65-84)	0.100
Splenic Injury Grades			0.504		<0.001
OIS=3	71 (42.3)	30 (35.7)		19 (10.7)	
OIS=4	69 (41.1)	41 (48.8)		59 (33.1)	
OIS=5	28 (16.7)	13 (15.5)		100 (56.2)	
ISS	17 (13-21)	17 (14-22)	0.712	25 (19-29)	<0.001
Time to intervention	137 (92-188)	144 (100-176)	0.532	66 (47-98)	<0.001

*PS-matched splenectomy and SAE versus PS-unmatched splenectomy

Table. Characteristics of propensity-score matched and unmatched patients

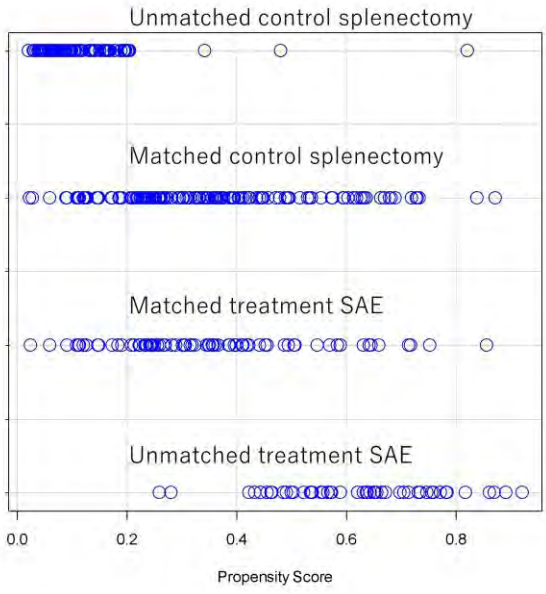


Figure. Distribution of propensity scores

Quick Shot #19
January 19, 2023
9:33 am

RISK FACTORS FOR ANASTOMOTIC LEAK FOLLOWING PRIMARY ANASTOMOSIS OF BLUNT-TRAUMA ASSOCIATED BUCKET HANDLE INTESTINAL INJURIES: A MULTI-CENTER STUDY

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Presenter: Erin Morris, BS

Objectives: Risk factors for an anastomotic leak (AL) after resection & primary anastomosis for traumatic bucket handle injury (BHI) have not been previously defined; this multi-center study was conducted to address this knowledge gap.

Methods: A multi-center retrospective study on the small intestine and colonic BHI from blunt trauma between 2010—2021. Baseline patient characteristics, presence of shock & transfusion, operative details, and clinical outcomes were compared, & pertinent risk factors were explored using R.

Results: Data on 395 subjects were submitted by 12 trauma centers, of whom 33 (8.1%) patients developed AL. Baseline details were similar, except a higher proportion of patients in the AL group had medical comorbidities such as diabetes, hypertension, and obesity (60.6% vs. 37.3%, p=0.015). AL had higher rates of surgical site (13.4% vs. 5.3%, p=0.004) & organ space infections (65.2% vs. 11.7%, p <0.001), along with higher readmission and reoperation rates (48.4% vs. 9.1%, p<0.001 & 39.4% vs 11.6% p<0.001, respectively). There was no difference in ICU length of stay or mortality (p>0.05).

More patients with AL were discharged with an ostomy (69.7% vs. 7.3%, p<0.001), & mean duration until ostomy reversal was 5.85±3 months (range 2-12.4 months).

The risk for AL significantly increased when the initial operation was a damage control procedure, after adjusting for age, sex, injury severity, presence of ≥ 1 comorbidities, shock, transfusion of >6 packed red blood cells, & site of injury (adjusted RR=2.32 [1.13, 5.17]), none of which were independent risk factors in themselves.

Conclusions: Patients with AL after BHI do significantly worse on post-operative infection, reoperation, and readmission, and have a nearly 10-fold increase in ostomy upon discharge. Damage control surgery appears to double the risk of AL.

Table 1. Patient presentation and outcome of the whole cohort

Variable	Anastomotic leak (n = 33) mean ± SD/ n (%)	No leak (n = 372) mean ± SD/ n (%)	p-value
Age	44.12 ± 15.18	39.08 ± 16.11	0.077
Sex (males)	25 (75.8)	260 (69.9)	0.611
BMI	29.15 ± 7.44	27.93 ± 5.55	0.363
ISS	26.21 ± 11.84	22.85 ± 11.86	0.127
≥ 1 comorbidity	20 (60.6)	135 (37.3)	**0.015**
Site of Injury* Small Intestine only	15 (6.4)	220 (93.6)	0.136
Colonic Injury	11 (13.4)	71 (86.6)	
Small and Colonic Injuries	7 (8.3)	77 (91.7)	
Presented with Shock	15 (45.5)	130 (35.1)	0.320
WBC	15.66 ± 7.48	15.65 ± 7.21	0.994
Hb	11.96 ± 2.54	12.62 ± 2.19	0.175
BE	-3.96 ± 6.47	-4.74 ± 4.66	0.566
Lactate	4.4 ± 3.12	3.62 ± 2.19	0.273
Outcomes			
Transfusion of >6 packed red blood cells*	9 (27.27)	74 (20)	0.444
Technique of anastomosis (Staples)	20 (62.5)	246 (70.5)	0.459
Total number of abdominal surgeries†	2 (1)	1 (1)	0.581
SSI*	7 (13.0)	21 (5.3)	**0.004**
Organ space infection*	22 (65.2)	45 (11.7)	**< 0.001**
LOS†	12.5 (13.8)	11 (17)	0.512
ICU†	4 (8.02)	4 (11)	0.625
Ventilator days †	2 (4)	2 (6)	0.692
First surgery being a damage control surgery	24 (72.7)	168 (47.3)	0.009
Discharged with Ostomy	23 (69.7)	27 (7.3)	**< 0.001**
Ostomy reversed ‡	11 (47.8)	17 (63)	0.430
Readmission*	15 (48.4)	32 (9.1)	**< 0.001**
Reoperation	13 (39.4)	43 (11.6)	**< 0.001**
Mortality*	2 (6.1)	20 (5.4)	0.698

* Fisher's exact test; †Non-parametric Wilcoxon rank-sum test was used expressed with median

Table 1. Patient presentation and outcome of the whole cohort

Quick Shot #20
January 19, 2023
9:39 am

A WTA MULTICENTER COMPARISON OF MESH VERSUS NON-MESH REPAIR OF BLUNT TRAUMATIC ABDOMINAL WALL HERNIAS

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Objectives: Blunt traumatic abdominal wall hernias (TAWH) occur in <1% of trauma patients but cause significant morbidity and mortality. Optimal repair techniques, such as mesh reinforcement, have not been studied in detail. We hypothesize that mesh use will be more common in larger TAWH and associated with increased surgical site infections (SSI).

Methods: A secondary analysis of the WTA TAWH multicenter study was performed. Patients who underwent TAWH repair during initial hospitalization (01/2012-12/2018) were included. Patients repaired after initial hospitalization were excluded. Mesh repair patients were compared to primary repair patients (non-mesh). A logistic regression was conducted to assess risk factors for SSI.

Results: 157 patients underwent TAWH repair during index hospitalization. Mesh was used in 51 (32.5%) patients, with 24 (45.3%) synthetic and 29 (54.7%) biologic placed. Flank hernias had a higher rate of mesh repair compared to rectus hernias (40.0% vs. 22.3%, p=0.038). 26 (16.6%) patients underwent mesh placement with bowel resection. Mesh patients were more commonly smokers (43.1% vs. 22.9%, p=0.016) and had a larger defect size (12.6 vs. 9.1 cm, p=0.016). Mesh repair patients less frequently had primary fascial closure (43.1% vs. 93.4%, p<0.001). Mesh patients had a higher rate of SSI (25.5% vs. 9.5%, p=0.016) compared to non-mesh patients, but had a similar rate of recurrence (13.7% vs. 10.5%, p=0.742), hospital length of stay (LOS), and mortality. Mesh use and higher ISS remained significant risk factors for SSI in a multivariable model.

Conclusions: Mesh was used more frequently in flank TAWH and those with a larger defect size. Mesh use was associated with a higher incidence of SSI and did not reduce the risk of hernia recurrence. When repairing TAWH mesh should be employed judiciously, and prospective randomized studies are needed to identify clear indications for mesh use in TAWH.

	Univariable			Multivariable		
Variable	OR	95% CI	p-value	OR	95% CI	p-value
Mesh use	3.250	1.313-8.043	**0.011**	1.056	1.011-1.104	**0.015**
Higher ISS	1.051	1.017-1.086	**0.003**	3.560	1.163-10.900	**0.026**
Larger defect size (cm)	1.061	1.003-1.121	**0.039**	1.824	0.550-6.054	0.326
Bowel resection	3.321	1.278-8.626	**0.014**	1.009	0.942-1.080	0.805

OR: odds ratio, CI: confidence interval, ISS: injury severity score

Univariable and multivariable binary logistic regression for risk factors influencing SSI in TAWH repair