Session I: Plenary Papers 1-8
Paper 1: 8:45 AM - 9:05 AM

CHILLING THE NERVE, EASING THE PAIN: A RANDOMIZED CLINICAL TRIAL EVALUATING SURGEON-ADMINISTERED BEDSIDE PERCUTANEOUS CRYONEUROLYSIS FOR RIB FRACTURE PAIN

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Stanford University, Stanford
Invited Discussant: Fredric Pieracci, MD, MPH

Introduction: A cornerstone of rib fracture management is multimodal pain control, which includes scheduled non-opioid analgesics, as-needed opioids, regional or neuraxial blockade, and surgical stabilization of rib fractures (SSRF). Yet, these modalities have limitations and side effects, limiting use in all patients. Surgeon-administered, ultrasound-guided percutaneous cryoneurolysis performed at the patient bedside is a promising analgesic adjunct.
Methods: We performed a prospective, randomized clinical trial assessing additive benefit of surgeon-administered percutaneous cryoneurolysis to our existing multimodal rib fracture pain control bundle (Standard of Care [SoC]) for injured adults aged 18-64y. Patients with fractured ribs 3-9 were randomized within 72 hours of admission to receive either surgeon-administered, ultrasound-guided percutaneous cryoneurolysis at the bedside and our multimodal pain control bundle, or SoC alone. Patients undergoing SSRF were excluded. The primary outcome was pain score at discharge. Secondary outcomes included hospital length of stay, intervention-associated adverse events, morphine milligram equivalent (MME) use, Glasgow Outcome Score, SF-12, and McGill Pain Score (PROs) which were assessed at discharge and 1-, 3-, and 12-month intervals after discharge.
Results: Thirty-nine patients were randomized; 20 in the intervention arm and 19 in the SoC arm. Median age was 53 (interquartile [IQR] range 44,60), 9 (23%) patients were female, median injury severity score was 14 (IQR 10,17), and median number of rib fractures was 6 (IQR 4,8). Patients were well matched with no differences between groups. No intervention-associated adverse events were identified. Pain scores and MME use at discharge were not statistically different between groups, nor were pain scores, MME use, and PROs at 1-month. Among intervention patients, pain scores and MME use significantly decreased between discharge and 1-month follow-up (median (IQR) pain intensity: 7 (6, 7) to 3 (1, 6), $p < 0.001$; median (IQR) MME: 50 (15, 50) to 0 (0, 15), $p = 0.001$).
Conclusion: Application of surgeon-administered, ultrasound-guided percutaneous cryoneurolysis is safe and was associated with a significant decrease in both pain and daily narcotic usage.

Session I: Plenary Papers 1-8
Paper 2: 9:05 AM - 9:25 AM

SPLENIC ARTERY EMBOLIZATION IS ASSOCIATED WITH SPLENIC SALVAGE EVEN WHEN ANGIOGRAPHY IS NEGATIVE: AN AAST MULTI-INSTITUTIONAL STUDY

Rachel Yoo, MD; Adrian Ong, MD; Lucas Canaan, DO; Daniel Cullinane, MD; Pascal Osi Udekwu, MBBS, MBA/MHA; Lewis Jacobson, MD FACS; Lindsey L. Perea, DO, FACS; Christine Castater, MD, MBA; Christine T. Trankiem, MD, FACS; Brennan Gagen, MD; Erik Teicher, MD; Carolyn Cook, MD; Grace Chang, MD FACS; Richard Lewis, MD; Jonathan Martin, MD
Reading Trauma Center, Tower Health, West Reading
Invited Discussant: Lara Senekjian, MD

Introduction: While positive findings on splenic angiography (SA) require splenic artery embolization (EMB) after blunt trauma, whether EMB is indicated when SA is negative remains controversial. We hypothesize that prophylactic EMB is associated with splenic salvage in patients with negative SA.

Methods: 19 level 1 and 2 trauma centers participated in this retrospective trial. Blunt trauma patients who presented within 48 hours of injury and who underwent both computed tomography (CT) and SA from 2018 to 2023 were included. The primary endpoint was splenectomy within 30 days from admission. SA was categorized as positive/negative based on prespecified criteria. Patients with negative SA who underwent EMB were compared to those with negative SA who did not have EMB. A p value < 0.05 was considered significant.

Results: 686 patients were included of which 316 (46.1%) had a negative SA. 274 (86.7%) with a negative SA had AAST Organ Injury Scale (OIS) grades 3-5 injuries. 257 (81.3%) had EMB and 59 did not. Of the EMB patients, 199 (77.4%) had proximal or proximal and distal (segmental) EMB, and 58 had distal (segmental) EMB only. Compared to EMB patients, patients without EMB had lower OIS grades (median, 3 vs 4, $p< 0.001$), similar Injury Severity Scores (ISS), age, time to SA and arrival systolic blood pressure (SBP). Crude 30-day splenectomy rates for EMB vs no EMB were 5.8% vs 18.6% ($p=0.003$). Adjusted for arrival SBP, age, OIS grade and ISS, EMB was associated with a reduced risk of splenectomy (hazard ratio [HR] 0.28, 95% confidence interval [CI] 0.12-0.67, $p=0.004$). Repeat SA rates (EMB vs no EMB: 1.2% vs 1.7%, $p=0.57$) and rates of complications requiring surgical or radiologic interventions (EMB vs no EMB: 1.5% vs 0%, $p= 0.41$) were similar.

Conclusion: EMB is associated with increased splenic salvage after negative angiography. Prophylactic EMB should be considered even when SA is negative.

Session I: Plenary Papers 1-8
Paper 3: 9:25 AM - 9:45 AM

WHAT'S A TRAUMA SURGEON WORTH? A 2025 RE-EXAMINATION OF THE QUESTION POSED IN 2000

Melissa Kendall, MD; Tyler Zander, MD;
Emily Grimsley, MD; Rachel Wolansky, MD; David Anderson, MBA;
Jospeh Sujka, MD; Paul Kuo, MD
University of South Florida, Tampa
Invited Discussant: Angela Ingraham, MD, MS

Introduction: We compare valuation of trauma subspecialties including Critical Care Intensivist (CC), Orthopedic Trauma Surgery (OT), General Surgery (GS), and Trauma Surgery (TS).
Methods: Total Clinical Compensation (TCC), wRVU, and TCC/wRVU data were obtained from MGMA (2010, 2014, 2018, and 2022) for CC, OT, GS, and TS in academic (Ac) and non-Ac settings. Ac:non-Ac ratio for TCC/wRVU and wRVU was calculated to assess trends in compensation. Z-test compared mean TCC and TCC/wRVU between Ac vs. non-Ac each year for all specialties.
Results: In 2022, Ac:non-Ac TCC/wRVU < 1 and Ac:non-Ac wRVU >1 for all specialties. Average TCC was greater in non-Ac GC and non-Ac TS across all years ($p < 0.01$). (Table 1) Average TCC/wRVU was greater in non-Ac TS for all years except 2018, although not statistically significant. (Table 2)
Conclusion: Compared to other specialties in the trauma field, Ac TS consistently generated more wRVU, earned less per wRVU, and received less TCC than non-Ac TS. The worth of an Ac TS is not adequately reflected in their compensation.

Table 1: Mean TCC Ac vs Non-Ac

Specialty	Year	Ac	Ac TCC	Non-Ac	Non-Ac TCC	Mean Difference	Confidence Interval	p-value
CC	2010	n=72	$316,458 (111,854)	n=99	$326,070 (140,383)	$9,612.00	[(28,233.40) - (47457.4)]	0.62
	2014	n=36	$304,331 (106,451)	n=251	$407,349 (128,069)	$103,018.00	[(64804.64) - (141231.36)]	<0.01
	2018	n=247	$351,839 (129,248)	n=559	$432,163 (163,160)	$80,324.00	[(59282.09) - (101365.91)]	<0.01
	2022	n=257	$380,173 (138,470)	n=876	$488,739 (171,416)	$108,566.00	[(88182.98) - (128949.02)]	<0.01
OS	2010	n=62	$429,924 (151,732)	n=43	$609,614 (168,308)	$179,690.00	[(72031.36) - (133594.64)]	<0.01
	2014	n=49	$551,747 (150,552)	n=83	$644,164 (251,916)	$92,417.00	[(52187.77) - (116910.23)]	<0.05
	2018	n=57	$642,907 (216,872)	n=102	$700,899 (194,347)	$57,992.00	[(75313.71) - (127354.29)]	0.09
	2022	n=68	$719,205 (286,373)	n=166	$751,768 (279,658)	$32,563.00	[(48396.43) - (97005.57)]	0.42
GS	2010	n=312	$308,125 (145,741)	n=1008	$368,108 (141,724)	$59,983.00	[(116783.06) - (242596.94)]	<0.01
	2014	n=230	$352,184 (182,528)	n=1413	$429,923 (179,908)	$77,739.00	[(23756.32) - (161077.67)]	<0.01
	2018	n=356	$356,261 (142,176)	n=1800	$459,435 (171,624)	$103,174.00	[(9,775.55) - (125759.55)]	<0.01
	2022	n=251	$423,720 (137,834)	n=2182	$501,940 (207,462)	$78,220.00	[(47,705.12) - (112831.12)]	<0.01
TS	2010	n=139	$329,342 (112,909)	n=134	$432,155 (144,085)	$102,813.00	[(41596.09) - (78369.91)]	<0.01
	2014	n=137	$381,452 (133,932)	n=156	$466,001 (148,665)	$84,549.00	[(52352.59) - (103125.41)]	<0.01
	2018	n=167	$401,532 (137,528)	n=348	$502,866 (148,051)	$101,334.00	[(86392.85) - (119955.15)]	<0.01
	2022	n=183	$468,308 (131,120)	n=555	$541,009 (182,208)	$72,701.00	[(59074.57) - (97365.43)]	<0.01

Data presented as mean (standard deviation).

Table 2: Mean TCC/wRVU Ac vs. Non-Ac

Specialty	Year	Ac	Ac TCC/wRVU	Non-Ac	Non-Ac TCC/wRVU	Mean Difference	Confidence Interval	p-value
CC	2010	n=23	$72.33 (95.04)	n=77	$73.67 (34.88)	$1.34	[(40.96) - (38.28)]	0.95
	2014	n=6	*	n=180	$99.61 (35.44)	*	*	*
	2018	n=75	$88.07 (47.33)	n=199	$52.51 (21.18)	$35.56	[(24.45) - (46.67)]	<0.01
	2022	n=67	$119.61 (57.47)	n=544	$126.44 (94.59)	$6.83	[(22.72) - (9.06)]	0.40
OS	2010	n=20	$52.36 (14.43)	n=35	$77.50 (22.30)	$25.14	[(34.87) - (15.41)]	<0.01
	2014	n=32	$64.25 (12.18)	n=53	$75.32 (21.19)	$11.07	[(18.17) - (3.97)]	<0.01
	2018	n=33	$75.87 (26.93)	n=31	$76.32 (27.60)	$0.45	[(13.82) - (12.92)]	0.95
	2022	n=42	$80.80 (30.11)	n=116	$86.86 (30.80)	$6.06	[(16.75) - (4.63)]	0.27
GS	2010	n=95	$75.61 (136.07)	n=766	$57.06 (29.86)	$18.55	[(8.89) - (45.99)]	0.19
	2014	n=74	$56.55 (23.82)	n=987	$68.62 (32.97)	$12.07	[(17.87) - (6.27)]	<0.01
	2014	n=164	$68.39 (34.16)	n=470	$71.54 (25.10)	$3.15	[(8.85) - (2.55)]	0.28
	2014	n=99	$76.02 (34.09)	n=1444	$82.56 (51.73)	$6.54	[(13.77) - (0.69)]	0.08
TS	2014	n=36	$44.89 (20.47)	n=87	$89.54 (61.61)	$44.65	[(59.22) - (30.08)]	<0.01
	2014	n=57	$51.51 (23.43)	n=73	$78.56 (32.35)	$27.05	[(36.65) - (17.45)]	<0.01
	2014	n=80	$58.52 (22.38)	n=86	$52.11 (21.75)	$6.41	[(0.31) - (13.13)]	0.06
	2014	n=102	$68.59 (28.22)	n=399	$104.48 (55.66)	$35.89	[(43.62) - (28.16)]	<0.01

Data presented as mean (standard deviation). *Indicates unknown values.

Session I: Plenary Papers 1-8
Paper 4: 9:45 AM – 10:05 AM

ANTI-IMPULSE THERAPY FOR BLUNT THORACIC AORTIC INJURY: DOES IT AFFECT OUTCOMES IN PATIENTS WITH CONCOMITANT TRAUMATIC BRAIN INJURY?

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Cherrie Abraham, MD; Martin Schreiber, MD, FACS, FCCM;
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Invited Discussant: Louis Magnotti, MD

Introduction: Traumatic brain injury (TBI) and blunt thoracic aortic injury (BTAI) are leading causes of death in trauma patients. Mortality for patients with concomitant TBI and BTAI approaches 25%. Conflicting blood pressure (BP) management goals for TBI (higher BP) and BTAI (lower BP) create a therapeutic conundrum when treated concomitantly. Anti-impulse therapy (AIT) with antihypertensive medications has been shown to safely and effectively reduce the risk of injury extension in low-grade BTAI. However, there is limited information on its effect on outcomes in patients with concomitant TBI/BTAI.
Methods: An international prospective multicenter registry was used to identify adult blunt trauma patients 2006 – 2022. Primary outcomes included in-hospital mortality, 30-day mortality, aortic related mortality (ARM), operative intervention rates and complications. Outcomes were compared between patients with BTAI alone to those with TBI/BTAI, relative to receiving AIT.
Results: 1,276 BTAI patients were identified. Overall, compared to patients not treated with AIT, those treated with AIT had a lower rate of in-hospital mortality (8.1% versus 24.7%, $p< 0.001$) and a lower rate of aortic related in-hospital mortality (16.7% versus 53.0%, $p< 0.001$). A lower rate of laparotomy (16.2% versus 21.1%, $p=0.025$) and median ventilator days (1 versus 2, $p< 0.001$) was also identified in AIT patients. 315 patients (24.7%) had concomitant TBI and BTAI, of which 36 (23.8%) were treated with AIT. Patients with concomitant TBI/BTAI treated with AIT were 0.46 times less likely to have in-hospital mortality than those who were not treated with AIT [OR 0.46(0.28,0.75)]. Patients undergoing AIT with concomitant TBI/BTAI had a higher rate of in-hospital mortality ($p< 0.001$) and a lower rate of postoperative vasopressors utilized ($p< 0.001$) compared to patients with BTAI alone. Patients with concomitant TBI/BTAI treated with AIT had a lower likelihood aortic related in-hospital mortality [OR 0.16(0.06,0.43)] and of undergoing laparotomy [OR 0.49(0.06,0.43)] compared to those not treated with AIT. There was no significant difference in likelihood of 30-day mortality, craniotomy or ischemic stroke.
Conclusion: TBI occurred in approximately 25% of patients with a BTAI; 23.8% were treated with AIT. AIT significantly reduced mortality in BTAI alone as well as in concomitant TBI/BTAI patients. AIT was also associated with lower likelihood of aortic related in-hospital mortality, postoperative vasopressor usage, and laparotomy. These findings suggest that AIT is beneficial compared to no AIT in BTAI patients, even when they present with TBI.

Session I: Plenary Papers 1-8
Paper 5: 10:05 AM – 10:25 AM

ACUTE TRAUMATIC PAIN TREATMENT WITH KETAMINE DECREASED PTSD AND ANXIETY SYMPTOMS 6 MONTHS POST HOSPITAL DISCHARGE

Colleen M. Trevino, PhD; Thomas Carver, MD; Carissa Tomas, PhD; Margo Mantz-Wichman, BSN; Terri deRoon-Cassini, PhD
Medical College of Wisconsin, Milwaukee
Invited Discussant: Adil Haider, MD, MPH

Introduction: Chronic pain, anxiety, depression, and posttraumatic stress disorder (PTSD) are frequently seen after traumatic injury. Ketamine infusions used to treat acute pain may decrease the risk of chronic pain and improve psychological outcomes of injured patients. We hypothesized patients receiving ketamine would have a lower incidence of chronic pain, anxiety, depression, and PTSD.
Methods: A prospective, randomized, double-blind placebo-controlled trial of severely injured (ISS ≥15) adult patients (age 18-64) admitted to a Level 1 trauma center was conducted. Exclusion criteria also included pregnancy, and chronic opiate use. All patients were prescribed a patient-controlled analgesia in addition to being randomized to either adjustable dose ketamine (ADK) starting at 3 mcg/kg/min or an equivalent rate of 0.9% normal saline. Quality of life (QoL) outcomes were measured using the Depression and Anxiety (DASS-21), PTSD (PCL-5), Trauma quality of life (TQOL), and pain (BPI-SF) questionnaires, which were performed at hospitalization, and 1-, 3-, and 6-months post discharge. Linear regression was used to evaluate the relationship between groups and baseline pain and mental health outcomes at each follow-up.
Results: Forty-four of 82 patients (54%) were randomized to ADK. Both groups were similar in demographics, injury mechanisms/severity, and baseline QOL measures. Patients in the ketamine group had significantly less anxiety symptom severity ($p < .05$) and PTSD ($p < .05$), with significantly less re-experiencing symptoms (subscale of PTSD) at 3 and 6 months ($p < .05$).
Conclusion: Ketamine infusion for acute pain treatment in severe traumatic injury may significantly reduce anxiety and PTSD 6 months after injury. This effect may be specific to the memory processes responsible for re-experiencing symptoms, such as nightmares and flashbacks. Further research is needed to explore the effects of acute ketamine administration on the neurobiological mechanisms implicated in the development of PTSD, as this could be a novel preventative intervention to improve QoL for injured patients.

Session I: Plenary Papers 1-8
Paper 6: 10:25 AM – 10:45 AM

ENDOTHELIAL PROTEIN C RECEPTOR RS867186 VARIANT ALLELE IS ASSOCIATED WITH PULMONARY EMBOLISM IN BLEEDING TRAUMA PATIENTS

Joseph D. Krocker, MD, MS; Madeline E. Cotton, BS;
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Charles S. Cox, Jr., MD; Jessica C. Cardenas, PhD; Charles E. Wade, PhD
University of Texas Health Science Center, Houston
Invited Discussant: M. Margaret Knudson, MD

Introduction: Pulmonary embolism (PE) remains a leading cause of potentially preventable death following traumatic injury. The endothelial protein C receptor (PROCR) missense single nucleotide polymorphism (SNP) rs867186 has been associated with elevated circulating soluble PROCR and a hypercoagulable state. Our study evaluates the influence of rs867186 on PE development in a cohort of bleeding trauma patients.

Methods: Trauma subjects requiring the highest level of activation, blood transfusion and with base excess < -4 were eligible for the study. Real-time PCR was used to genotype subjects for PROCR rs867186 and other common heritable risk factors for PE including factor V Leiden, prothrombin G20210A mutation and sickle cell disease.

Results: 623 trauma subjects had adequate DNA for rs867186 genotyping. 33 subjects developed PE of whom 9 (27%) carried a variant PROCR rs867186 allele and 3 (9%) carried a common heritable PE risk factor. rs867186 variant subjects were more likely to develop PE (10%) compared to wild type (5%; P=0.04) and this association persists in time to PE analysis (P=0.03) and when controlling for demographics and injury characteristics (P=0.04). Further, variant rs867186 was associated with shorter thromboelastography reaction-time (P=0.04) and activated clotting time (P=0.04).

Conclusion: We identify an endothelial protein SNP associated with a hypercoagulable profile and PE within a bleeding trauma cohort. These findings suggest that genetic predisposition is a significant driver of PE development following trauma and that the SNPs primarily responsible for this prothrombotic phenotype are specific to the pathophysiology of hemorrhage, shock and endotheliopathy rather than the common heritable thrombophilias.

Session I: Plenary Papers 1-8
Paper 7: 10:45 AM - 11:05 AM

EFFECTIVENESS OF PRE-EMPTIVE TARGETED MUSCLE REINNERVATION IN DECREASING THE POSTAMPUTATION PAIN IN AN ACUTELY INJURED PATIENTS UNDERGOING ABOVE KNEE AMPUTATION

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Junaid Alam, MBBS, MS; Sushma Sagar, MBBS, MS, FACS;
Subodh Kumar, MS, FACS; Pratyusha Priyadarshini, MS;
Maroof A. Khan, MBBS, MD; Rajesh Sagar, MBBS, MD; Nida Mir, MSC
All India Institute of Medical Sciences, New Delhi
Invited Discussant: Krista Kaups, MD, MSc

Introduction: Post-amputation pain in amputees is a major cause of morbidity. Recent studies have highlighted the impact of pre-emptive surgical intervention of the amputated nerves for the prevention and treatment of post-amputation pain. In this study, we aimed to analyze the role of Targeted muscle reinnervation (TMR) at the time of limb loss in addressing both residual limb pain (RLP) and phantom limb pain (PLP).
Methods: In this open RCT, an acutely injured patients with lower extremity trauma undergoing above-knee amputation were randomized into two groups i.e. group A with TMR (Intervention) and group B with conventional stump formation (Control) at the time of amputation using simple mixed block randomization. The primary outcome analysis for the assessment of postoperative residual limb pain (RLP) and phantom limb pain (PLP) at five-time points postoperatively viz. 48 hours, 2nd , 4th , 8th , and 12th weeks were done using the Numerical Rating Scale (NRS) for RLP and PLP. To assess the psychological status with respect to post-amputation pain the Hospital Anxiety and Depression Scale (HADS) and McGill pain questionnaire and PROMIS scores were used.
Results: The majority of the patients were males (n=92, 94.8%) with median age of 30 years with IQR of 24-43. The mean MESS score was comparable (p=0.98) between the groups. The mean NRS of the residual limb pain (1.8 vs 3.3) and phantom limb pain (1.2 vs 2.6) were statistically different between the two groups (p-value of 0.001). The psychological scores HADS, McGill pain questionnaire and PROMIS scores were found to be statistically significant.
Conclusion: The pre-emptive surgical intervention of amputated nerve at the time of amputation by TMR techniques significantly reduces the postoperative residual limb pain and phantom limb pain.

Session I: Plenary Papers 1-8
Paper 8: 11:05 AM - 11:25 AM

THE COST OF DELAY: EVALUATING THE EFFECTIVENESS OF TIERED OPERATING ROOM POSTINGS ON PATIENT OUTCOMES

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Wake Forest Baptist Medical Center, Winston-Salem
Invited Discussant: Terence O'Keeffe, MD

Introduction: Most centers utilize a tiered operating room (OR) posting system. This system is based on patient physiology and the potential for deterioration of their condition due to the pathology that requires operative intervention. If those criteria are respected, then meeting those time goals should result in better patient outcomes. We sought to determine the effect of patients meeting the time goals within the tiered posting systems on patient outcomes.
Methods: A retrospective review at a single academic center was performed on all patients posted for the OR by the acute care surgery (ACS) service over a 9-year period. Elective cases were excluded. The posting system was E48, E24, E12, E4, E2, E1 which designated Emergent and the number of hours they were to go to the OR after posting. Only the index surgery each admission was considered.
Results: There were 7520 patients. The 30-day mortality was significantly higher in the patients who did not meet the posting goal (8.7% versus 6.4%, $p< .001$). In a regression analysis controlling for age and Charlson Comorbidity Index, failure to reach the OR in a timely fashion remained an independent predictor of death (OR=1.3, 95% CI [1.1, 1.7], p=.005)
Conclusion: ACS care is predicated on timely intervention. Tiered OR posting systems are intended to get patients to the OR to achieve early source control and prevent further deterioration. There is a price to pay when those goals are not reached with an increased risk of death.

Session IIIA: Papers 9-18
Paper 9: 2:10 PM - 2:30 PM

A 2-GRAM BOLUS OF TXA IN PATIENTS WITH MODERATE OR SEVERE TBI MAY BE PROTECTIVE IN MALES BUT NOT IN FEMALES

Dominic Montas, MS; Robert L. Medcalf, PhD;
Christopher Barrett, MD; Rachel Nordgren, PhD; Zachary Newman, BS;
Pierce Pramuka, BS; Claire Barbosa, BS; William I. McKinley, MD;
Alex Valadka, MD; Linda Papa, MD, MSc;
Martin Schreiber, MD, FACS; Susan Rowell, MD, MBA
The University of Chicago
Invited Discussant: Lisa Knowlton, MD, MPH

Introduction: Two trials have shown that tranexamic acid (TXA) decreases mortality overall in patients with traumatic brain injury (TBI), however, which patients are most likely to benefit remains unclear. In animal models, TXA reduces blood-brain barrier (BBB) breakdown and improves motor function in males while increasing BBB permeability and intracranial hemorrhage (ICH) in females. We examined the association between TXA and mortality separately in males and females with moderate or severe TBI.
Methods: This is a secondary analysis of the Prehospital TXA for TBI trial that randomized patients prehospital setting with moderate or severe TBI to placebo, 1-g TXA bolus + 1-gram 8-hr TXA infusion (1/1g), or 2-gram TXA bolus (2g) within 2 hours of injury. Patients with ICH on initial head CT were included. Logistic regression models were created for males (M) and females (F) to assess the association between TXA administration, sex, and 28-d mortality adjusting for age, Glasgow Coma Scale (GCS) score, Head Abbreviated Injury Scale, Injury Severity Score, and Marshall Score.
Results: Of 966 patients in the parent trial, 545 had ICH (405 M, 140 F). Baseline patient characteristics were similar between groups with the exception of median age (M=36y vs F=53y, p=0.001) and GCS (M=6 vs F=7, P=0.02). Overall, 2g was associated with decreased 28-d mortality compared to placebo (OR=0.46, CI: 0.22-0.94, p=0.03). When comparing male and female subjects to their placebo counterparts, 2g was associated with decreased 28-d mortality in M (OR=0.41, CI: 0.17-0.96, p=0.04) but not F (p=0.5). No associations were observed between 1/1g and placebo.
Conclusion: These results are consistent with animal studies suggesting TXA is beneficial in males but not females. The decrease in mortality observed in patients with moderate or severe TBI who receive a 2g bolus of TXA within 2 hours of injury appears to be driven entirely by males.

Session IIIA: Papers 9-18
Paper 10: 2:30 PM - 2:50 PM

TXA AFTER SEVERE TBI: BENEFITS IN LEARNING AND MEMORY PROMINENT IN MALES, LESS PERVASIVE IN FEMALES

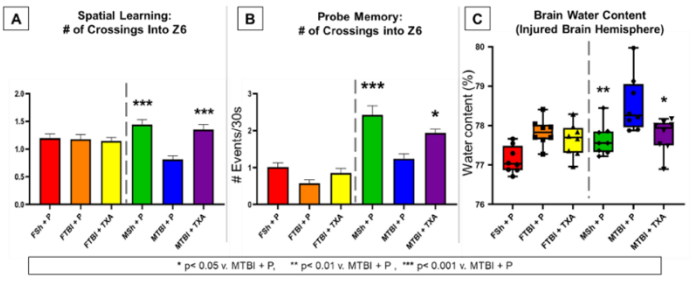
Patricia Santos Carlin, MD; Lewis Kaplan, MD, FACS; Emilie Katz, BA; Alexandra Kauffman, BS; Michael Coons, BA; Priyanka Bele, MD; Matthew Culkin, BS; Anastasia Georges, MS; Daunel Augustin, MS; David Meaney, PhD; Douglas Smith, MD; Gary Bass, MD, MSc, MBA, MRCSI; Jose Pascual L, MD, PhD, FACS
University of Pennsylvania
Invited Discussant: Susan Rowell, MD, MBA

Introduction: Despite common use, post-TBI tranexamic acid (TXA) may only benefit males. TXA appears to preserve blood brain barrier integrity after TBI, but this solely occurs in male animals. We hypothesized that TXA unequally affects male and female learning and memory post-TBI.

Methods: CD1 male (M, n=24) and female (F, n=24) mice underwent controlled cortical impact (TBI) or sham craniotomy (Sh), receiving either TXA (60mg/kg) or saline (placebo, P) i.v., 1-hour later. For 14 days, mice underwent Morris water maze testing where improved learning/memory was indicated by traveling a shorter distance / reach or cross into target zones with greater frequency (Z1 - platform quadrant, Z5 - platform, Z6, Z7 -concentric peri-platform zones). Brains were collected for tissue water content.

Results: Post-TBI TXA improved male spatial **learning** (crossing frequency into Z6 (Fig A) & Z7 ($p<0.01$); latency to Z1 ($p<0.01$), Z5 ($p<0.01$), Z6 ($p<0.01$) & Z7 ($p<0.01$)). TXA improved female **learning** solely in one parameter (Z7 latency; $p<0.01$). TXA improved male **memory** (frequency into Z5 ($p=0.02$) & Z6 (Fig B); duration in Z1 ($p=0.01$) & Z7 ($p=0.04$); swimming velocity ($p<0.01$)). In females, TXA improved **memory** solely in one parameter (Z1 duration; $p=0.02$). TXA reduced only male cerebral edema (Fig C).

Conclusion: Post-TBI TXA benefits males more than females. TBI should be studied separately in males and females to identify sex-specific mechanisms of injury & recovery.



Session IIIA: Papers 9-18
Paper 11: 2:50 PM - 3:10 PM

PREHOSPITAL TRANEXAMIC ACID BOLUS IMPROVES OUTCOMES IN TRAUMATIC BRAIN INJURY: A BAYESIAN REANALYSIS OF THE PREHOSPITAL TXA FOR TBI TRIAL

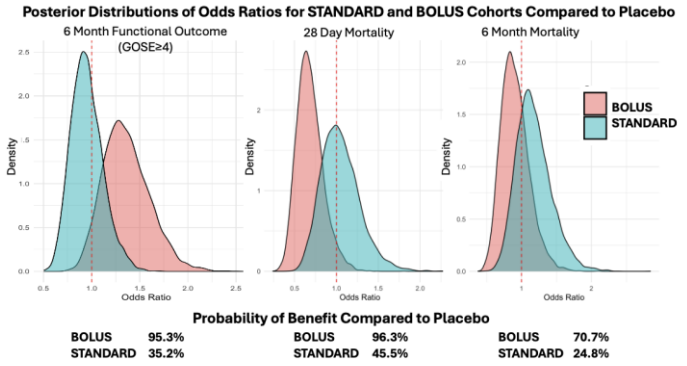
Daniel Lammers, MD; James Williams, MD;
Reynold Henry, MD, MPH; Matthew Eckert, MD, MHPE;
Jan Jansen, MBBS, PhD; Martin Schreiber, MD;
John B. Holcomb, MD, FACS; Susan Rowell, MD, MBA
University of North Carolina
Invited Discussant: Christopher Barrett, MD

Introduction: Despite two large randomized controlled trials evaluating the effectiveness of prehospital tranexamic acid (TXA) in patients with traumatic brain injuries (TBI), the optimal dosing strategy remains uncertain. We sought to assess the impact of infusion and bolus administration on functional and mortality outcomes, using Bayesian techniques.

Methods: We performed a post hoc analysis of the Prehospital TXA for TBI RCT where TBI patients received TXA as a 1-gram bolus followed by a 1-gram infusion (STANDARD), 2-gram bolus (BOLUS), or placebo. Bayesian regression models were created to assess the association of early TXA administration in TBI patients using posterior probabilities for 6-month functional outcomes, as well as 28 day and 6-month mortality.

Results: Patients receiving TXA (STANDARD or BOLUS) displayed a 78.1% probability of having improved functional outcomes at 6 months compared to placebo. When comparing STANDARD and BOLUS dosing strategies versus placebo, the BOLUS cohort demonstrated posterior probabilities consistent with improved benefit for 6-month functional outcomes, 28day mortality, and 6-month mortality (Figure).

Conclusion: The 2gm TXA bolus dosing strategy demonstrated a high probability of benefit compared to both placebo and STANDARD cohorts for functional and mortality outcomes in TBI patients.



Session IIIA: Papers 9-18
Paper 12: 3:10 PM - 3:30 PM

TRANEXAMIC ACID BOLUS PLUS DRIP PARADOXICALLY INCREASES COMPLEMENT ACTIVATION: A PATCH TRIAL SECONDARY STUDY

Elizabeth R. Maginot, MD; Dominik F. Draxler, MD, PhD, MBA;
Ernest E. Moore, MD; Flobater I. Gawargi, PhD;
Hunter B. Moore, MD, PhD; Isabella M. Bernhardt, BA;
Collin M. White, BS; Miguel Matos, MD; Angela Sauaia, MD, PhD;
Martin Schreiber, MD; Reynold Henry, MD, MPH; Russell Gruen, PhD;
Robert L. Medcalf, PhD; Christopher Barrett, MD
University of Nebraska Medical Center
Invited Discussant: Jason Sperry, MD, MPH

Introduction: Multiple trials have found a survival benefit from early tranexamic acid (TXA) administration after polytrauma, but the early discrimination of the survival benefit observed (~10 minutes) has questioned if bleeding reduction is the primary mechanism. Plasmin is known to directly cleave and activate complement proteins, which generate marked inflammation, and TXA can inhibit plasmin generation. We hypothesized that polytrauma patients who received TXA would demonstrate less complement activation compared to placebo controls.
Methods: Patient plasma was obtained from N=56 polytrauma patients in the Emergency Department, at 8 hours and again at 24 hours after admission, who were enrolled in the PATCH randomized placebo-controlled trial of pre-hospital TXA (1g bolus + 1g drip over 8 hours) versus placebo. Complement multiplex was performed on plasma samples for activation and regulatory markers, and plasmin-antiplasmin (PAP) was measured via ELISA. Pairwise comparisons of analytes between TXA and placebo at each timepoint were performed. Significance was set at $p<0.05$.
Results: Median age was 40.5 (IQR 28-56), 71.4% were male, median ISS was 36 (24.5-50), and 94.6% were blunt mechanism. At early time points (ED and 8hrs) patients who received TXA did not demonstrate a reduction in C3a, C5a, sC5b-9 or PAP relative to placebo. At 24 hours, there was a significant increase in both C3a (274.0 vs 416.6ng/mL, $p=0.0024$) and C5a (9.4 vs 11.6ng/mL, $p=0.0462$) in the TXA group.
Conclusion: A 1g bolus + 1g drip of TXA does not reduce complement activation in trauma patients. Paradoxically, there was a significant increase in complement activation at 24-hours in the TXA group. Further studies are required to understand if previously hypothesized mechanisms, such as delayed urokinase release, and dosing regimen are responsible for this observation and may drive further discussion on optimal TXA dosing.

Session IIIA: Papers 9-18
Paper 13: 3:30 PM - 3:50 PM

A SMALL MOLECULE THERAPEUTIC TARGETING THE CHOLINERGIC ANTI-INFLAMMATORY PATHWAY ATTENUATES TRAUMA-INDUCED ACUTE LUNG INJURY

Keita Nakatsutsumi, MD, PhD; Wooil Choi, PhD; Matthew Heard, DO, MHS; Katie Pool, BS; Raul Coimbra, MD, PhD, FACS; Brian P. Eliceiri, PhD; Todd W. Costantini, MD, FACS
University of Minnesota
Invited Discussant: Anupamaa Seshadri, MD

Introduction: Acute lung injury (ALI) after trauma is associated with alveolar dysfunction that causes significant morbidity with limited treatment options. We have shown that AR-R17779 (AR), a small molecule agonist of the a7 nicotinic acetylcholine receptor highly expressed on macrophages, prevents lung edema in preclinical models of injury. The mechanism by which AR attenuates trauma-induced ALI is unknown. We hypothesized that AR decreases trauma-induced ALI by limiting macrophage activation and preventing lung epithelial glycocalyx breakdown.

Methods: C57BL/6 mice underwent a polytrauma model consisting of lung contusion and liver crush injury with cohorts treated with an intraperitoneal dose of AR (25 mg/kg) vs. vehicle after polytrauma. Lungs were harvested 24 hours post-injury for evaluation of ALI using histology and immunofluorescence of heparan sulfate (HS), a key component of the glycocalyx. In vitro co-culture studies were performed to assess the impact of AR on the activation of macrophages by LPS and its effects on the lung epithelial glycocalyx by immunoblotting, ELISA, and HS expression.

Results: AR attenuated polytrauma-induced histological ALI ($p<0.01$) and loss of HS from the lung epithelial glycocalyx ($p=0.04$). In vitro, AR dose-dependently suppressed STAT3 phosphorylation ($p<0.01$) and TNFa release ($p=0.04$) from LPS-treated macrophages. In co-culture studies, treating LPS-stimulated macrophages with AR decreased epithelial glycocalyx degradation compared to macrophages treated with LPS alone ($p=0.02$).

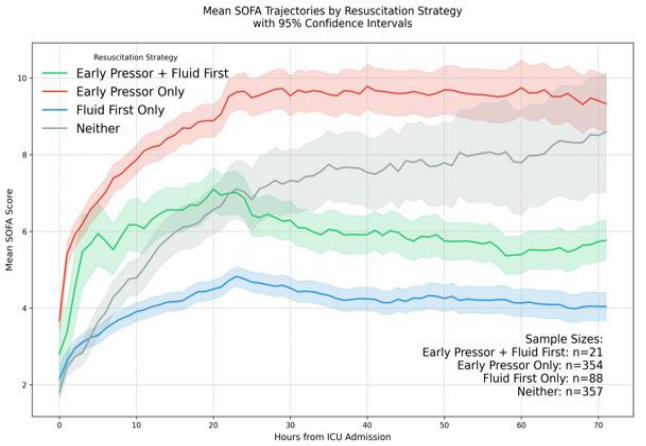
Conclusion: AR attenuated ALI by decreasing macrophage STAT3 signaling that prevented macrophage-induced lung epithelial glycocalyx breakdown. Future research should test AR as an adjunct to resuscitation aimed at limiting dysregulated macrophage activation and ALI after trauma.

Session IIIA: Papers 9-18
Paper 14: 3:50 PM - 4:10 PM

FLUID-FOCUSED RESUSCITATION ENHANCES ORGAN RECOVERY IN SEPTIC EGS PATIENTS: A TIME-VARYING ANALYSIS

Ellen Cohn, MD, MPH; Jessica Cao, MD; Rebecca S. Meltzer, MD; Robert C. Keskey, MD, PhD; Justin Hatchimonji, MD, MBE, MSCE; Kenneth Wilson, MD; John Alverdy, MD; Andrew J. Benjamin, MD
University of Chicago Medicine
Invited Discussant: Lena Napolitano, MD

Introduction: Septic patients undergoing emergency general surgery (EGS) procedures have unique physiology due to acute tissue injury and infection yet are underrepresented in large sepsis trials of early vasopressor initiation. Thus, optimal management of septic shock in EGS remains uncertain.
Methods: We retrospectively analyzed 820 EGS patients from the MIMIC-IV database using a time-varying marginal structural model to address hourly confounding in the ICU. Two strategies—early vasopressor initiation ("Early Pressor, EP") and a fluid-prioritizing approach ("Fluid First, FF")—were compared. Primary outcomes were 72-hour SOFA (Sequential Organ Failure Assessment) and ΔSOFA from baseline. Stabilized inverse-probability weights balanced baseline severity and evolving clinical parameters.
Results: Weighted regression showed that FF was associated with lower final SOFA and a smaller ΔSOFA (–2.17, $p<0.001$). EP had a significant positive effect on final SOFA (+1.30, $p<0.001$). Group-level analyses confirmed less organ dysfunction in FF.
Conclusion: In septic EGS patients, a fluid-first approach was linked to improved organ function recovery, suggesting that EGS sepsis may require a different resuscitation strategy than medical sepsis.

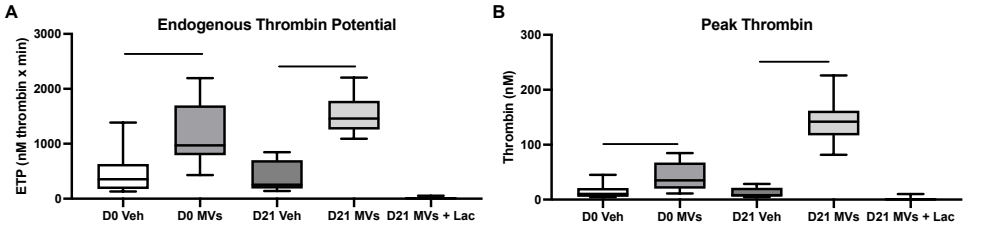


Session IIIA: Papers 9-18
Paper 15: 4:10 PM - 4:30 PM

MICROVESICLES IN STORED HUMAN WHOLE BLOOD INCREASE THROMBIN GENERATION VIA PHOSPHATIDYLSERINE

Lindsey Wattley, MD; Ryan Chae, MD; Rebecca Schuster, MS;
Michael Goodman, MD; Timothy Pritts, MD, PhD
University of Cincinnati
Invited Discussant: Andre Campbell, MD

Introduction: Whole blood storage leads to microvesicle (MV) release. The effect of these shed MVs on coagulation is poorly understood. We hypothesized that MVs produced during whole blood storage express phosphatidylserine (PS) and cause increased thrombin generation.
Methods: Whole blood was collected from 14 healthy donors (6 male, 8 female; 20-30 years old) and stored for 21 days. On day 0 and 21, MVs were quantified by cell origin and PS expression. Platelet poor plasma (PPP) was sampled during storage and thrombin generation determined via calibrated automated thrombogram. To determine the MV effect on thrombin generation, MVs from day 21 blood were added to PPP with and without lactadherin and assayed for changes in thrombin generation.
Results: There was a significant increase in PS expressing, platelet-derived MVs after 21 days of storage. Thrombin generation increased with storage duration. When MVs were added to plasma, thrombin generation was increased as evidence by increased endogenous thrombin potential (ETP; Figure A) and peak thrombin (Figure B). This effect was mitigated by blocking phosphatidylserine on MVs with lactadherin (lac; Figure).
Conclusion: Whole blood storage results in time-dependent increased thrombin generation. Our data suggest that changes in thrombin generation are due, in part, to PS expression on MVs shed during storage. These data highlight the need for clinical studies on the coagulability of stored versus fresh whole blood, particularly in the setting of massive transfusion.



Session IIIA: Papers 9-18
Paper 16: 4:30 PM - 4:50 PM

ROLE OF PEPTIDYLARGININE DEAMINASE 2 IN A MURINE MODEL OF TRAUMATIC BRAIN INJURY

Zaiba Dawood, MD; Marjorie Liggett, MD; Bowen Wang, PhD; Kaijie Zhang, MD; Guang Jin, MD, PhD; Wenlu Ouyang, MD; Daniel Couchenour, MD; Aleezeh Shaikh, BS; Kiril Chtraklin, DVM; Baoling Liu, MD, PhD; Dinesh Jaishankar, PhD; Yongqing Li, MD; Hasan Alam, MD
Northwestern University
Invited Discussant: Tanya Egodage, MD

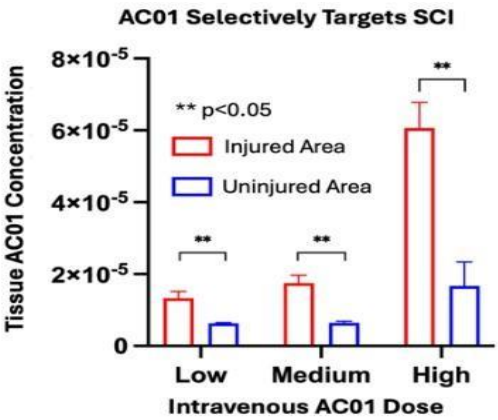
Introduction: Traumatic brain injury (TBI) is among the leading causes of death and disability worldwide. Studies have linked Peptidylarginine deiminases (PADs) with TBI outcomes. However, nonspecific PAD inhibition makes it difficult to decipher the exact role of specific PAD enzymes in neurotrauma. Since both PAD2 and PAD4 have been linked with neurodegeneration, we sought to clearly establish their roles in TBI.
Methods: Male mice (11-14 weeks) were subjected to controlled cortical impact TBI (n=5/group). Experimental groups included wildtype (WT), PAD2 knockout (PAD2-KO), PAD4 knockout (PAD4-KO), and PAD2/4 double knockout (PAD2/4-DKO). 24 hours post-TBI, frozen brain-sections were stained (Nissl and immunofluorescence) to determine lesion size and expression of PAD2 and PAD4. We also assessed the impact of PAD2-KO on neurologic severity scores (NSS, 1-8 days post TBI) and visuospatial learning using the Morris water maze test (MWM, 21-30 days post TBI).
Results: Overall, PAD2-KO and PAD2/4-DKO displayed significantly smaller brain lesion sizes than WT ($p= 0.005$ and 0.005 respectively) and PAD4-KO ($p= 0.005$ and 0.004 respectively). However, there was no significant difference in lesion size between PAD4-KO and WT ($p= 0.880$). Analysis of archived snRNA-seq data and immunofluorescence staining 24 hours post-TBI showed upregulation of PAD2 (primarily in astrocytes) in WT compared with sham ($P=0.048$), whereas PAD4 was undetectable. Guided by these results, we compared the neurological outcomes of WT with PAD2-KO TBI mice. Overall, PAD2-KO had a significantly lower NSS on post-injury days 1, 5 and 6 compared with WT TBI mice (all $P<0.05$). Moreover, MWM demonstrated that the cumulative noncued spatial learning was worse in WT compared with PAD2-KO ($p < 0.05$).
Conclusion: Our results suggest that PAD2, but not PAD4, blockade can improve outcomes following TBI, which justifies its exploration as a potential therapeutic target.

Session IIIA: Papers 9-18
Paper 17: 4:50 PM - 5:10 PM

INTRAVENOUS AC01 SELECTIVELY TARGETS INJURED SPINAL NEURONS AND DISPLAYS NEUROPROTECTIVE ACTION

Rachel Russo, MD, MS; Jose Castillo, MD; Chris Pivetti, MS;
Aijun Wang, PhD; UC Davis SCI Study Group
University of California, Davis Medical Center
Invited Discussant: Jose Pascual, MD, PhD

Introduction: AC01 is a homing protein that ferries nanotherapeutics to neuronal injury sites and has intrinsic neuroprotective effects in brain injury. This study evaluates AC01's biodistribution and therapeutic properties in spinal cord injury (SCI).
Methods: Neuroprotection was tested in vitro using human spinal neurons treated with increasing doses of AC01 or saline and exposed to staurosporine. Then, 24 rats with cervical SCI were injected with CY5-labeled AC01 at low (n=3), medium (n=3), or high doses (n=6) or CY5 saline (n=12) as controls. Biodistribution was tracked with LAGOS live imaging. Eighteen rodents were sacrificed after 24 hours, and six animals (3 high-dose and three controls) were sacrificed after 7 days. Organ imaging and histological analyses were performed; a dose-response curve was established. Neuronal degeneration was assessed via Fluoro-Jade C staining.
Results: In vitro, AC01 treatment led to a dose-dependent increase in neuron branching and length compared to controls. In vivo, immediate post-injection showed a broad distribution of CY5 and CY5-AC01, with CY5-AC01 accumulating at the SCI site one hour post-injury and remaining bound for up to 7 days. Higher doses resulted in greater accumulation and reduced cellular apoptosis and neuronal degeneration compared to controls.
Conclusion: Intravenously injected AC01 specifically binds to injured spinal neurons and provides dose-dependent neuroprotection, suggesting potential for use as an injectable treatment for SCI.



Session IIIA: Papers 9-18
Paper 18: 5:10 PM - 5:30 PM

DAILY STRESS FOLLOWING TRAUMATIC BRAIN INJURY INDUCES UNIQUE DIFFERENTIAL NEUROINFLAMMATORY GENE TRANSCRIPTION COMPARED TO INJURY ALONE

Letitia Bible, MD; Casey Wheeler; Kolenkode Kannan, PhD;
Philip Efron, MD; Robert Maile, PhD; Alicia Mohr, MD
University of Florida – Gainesville
Invited Discussant: Eric Ley, MD

Introduction: Traumatic brain injury (TBI) is a significant health burden often with long stays in the intensive care unit (ICU). We hypothesize that extended stress exposure, such as that seen during an ICU stay, leads to differential expression of genes related to neuronal death and astrocyte activation.
Methods: Male Sprague-Dawley rats (n=6/group) were divided into four groups: 1) TBI 1d underwent controlled cortical impact brain injury (CCI) with sacrifice 3hs later, 2) TBI 7d underwent CCI followed by 7 days of daily handling, 3) TBI/CRS 7d underwent CCI followed by daily chronic stress or 4) naïve underwent daily handling only. At sacrifice the brains were flash frozen, and later, RNA was isolated from the injured frontal lobe. The gene expression in the isolated RNA was evaluated using the 770 gene NanoString Neuroinflammation panel. The data was imported to ROSALIND (San Diego, CA) and analyzed using normalization, fold changes, and significance using criteria defined by NanoString. Significant differential expressed genes (sDEG) was defined if the fold change was ≥ 1.5 or ≤ -1.5 and p-value ≤ 0.05. These sDEG were selected for functional analysis using Qiagen Ingenuity Pathway Analysis.
Results: Following brain injury, we observed a number of unique sDEG. for example, 3hs following CCI (TBI 1d), 74 sDEG were identified compared to naïve animals. On day seven (TBI 7d), 115 sDEG genes are altered compared to the TBI 1d group. The addition of stress following TBI results in distinct gene expression within the brain involving astrocyte and microglial function as well as inflammation and cell death, many of which have their expression altered to increase cell death.
Conclusions: Daily stress following TBI results in gene expression changes associated with neuronal death and astrogliosis. Reducing this effect of stress may improve long term recovery outcomes following TBI.

Session IIIB: Papers 19-28
Paper 19: 2:10 PM - 2:30 PM

SCHEDULING THE ACS SURGEON: MINIMIZING ERROR RISK

Jane Cowan, MD
Yale
Invited Discussant: Jamie Coleman, MD

Introduction: Fatigue contributes to suboptimal human performance and increases risk of error. Military experiments on sleep deprivation led to the validated Sleep, Activity, Fatigue and Task Effectiveness (SAFTE) algorithm, which uses sleep data to predict risk of error and has been calibrated against blood alcohol level. We used the Fatigue Avoidance Scheduling Tool (FAST), which applies the SAFTE algorithm, to predict error risk in surgeons during in-house night call.
Methods: Two common night shift schedules were analyzed using the FAST application: a 24-hour call and 12-hour night shift under idealized pre-shift rest conditions (8 hours of sleep before the 24 hour and a 6-hour pre-call sleep period before the 12 hour shift), but without sleep during the shift. Time with performance predicted under 77% (equivalent to a blood alcohol level [BAL] of 0.05) and below 70% (BAL 0.08) was recorded.
Results: During a 24-hour call, predicted performance drops below 77% (BAL 0.05) at midnight and 70% (BAL 0.08) at 01:30; performance improves above 70% at 07:00, but not above 77%. Conversely, for a 12 hour night shift, predicted performance drops to but not below 77% (BAL 0.05) between 02:30 and 0:500.
Conclusion: Our analysis using the SAFTE model and FAST application shows that 24h shifts, a common practice in surgeon scheduling, likely include periods of significant performance impairment due to fatigue equivalent to alcohol intoxication. During a 24-hour shift without sleep, performance impairment is more severe and of longer duration than during a 12-hour night shift. However, this model assumes that the surgeon sleeps during the day before the night shift, a practice which may not be common.

Session IIIB: Papers 19-28
Paper 20: 2:30 PM - 2:50 PM

THE UNWRITTEN COST OF TRANSFER: SMALL BOWEL OBSTRUCTION TRANSFERS TO HIGHER LEVEL OF CARE LARGELY AFFECT SOCIOECONOMICALLY DISADVANTAGED PATIENTS

Annika Storey, DO; Maosong Ye, PhD; Carolina Chu, MS;
Jessie Chu, MD; Kevin Huang, MD; Adam Skibbe, MLA;
Colette Galet, PhD; Dionne Skeete, MD
University of Iowa Health Care
Invited Discussant: Joshua Brown, MD

Introduction: Small bowel obstruction (SBO) represents over 250,000 admissions annually with a 70% success rate of non-operative management (NOM). Patients are frequently transferred to tertiary care centers; yet many do not require advanced surgical interventions or resources. We evaluated factors associated with need for transfer for SBO at a tertiary care center, patient socioeconomic status, and success of NOM. We hypothesized that transfer to a tertiary care center is often unnecessary for SBO management and places additional financial and social stress on disadvantaged patients.
Methods: Adult patients transferred for SBO and evaluated by the EGS service from 1/1/2018 to 12/31/2022 were identified via ICD-10 codes and included. Patient demographics, comorbidities, socioeconomic status, referring center information and SBO management were collected. Referring institution's trauma center level was utilized as a proxy for available surgical services. The cohort was divided based on SBO management (NOM vs. operative) and further characterized to assess whether NOM was successful. Multivariate analysis was performed to identify variables associated with NOM failure. The Census Bureau Social Vulnerability Index (SVI) data were obtained and transformed into quartiles. Patients' home zip codes were geocoded and spatially merged at the census tract level with the SVI data. $P < 0.05$ was considered significant.
Results: Referring hospitals transferred 288 SBO cases: 43 (14.9%) operative and 245 (85.1%) NOM cases. Most patients (65.6%) were referred from hospitals categorized as level 4 trauma centers; 57.3% resided in high vulnerability areas based on SVI. NOM was successful in 203 patients (82.9%); of which 60% resided in high vulnerability areas. NOM failed for 42 patients (17.1%). Factors associated with NOM failure included older age (OR=1.04[1.01-1.07], p=0.005), female sex (OR=2.53[1.15-5.55], p=0.021), systolic blood pressure (OR=0.98[0.97-0.99], p=0.04), and presence of ascites prior to admission (OR=6.96[2.08-23.26], p=0.002).
Conclusion: NOM was effective for most SBO patients (70.5%), suggesting that NOM should be attempted prior to transfer to tertiary care centers. Tertiary centers should collaborate with referring facilities and develop SBO care pathways to minimize unnecessary transfers and healthcare costs in this socioeconomically vulnerable population.

Session IIIB: Papers 19-28
Paper 21: 2:50 PM - 3:10 PM

BEYOND THE BLUSH: IS ANGIOEMBOLIZATION NECESSARY FOR STABLE GRADE III LIVER INJURIES?

Dayle K. Colpitts, DO; Allison Berndtson, MD, FACS;
Michelle D. Lippincott, MD; Parisa Oviedo, MD;
Alan M. Smith, PhD, MPH; Laura N. Haines, MD, FACS;
Jarrett E. Santorelli, MD, FACS
UC San Diego
Invited Discussant: Adrian Ong, MD

Introduction: In 2018, contrast extravasation was incorporated into AAST grade III liver injury criteria, yet the role of immediate angioembolization (AE) for these injuries remains nuanced. While AE has been associated with increased liver-related complications in AAST IV-V injuries, its impact on grade III injuries is unclear. This study evaluates outcomes of AE in stable grade III liver injuries following the 2018 OIS revisions.
Methods: The 2020-2022 TQIP database was queried for adults with blunt grade III liver injury and stable vital signs on arrival. Patients with other major abdominal injuries (OIS $\geq$3), early laparotomy (<4 hours), and delayed AE (>24hrs) were excluded. Patients were matched 1:1 (AE vs. non-AE) controlling for age and ISS using propensity score matching. Primary outcomes were mortality, failure of non-op management, transfusions, and liver-related complications.
Results: 6,503 patients were included, with 186 (2.9%) receiving AE. After propensity matching, there were 180 patients in each cohort. The median time to AE was 3.6 hours.
Conclusion: For stable Grade III liver injuries, AE offers no survival benefit and is associated with increased liver-related complications and hospital length of stay. Our findings suggest that in the absence of hemodynamic instability, observation without AE should be strongly considered.

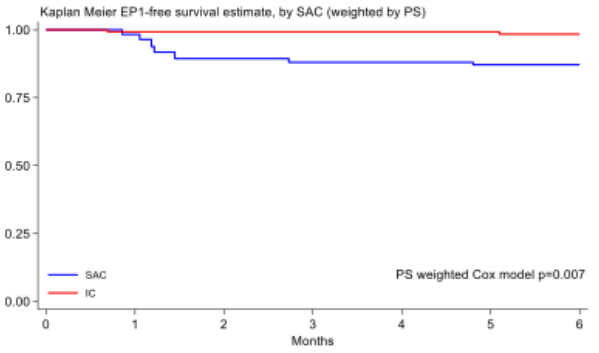
	Non-AE (n=180)	AE (n=180)	p Value
Mortality, *n (%)*	12 (7.0)	6 (3.3)	0.147
Late laparotomy (>4h)	3 (1.7)	6 (3.3)	0.311
Late RBC transfusion (>4h)	5 (2.8)	23 (13.0)	**<0.001**
Liver Complication	0 (0)	6 (3.3)	**0.03**
AKI	0 (0)	5 (2.8)	**0.024**
Unplanned Intubation	0 (0)	8 (4.4)	**0.004**
Unplanned ICU Admission	2 (1.1)	9 (5.0)	**0.032**
Hospital Days, *median (IQR)*	4 (3-9)	7 (5-14)	**<0.001**
ICU Days	3 (2-5)	3 (2-6)	**0.023**

Session IIIB: Papers 19-28
Paper 22: 3:10 PM - 3:30 PM

CLOSING THE GAP BETWEEN EVIDENCE AND PRACTICE: UNDERUTILIZATION OF SAME-ADMISSION CHOLECYSTECTOMY IN MILD ACUTE BILIARY PANCREATITIS - A MULTICENTER PROSPECTIVE STUDY

Paola Fugazzola, MD; Antonio Stabile, MD; Simone Frassini, MD; Marcello Maestri, MD; Lorenzo Cobianchi, PhD; Matteo Tomasoni, MD; Catherine Klersy; Luca Ansaloni, PhD; Francesca Toma, MD
Università di Pavia / Fondazione IRCCS Policlinico San Matteo
Invited Discussant: Rishi Rattan, MD

Introduction: Mild acute biliary pancreatitis (MABP) is a common condition requiring timely cholecystectomy to prevent recurrent gallstone-related events (GRE). Nevertheless, data from the literature indicate that same admission cholecystectomy (SAC) remains underutilized in clinical practice despite its demonstrated efficacy in reducing GRE. Our study aimed to provide additional evidence supporting SAC while highlighting its suboptimal adoption in real-world settings.
Methods: A prospective observational study with propensity score analysis was conducted across multiple centers. Patients with MABP were categorized into SAC and interval cholecystectomy (IC) groups. Primary endpoint was 6-month readmission due to GRE. Secondary outcomes included postoperative complications, operative times, and length of hospital stay.
Results: A total of 445 patients were enrolled. Only slightly more than half (57%) of the enrolled patients who underwent cholecystectomy had the procedure performed during the same hospital admission, and 26% of all enrolled patients did not undergo cholecystectomy even within six months of the episode of pancreatitis. SAC significantly reduced GRE readmissions compared to IC (HR 0.11; 95% CI: 0.02–0.55; p = 0.007, figure 1). Postoperative complications were comparable between groups.
Conclusion: Our findings reaffirm the evidence supporting SAC as the preferred approach for patients with MABP. Despite this, our study highlights the persistent gap between evidence and clinical practice. Efforts to address logistical challenges and improve guideline adherence are essential to optimize patient outcomes and reduce healthcare resource utilization.



Session IIIB: Papers 19-28
Paper 23: 3:30 PM - 3:50 PM

IS IT TIME TO UNBUNDLE THE 'TRACH-PEG' DURING TBI RECOVERY?

Stephanie Cleaverdon; Tylor McGrew, MD;
Todd W. Costantini, MD, FACS; Jarrett E. Santorelli, MD, FACS;
Allison Berndtson, MD, FACS; Laura N. Haines, MD, FACS
UC San Diego
Invited Discussant: Kevin Harrell, MD

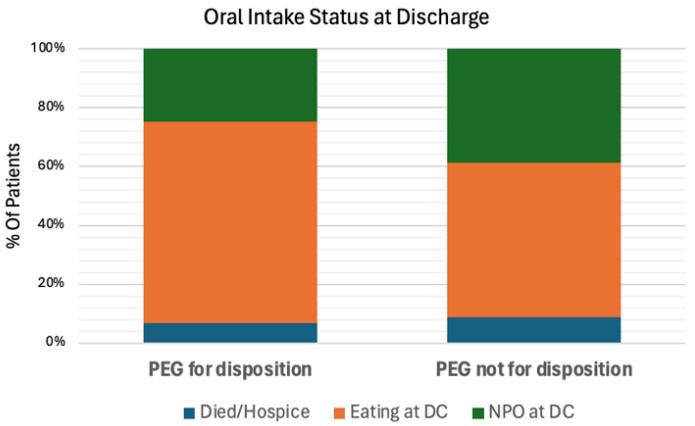
Introduction: Dysphagia is a significant concern for patients following traumatic brain injury (TBI). The true need for gastrostomy tube (GT) placement is not well described for patients with moderate to severe TBI. Defining patients that will regain swallow function will help to decrease unnecessary GT procedures and their complications. We hypothesized that there is a subgroup of patients with moderate to severe TBI who may not need early GT placement.
Methods: Retrospective chart review from a Level 1 Trauma Center, 2019-2024. Inclusion criteria: Age≥18, admission GCS≤13. Exclusion criteria: Died ≤9 days post injury or GCS=15 on post injury day 1. Variables collected: Demographics, injury characteristics, neurosurgical interventions, tracheostomy, ventilator days and swallowing function data including timing of first swallow evaluation (SE), number of failed SEs, initiation of oral diet and full oral intake achieved.
Results: There were 335 patients identified, the average age was 51.6±20.9 years and 61.2% were male. 54.0% had severe TBI (GCS≤8), 76.1% had an ICP monitor, and 25.7% underwent craniotomy/ectomy. GTs were placed in 51 patients (15.2%); 82.4% had Severe TBI, and 92.2% had a tracheostomy. Of all GT patients, 45.1% passed a SE, with a median days from first SE to initial diet of 13(2-31), and 29.4% achieved full PO intake after a mean of 7.1 SEs. Compared to patients with ongoing dysphagia GT patients achieving full PO intake had less time to first SE (7±12 vs 14±18 days, p=0.614) and better GCS at 2 weeks post-injury (11±2 vs 9±3, p=0.007).
Conclusion: Patients with severe TBI who can participate in a SE within the first 7 to 10 days after ventilator liberation may not need a GT and should not have it bundled with early tracheostomy.

Session IIIB: Papers 19-28
Paper 24: 3:50 PM - 4:10 PM

REASSESSING THE TIMING OF PEG TUBE PLACEMENT: TOO MANY TOO SOON

Anna Tatakis, MD; Danielle Wilson, MD;
Hannah Holland, MD; Bryce Patin, BS; Elise Biesboer, MD;
Lewis Somberg, MD; Thomas Carver, MD;
Marc De Moya, MD; Patrick Murphy, MD, MPH, MSc
Medical College of Wisconsin
Invited Discussant: John Myers, MD

Introduction: Percutaneous endoscopic gastrostomy (PEG) tubes are frequently placed for durable feeding, and often for facility disposition. We investigated PEG timing, indications, and outcomes to better elucidate the balance of procedural risk/benefit for PEG placement.
Methods: A retrospective review of all patients who underwent non-elective PEG placement at our Level 1 trauma center from 1/1/23 to 3/1/24 was performed. Patient demographics, procedure details, time to resumption of oral feeding, and outcome data was collected. Descriptive statistics were used to compare outcomes by indication.
Results: 236 patients were identified, 50 of which were trauma/acute care surgery patients. The overall complication rate was 25% (45% Clavien-Dindo 3 [requiring intervention]). The median time to discharge from PEG placement was 11 days and 60% had resumed an oral diet at time of discharge. 38% of PEGs were performed for disposition. This group resumed an oral diet at a median of 5.5 days vs. 17.5 days in those not placed for disposition ($p<0.01$).
Conclusion: Most patients who received a non-elective PEG resumed an oral diet prior to discharge. Deferring PEG placement until near discharge may reduce unnecessary procedures and their associated morbidity.

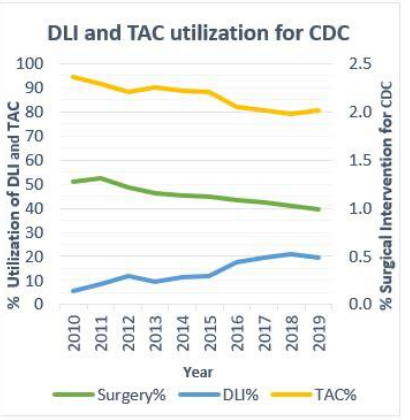


Session IIIB: Papers 19-28
Paper 25: 4:10 PM - 4:30 PM

DIVERTING LOOP ILEOSTOMY WITH ANTEGRADE COLONIC LAVAGE V.S. COLECTOMY IN FULMINANT C. DIFFICILE COLITIS: A DECADE-LONG PROPENSITY SCORE-MATCHED ANALYSIS OF SURGICAL OUTCOMES

Riddhi Mehta, MD; Bardiya Zangbar, MD; Anna Jose, MD;
Rishwanth Vetri, MD; Jordan Kirsch, DO; Ilya Shnaydman, MD;
Joshua Klein, DO; Kartik Prabhakaran, MD
Westchester Medical Center
Invited Discussant: Weidun Guo, MD, PhD

Introduction: The use of a more conservative approach involving diverting loop ileostomy with antegrade colonic lavage (DLI) compared to total abdominal colectomy (TAC) offers a less invasive option while still providing colonic decompression and reducing systemic toxicity in patients with fulminant clostridium difficile colitis (CDC). This study aims to assess DLI as an alternative to TAC in the management of CDC. **Methods**: Retrospective analysis of National Inpatient Sample (NIS))(10-19) was done to isolate patients with primary diagnosis of CDC. Patients who underwent TAC or DLI were included. Patients who had IBD, volvulus, colon cancer, ischemic colitis, colon trauma and diverticulitis in addition to TAC or DLI were excluded. Patients with failed trial of DLI requiring TAC were included in the DLI group. Propensity score matching was performed in 1:1 ratio to adjust for age, sex, race, Charlson comorbidity index, APR-DRG severity of illness, vasopressor use, presence of ileus and immunosuppression. Outcomes were mortality, in-hospital complications, length of stay, discharge disposition, costs and utilization rates.
Results: Out of 693,784 CDC patients, 7,935 (1.14%) patients were included. There were 6, 913 (87.1%) patients in TAC group vs 1,022 (12.9%) patients in DLI group. The utilization of DLI in CDC went up from 5.6% in 2010 to 19.4% in 2019 ($p<0.001$). Failed DLI trial requiring TAC constituted 18.8% of the DLI group. After matching there were 194 patients in each. There was no significant difference in mortality and complications including wound infection, wound dehiscence, post-op shock, post-op bleeding, sepsis, need for mechanical ventilation, post-op GI and renal complications. There was no significant difference in length of stay, discharge to home or costs.
Conclusion: Comparable outcomes and relatively low failure rate of DLI offer promising insights into its potential as a viable alternative to TAC in CDC.



Session IIIB: Papers 19-28
Paper 26: 4:30 PM - 4:50 PM

TO IMAGE OR NOT TO IMAGE: THE ROLE OF PRE-OPERATIVE IMAGING IN OSTOMY REVERSAL AFTER TRAUMA

Andrea M. Gochi, MD, MS; Cynthia J. Susai, MD;
Alberto Jarrin-Lopez, MD; Chade Arribo, MD; Anna Huang-Perez, MD;
Henry Olivera Perez, MD; Madeline Ryu, MD; Savinnie Ho, MD;
Gregory P. Victorino, MD; Adam Gutierrez, MD; Genna Beattie, MD, MS;
April E. Mendoza, MD, MPH
UCSF - East Bay
Invited Discussant: George Velmahos, MD, PhD

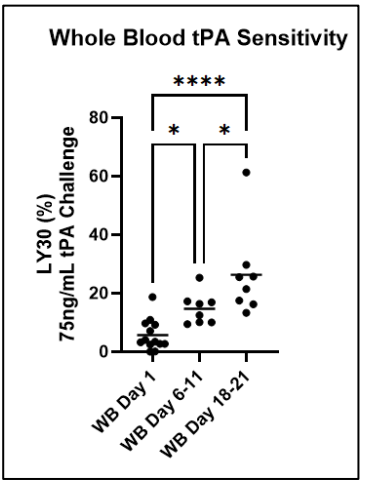
Introduction: The value of pre-operative imaging studies for ostomy reversal has been understudied in the trauma population. We hypothesized that pre-operative evaluation would not detect meaningful lesions requiring intervention prior to reversal.
Methods: Trauma patients with ostomies were identified from our Level 1 trauma center (2017–2024). Univariable and multivariable associations between injury patterns, pre-operative evaluation (colonoscopy, rectal contrast studies), intraoperative factors, and surgical outcomes were analyzed. A decision-analytic model to evaluate the cost-effectiveness of routine pre-operative evaluation prior to reversal was performed. Cost, probability estimates, and utilities in Quality-Adjusted Life Years (QALYs) were accessed from published literature.
Results: Of 280 patients with colorectal injuries, 70 required ostomies and 55 underwent reversal (median time to reversal 305 days$\pm$220). Pre-operative evaluation was performed in 36(65%) patients, with abnormal findings in 2(3.6%), without impact on operative plan. Patients with anastomotic leak after reversal were more likely to have had surgical complications at the index operation (63% vs. 19%, p=0.02) and an end ileostomy reversal (63% vs. 23%, p=0.03). Regression analysis showed presence of small bowel injury at index operation (OR 5.4, p=0.04) and loop ostomy (OR 4.8, p=0.04) were more likely to undergo pre-operative rectal contrast studies. Increasing age (OR 1.4, p=0.03) was associated with colonoscopy. Cost-effective analysis revealed no pre-operative evaluation as the most cost-effective option with a QALY of 0.83.
Conclusion: Pre-operative evaluation did not impact operative course or surgical management outcomes. Outside of standard colorectal cancer screening, we recommend avoidance of routine pre-operative evaluation for ostomy reversal.

Session IIIB: Papers 19-28
Paper 27: 4:50 PM - 5:10 PM

WHOLE BLOOD LOSES ABILITY TO CORRECT TPA-MEDIATED HYPERFIBRINOLYSIS DURING STORAGE

Elizabeth R. Maginot, MD; Flobater I. Gawargi, PhD;
Ernest E. Moore, MD; Hunter B. Moore, MD, PhD; Grace E. Volk, BS;
Trace B. Moody, BS; Dylan C. Hiser, BS; Collin M. White, BS;
Kyle S. Sextro, BS; Miguel Matos, MD; Natasha Goodman, MLS;
Aleh O. Bobar, MD; Reynold Henry, MD, MPH; Christopher Barrett, MD
University of Nebraska
Invited Discussant: John Holcomb, MD

Introduction: Whole blood (WB) transfusion is beneficial in trauma for hemostatic resuscitation. Emerging data suggests the functional integrity of WB components, particularly fibrinogen, may deteriorate during WB storage. Excess breakdown of fibrin(ogen) during trauma, termed hyperfibrinolysis, is driven by tPA release in shock and is implicated in traumatic hemorrhage. This study examines the impact of WB storage duration on tissue plasminogen activator (tPA) sensitivity/fibrinolysis and fibrinogen function.
Methods: Whole blood tails were obtained (n=13) and stored at 4C. Thromboelastography with 75ng/mL tPA (tPA-TEG) was performed on days 1, 6-11, and 18-21 to assess WB resistance to tPA-mediated hyperfibrinolysis. Fibrinogen function was evaluated using k-time and alpha angle. Significance was set at $p<0.05$.
Results: Aging WB units demonstrated a significant, progressive increase in fibrinolysis (LY30) in response to tPA (Figure 1), with a positive correlation between storage duration and tPA-TEG LY30 (Spearman r=0.56, p=0.01). Additionally, fibrinogen function declined during storage, with a positive correlation between k-time and storage duration (r=0.44, p=0.02), although α-angle correlation with time did not reach significance (r=-0.37, p=0.06). The native inhibitor of tPA, PAI-1, did not demonstrate reduced activity over time.
Conclusion: WB storage results in time-dependent increased susceptibility to tPA-mediated hyperfibrinolysis and diminished fibrinogen function. These findings may highlight the need to supplement older whole blood units with fibrinogen or other hemostatic adjuncts in trauma resuscitations.



Session IIIB: Papers 19-28
Paper 28: 5:10 PM - 5:30 PM

TO PACK OR PLUG: AAST MULTICENTER EVALUATION OF HEMORRHAGE CONTROL STRATEGIES IN PELVIC FRACTURE MANAGEMENT

Melike Harfouche, MD; Jason D. Sciarretta, MD, FACS; Christopher J O'Neil, MD; Allison McNickle, MD; Millicent Croman, MD; Bryana Baginski, MD; Arvin Gee, MD; Erika Bisgaard, MD; Joshua Dilday, DO; Claudia Alvarez, MD; Matthew Kochuba, MD; Rosemary Kozar, MD, PhD; Thomas Scalea, MD; Joseph Dubose, MD
University of Maryland, Shock Trauma Center
Invited Discussant: John Como, MD

Introduction: Mortality in pelvic ring fractures (PRF) with hemorrhagic shock remains high, with limited high-quality data to guide care. Our primary aim was to compare two main hemorrhage control interventions (HCI): pelvic angioembolization (PAE) and preperitoneal pelvic packing (PPP), hypothesizing similar risk of death.
Methods: A prospective, observational study was conducted across 47 trauma centers between 2022-24. We included patients with blunt trauma-associated PRF with hypotension (SBP<90 mmHg) and either transfusion > 4 units pRBCs within 24 hours and/or use of an HCI. Bivariate comparisons and a multivariable analysis controlling for age, sex, lactate level, injury severity score (ISS), Glasgow Coma Scale score, lowest SBP, abdominal Abbreviated Injury Scale score and REBOA use were performed. Primary outcomes were in-hospital and early (3 hour) mortality.
Results: 948 patients were included. The average age was 48 years, 68% were male, the lowest SBP was 73 mmHg, and the median ISS was 34. Overall and 3-hour mortality were 21% and 5%, respectively. A total of 549 patients (58%) received an HCI; 441 (80%) had 1 HCI, 95 (17%) had 2 HCIs, and 13 (2%) had 3. The most common HCIs were PAE alone (66%), PPP alone (10%) and PAE+PPP (9.8%). When compared to PAE, PPP was used in patients with a higher ISS (41 vs 34, p=0.005) and worse physiology (lowest SBP 62 vs 74 mmHg, lactate 6.4 vs 4.3, p<0.001), and who more often underwent laparotomy (68% vs 24%, p<0.001). Mortality was higher in PPP versus PAE patients (47% vs 18%, p<0.001), with 29% of deaths occurring within 3 hours in the PPP group vs. 1% in the PAE group (p<0.001). On multivariable analysis, PAE had lower odds of death overall (OR 0.4, CI 0.19, 0.88) and lower odds of death within 3 hours (OR 0.04, CI 0.01,0.17).
Conclusion: This is the largest observational study on hypotensive patients with PRF. Compared to PAE, PPP is being used in less stable patients, which may account for higher mortality. In allcomers, PAE is associated with better survival than PPP.

Session IV: Papers 29-34

Paper 29: 7:30 AM - 7:50 AM

REBOA COE DESIGNATION AND PARTIAL OCCLUSION IS ASSOCIATED WITH REDUCED MORTALITY, RESUSCITATION VOLUME, AND END-ORGAN DAMAGE

Kaushik Mukherjee, MD; Jorge Lopez, PhD; Zane Ashman, MD;
Jonathan Nguyen, DO; Matthew Vassy, MD, FACS;
Andrew Beckett, MD, FACS; Bradley Dennis, MD;
Alison Smith, MD, PhD; Jessica Raley, PhD; Michal Radomski, MD;
Chance Spalding, DO; Ernest E. Moore, MD
Loma Linda Univ Medical Center
Invited Discussant: Laura Moore, MD

Introduction: REBOA provides mechanical support for hemorrhagic shock(HS). pREBOA-PRO (PRO) was designed for partial occlusion and piloted in Centers of Excellence(COE) with continuous peer-to-peer educational support. This study hypothesizes that COE and partial occlusion (PRO vs ER-REBOA) reduce mortality through rapid HS control and reduced resuscitation volume (RV), mitigating end-organ damage.

Methods: All complete AAST AORTA registry cases were grouped by COE-PRO(224), COE-ER(233), and NCOE-ER(262). Kruskal-Wallis, chi-square, and Spearman's rho were used for statistical analysis.

Results: COE had shorter time to hemorrhage control (COE-PRO 70 min, COE-ER 67 min, NCOE-ER 104 min, $p<0.001$). COE-PRO group had the most Zone 1 placements ($p<0.001$), most improvement in hemodynamics ($p<0.001$), and lowest RV ([8 U PRBC vs. 13 COE-ER and 12 NCOE-ER, $p<0.001$], [2 L crystalloid COEs vs. 4 NCOE-ER, $p<0.001$]). RV was associated with ALI/ARDS (crystalloid) and MSOF(crystalloid and PRBC, $p<0.001$). ALI/ARDS was lowest in COE-PRO(4.9% vs. 10.7% COE-ER and 12.0% NCOE-ER, $p<0.02$) and MSOF was lower in COEs (5.8% COE-PRO and 4.3% COE-ER vs 14.7% NCOE-ER, $p<0.001$). COEs had a significantly lower mortality (49.1% COE-PRO and 43.8% COE-ER vs 61.7% NCOE-ER, $p<0.001$).

Conclusion: COE model designation coupled with a purpose-built partial aortic occlusion catheter (pREBOA-PRO) is associated with improved outcomes: reduced resuscitation volume, ALI/ARDS and MSOF, and mortality. Improved end-organ perfusion during resuscitation and hemorrhage control may be the reason for improved results.

Session IV: Papers 29-34
Paper 30: 7:50 AM - 8:10 AM

NO INJURY LEFT BEHIND: EFFECTS OF IMPLEMENTING A UNIVERSAL SCREENING PROTOCOL FOR BLUNT CEREBROVASCULAR INJURY AT A LEVEL 1 TRAUMA CENTER

Amelia Levi, MD; Kyle Gress, MD;
Jacob Broome, MD; Rocco Armonda, MD;
Jack A. Sava, MD, FACS; Christine T. Trankiem, MD, FACS
MedStar Washington Hospital Center
Invited Discussant: Dennis Kim, MD

Introduction: Evolution in blunt cerebrovascular injury (BCVI) screening has been driven by the increased utilization of computed tomography angiography (CTA), recognition of risk factors, and concern that BCVI incidence is underreported. We sought to determine the effect of implementing a universal screening protocol (UNIV) for BCVI at our Level 1 Trauma Center where approximately 1,600 blunt trauma cases present each year.

Methods: We retrospectively compared our patients screened before and after switching from the Western Trauma Association (WTA) BCVI screening protocol (January 2021 - July 2024) to UNIV (August - October 2024). Patient demographics, injuries, and screening outcomes were recorded. The primary outcome was detection rate of BCVI.

Results: The groups had comparable demographics, mechanisms of injury, and injury severity scores ($p=1.0$). BCVI was detected in 26 of the 5,609 patients with blunt injury screened with WTA (0.46%) vs 19 of the 457 (4.2%) UNIV patients ($p< 0.00001$). Fifteen of the 19 UNIV patients with BCVI (78.9%) would not have been screened under WTA. Among these 15, the Biffl Grade was I in nine patients, II in five patients, III in one patient, and IV in one patient. All BCVI patients were managed with anticoagulation, and the patient with Grade IV injury required operative intervention. Applying published stroke rates to our Biffl distribution, we found that without treatment these patients had a cumulative 19% risk of progression to stroke. 27 CTAs were required to diagnose one BCVI and 142 CTAs to potentially prevent one stroke.

Conclusion: UNIV increases detection of severe as well as low grade BCVI. With a one in five risk of progression to stroke, timely diagnosis and treatment of BCVI is paramount. UNIV is resource intensive but may prevent devastating and expensive outcomes.

Session IV: Papers 29-34
Paper 31: 8:10 AM - 8:30 AM

OPTIMIZATION OF PLATELET-DERIVED EXTRACELLULAR VESICLE PREPARATION FOR HEMOSTATIC EFFICACY DURING MAJOR HEMORRHAGE

Ava Mokhtari, MD; Mandeep Kaur, PhD; Sowmya Gopal, PhD;
Baron Osborn, BS; Marissa Pokharel, PhD; Charles E. Wade, PhD;
Amit Srivastava, PhD; Jessica Cardenas, PhD
University of Colorado at Denver
Invited Discussant: Zsolt Balogh, MD, PhD

Introduction: Storage limitations make early administration of platelets (PLTs) in austere settings a challenge. Platelet-derived extracellular vesicles (PEVs) are a PLT-derived product that may solve this problem. We aimed to determine if different PEV preparation methods result in differential hemostatic potential and determine if there is a superior procoagulant PEV fraction within PLT units.
Methods: Expired apheresis PLTs were obtained from 6 healthy donors. Platelet additive solution (PAS) supernatant and washed PLT PEV solutions were prepared through tangential flow filtration. PEVs were sized and quantified by Nanosight tracking assay. Rats were infused with phosphate-buffered saline (PBS), PAS prepared PEVs, or PEVs from washed PLTs 60 seconds after liver laceration. Blood was collected from the abdominal cavity in 15-minute intervals. Combined automated thrombography (CAT) was used to measure thrombin generation of differently prepared PEV solutions and post hemorrhage rat plasma.
Results: Rats infused with PAS-derived PEVs showed the least cumulative blood loss at all time points (Figure 1A). CAT analysis demonstrated an increased rate of thrombin generation (p=0.0317), higher peak thrombin concentration (p=0.0317), and higher total thrombin generation (p=0.025) in plasma from rats infused with PAS-derived PEVs compared to washed PLT PEVs (Figure 1B). PAS-derived PEV solutions demonstrated higher peak thrombin generation (p=0.045) and following a paired analysis of PAS & washed PEV solutions prepared from the same donor, an increased peak thrombin generation (p=0.0384) and increased rate of thrombin generation (p=0.0488) in PAS derived PEVs were observed.
Conclusion: PAS-derived PEVs exhibit superior hemostatic potential compared to washed PLT PEVs, providing valuable insights for optimizing PEV production from donor platelets in future approaches.

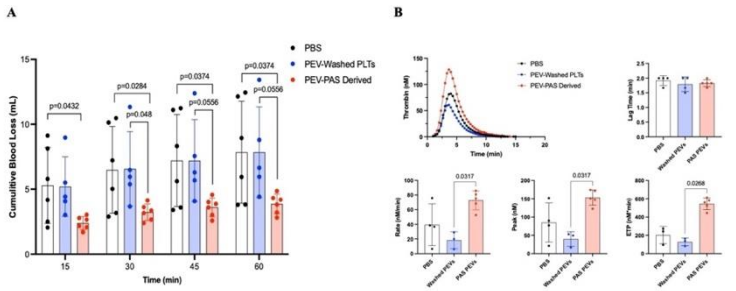


Figure 1. Procoagulant and superior hemostatic properties of PAS-derived PEVs. (A) Comparison of cumulative blood loss of rats over a 60-minute uncontrolled abdominal hemorrhage by PEV infusion type. (B) Thrombin generation results of post hemorrhage rat plasma (1:2 dilution with normal rat fresh frozen plasma). P-value<0.05 considered significant.

Session IV: Papers 29-34

Paper 32: 8:30 AM - 8:50 AM

REPEAT IMAGING OF HIGH-GRADE BLUNT SPLEEN AND LIVER INJURIES IN PEDIATRIC TRAUMA PATIENTS ALLOWS FOR EARLIER IDENTIFICATION OF COMPLICATIONS: RESULTS OF THE RADIOGRAPHIC EVALUATION OF DELAYED SOLID ORGAN COMPLICATIONS (REDSOC) EAST MULTICENTER TRIAL

Lindsey L. Perea, DO, FACS; Kelsey L. Fletcher, MD;
Madison E. Morgan, BS; John Oh, MD; Allison McNickle, MD;
Douglas Fraser, MD; Martin Rosenthal, MD; Ethan Wang, BS;
Paul Bjordahl, MD; Jenny Guido, MD; Mentor Ahmeti, MD;
Steven Briggs, MD; Kellie Bresz, MS;
Michael Horst, PhD, MPHS, MS; Joshua Hazelton, DO
Invited Discussant: Katie Russell, MD

Introduction: A non-operative, low-radiation approach is favored in stable pediatric trauma patients with blunt spleen (BSI) and liver (BLI) injuries. We hypothesized that scheduled repeat imaging in pediatric high-grade BSI & BLI allows for early identification of complications (abscess, pseudoaneurysm, necrosis, increased hemorrhage, etc.).

Methods: We performed a four-year (Nov 2020-Oct 2024) prospective observational study across 43 trauma centers evaluating pediatric (0-17y) trauma patients with BLI and/or BSI. Patients were grouped based on AAST injury grade and reason for repeat imaging being performed: scheduled imaging (SI) or patient experiencing a clinical change (CC).

Results: A total of 509 patients were included (BSI:311, BLI:257, combined BSI & BLI:59). Mean age for all patients was 11.9y ± 4.7y. Repeat imaging was performed in 68 (21.9%) BSI patients [SI:47 (69.1%), CC:21 (30.9%)] and 66 (25.7%) BLI patients [SI:40 (60.6%), CC:26 (39.4%)]. Complications were identified in 15 (22.1%) re-imaged BSI patients [SI:9 (60%), CC:6 (40%)] and in 11 (16.7%) re-imaged BLI patients [SI:6 (54.5%), CC:5 (45.5%)]. While the rate of identified complications in all patients was less than 5%, grade 4 & 5 BSI and BLI had identified complication rates of >20%. Of patients with BSI complications, 10 (66.7%) [SI:6 (60%), CC:4 (40%)] underwent an intervention. Of patients with BLI complications, 5 (45.5%) [SI:2 (40%), CC:3 (60%)] underwent intervention. Most complications were identified within 36-72 hours from initial imaging.

Conclusion: Pediatric patients with grade 4 and 5 BSI and/or BLI being managed non-operatively should have scheduled repeat imaging performed between 36 to 72 hours from index imaging, allowing for identification of complications.

Session IV: Papers 29-34
Paper 33: 8:50 AM - 9:10 AM

PARTIAL AORTIC OCCLUSION DURING HEMORRHAGIC SHOCK PRESERVES THE INTESTINAL PERFUSION

Gustavo A. Ospina Tascon, MD, MSc, PhD; Jose L. Aldana Diaz, MD, MSc; Angela M. Marulanda, MD; Helmer Palacios, MD; Camilo A. Peña, MD; Carlos A. Ordonez, MD, FACS; Gustavo A. García Gallardo, MD; Nicolás Orozco, MD, MSc; Edwin Rios, RN; Maria I. Velasco, RN; Alberto F. García, MD, MSc.
Fundación Valle del Lili
Invited Discussant: Hasan Alam, MD

Introduction: Partial aortic occlusion with balloon (pREBOA) offers extended occlusion times compared to complete REBOA. The effect on splanchnic circulation and metabolism has been studied partially.
We investigated the macro and microcirculatory effects of pREBOA in a porcine model of controlled hemorrhage.
Methods: Eighteen Landrace pigs underwent controlled hemorrhage and were randomized to three groups (n=6 each): total REBOA, pREBOA, or control, with 30-minute interventions. Blood was reinfused after 25 minutes post-hemorrhage. In REBOA groups, balloon deflation occurred after 30 minutes of ischemia. The animals were followed 4 hours. Descending aorta (DAO) and superior mesenteric artery (SMA) flow were measured; microcirculatory flow was monitored with laser-doppler probes in the jejunal mucosa and serosa. The intestinal microcirculation was studied by the Sidestream dark-field (SDF) technique.
Results: During the occlusion period, the tREBOA animals had drastic effects: arrest of the DAO flow, a marked reduction of the MA flow, and a parallel reduction of the microcirculatory flow. The SDF revealed a reduction to zero in the percentage of small vessels perfused (PPV) in the intestinal mucosa. Lactic acid peaked at the end of the occlusion period and remained elevated for the following three hours. pREBOA subjects demonstrated changes like controls, with 30% reductions in MA and microcirculatory flow. Intestinal mucosal PPV decreased 60% during hemorrhage and remained stable during balloon inflation. Lactate peaked post-occlusion and normalized within two hours.
Conclusion: Partial aortic occlusion preserved mesenteric flow and intestinal microcirculation, reducing ischemia and its metabolic consequences.

Session IV: Papers 29-34

Paper 34: 9:10 AM - 9:30 AM

DIRECT PERITONEAL RESUSCITATION VS OPEN ABDOMEN ALONE IN TRAUMA AND EMERGENCY GENERAL SURGERY: EARLY RESULTS OF A SINGLE-CENTER RANDOMIZED TRIAL

Isaac G. Alty, MD; Analia Zinco, MD; Juan Pablo Ramos, MD;
Nakul P. Raykar, MD, MPH; Ioram Jacubovsky, MD
Hospital Sotero del Rio
Invited Discussant: Eric Toschlog, MD

Introduction: Splanchnic vasoconstriction from the sympathetic response to acute blood loss and shock can lead to significant mesenteric hypoperfusion and associated inflammatory response, which is not easily detectable through conventional hemodynamics. Direct peritoneal resuscitation (DPR) using a glucose-supplemented balanced salt solution infused intraperitoneally has been shown in animal studies to induce visceral vasodilation, maintain hepatic blood flow and function, reduce organ edema and tissue necrosis, and reduce proinflammatory cytokine response and damage-associated molecular pathogen concentrations. Little high-quality evidence exists on the efficacy of DPR in trauma and acute care surgery in human populations.

Methods: This single-center trial randomized all patients undergoing damage control laparotomy with delayed closure into two arms: negative pressure temporary abdominal closure (TAC) alone, or TAC + DPR, reporting intention to treat. For DPR, a 19F Jackson-Pratt drain at the mesenteric root instilled 37˚C hypertonic peritoneal dialysate with initial 800mL/h bolus over 1h, then 400mL/h until re-exploration. Primary outcome was time to fascial closure. Secondary outcomes included intensive care unit (ICU) length of stay (LOS), hospital LOS, ventilator days, mortality, fluid and blood requirements, and complications including abscess, enterocutaneous fistula, & evisceration.

Results: In the first 30 patients, 12 had DPR, 18 TAC alone. Average time to closure was 4.0 days in DPR, 3.5 days in TAC alone ($p=0.78$). Complications were fewer in the DPR group (67% vs 100%, $p=0.018$). DPR patients had fewer superficial surgical site infections (SSI) (8% vs 67%, $p=0.002$), deep SSI (0% vs 67%, $p<0.001$), and intra-abdominal abscess (25% vs 78%, $p=0.004$). Mortality was lower in DPR but not significantly (8% vs 22%, $p=0.622$). Hospital LOS, ICU LOS, and ventilator time were all shorter for DPR compared to TAC alone, though not significantly different.

Conclusion: Although randomization yielded a more acidotic DPR group, patients who received DPR had lower overall complication rates, primarily in infectious complications, compared to patients undergoing TAC alone, albeit with similar closure rates and time to closure. The data support continuation of this trial, and DPR should be considered for critical patients requiring TAC.

Session X: Papers 35-42

Paper 35: 7:30 AM – 7:50 AM

TIMING THE FEED: THE IMPACT OF EARLY ENTERAL NUTRITION ON ABDOMINAL TRAUMA OUTCOMES AFTER ANASTOMOSIS

Riddhi Mehta, MD; Kartik Prabhakaran, MD; Aryan Rafieezadeh, MD; Rishwanth Vetri, MD; Jordan Kirsch, DO; Ilya Shnaydman, MD; Gabriel Froula, DO; Matthew Bronstein, MD; Bardiya Zangbar, MD
Westchester Medical Center, Valhalla
Invited Discussant: David Spain, MD

Introduction: This study assesses the relationship between time to initiation of enteral nutrition (EN) and outcomes in abdominal trauma patients undergoing single exploration and anastomosis.
Methods: Retrospective analysis of TQIP (2017-2022) was done to isolate adult (≥18 years) abdominal trauma patients who were taken to OR for exploratory laparotomy/diagnostic laparoscopy and were administered enteral feeds. Patients with Abdominal AIS of 6, AIS≥ 3 in other regions, death on arrival, patients who underwent multiple explorations and did not get primary anastomosis were excluded. Patients were dichotomized into: early EN (≤24 hours=EEN) and delayed EN (>24 hours=DEN). Propensity score matching was performed in 1:1 ratio to adjust for demographics, vitals and injury characteristics. In-hospital outcomes were assessed.
Results: Out of 3,975 patients, 1,082 (27.2%) were in EEN compared to 2,893 (72.8%) in DEN. Mean time to initiation of EN was 34.39 ± 9.50 hours. Median age was 48 and 89.6% had blunt trauma. After matching, there was no significant difference in mortality. EEN had lower complications, higher routine discharge, lower need for inpatient rehab and SNF ($p< 0.05$). With each additional day delay in initiation of EN, hospital stay increased by 1.08 days ($p< 0.001$).
Conclusion: Initiation of EN within 24 hours in abdominal trauma patients undergoing single exploration and primary anastomosis appears safe with lesser complications and resource utilization.

	Early EN (n= 448)	Delayed EN (n= 448)	*p*-value
Hospital LOS	25.31 ± 17.85	30.90 ± 20.05	<0.001
ICU-LOS	14.58 ± 11.04	18.60 ± 13.14	<0.001
Ventilator days	11.41 ± 9.74	14.42 ± 11.26	<0.001
VAP	37 (8.3%)	62 (13.8%)	0.008
Sepsis	10 (2.2%)	25 (5.6%)	0.035

VAP: Ventilator Associated Pneumonia, LOS: Length of Stay.
Using independent T-test and Chi-square test.

Session X: Papers 35-42

Paper 36: 7:50 AM – 8:10 AM

OUTCOMES AFTER SPLENIC INJURY IN GERIATRIC TRAUMA: IS SPLENIC EMBOLIZATION HELPFUL?

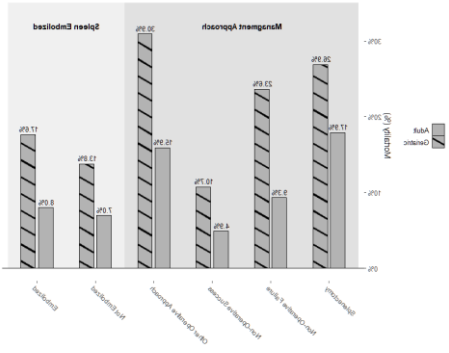
Nicholas Larson, BA; Ella Chrenka, MS;
David Dries, MD, MSE, FACS; Benoit Blondeau, MD, MBA, FACS;
Frederick Rogers, MD, MA, MS, FACS
Regions Hospital, Saint Paul
Invited Discussant: Cherisse Berry, MD

Introduction: A common adjunct to nonoperative management (NOM) of splenic injury is splenic artery embolization (SAE) which is not without controversy. Recent research has established SAE as protective against NOM failure in adult trauma patients (A), but studies focused on outcomes of SAE in Geriatric trauma patients (G) is sparse. We hypothesized SAE would confer no benefit in G undergoing NOM.

Methods: This study included patients in years 2019-2022 of the TQIP database with splenic trauma and placed patients into an A (18-64) or G (≥65) cohort. Multivariable logistic regression was used to estimate odds of mortality associated with age and management strategy adjusted for patient, injury, and hospital characteristics. Interaction terms allowed for evaluation of differential associations between management and likelihood of mortality. Secondary analysis focused on identification of predictors of NOM failure and potential differences between the age cohorts.

Results: G had nearly 5x greater odds of mortality after splenic trauma (OR 4.79 95%CI 3.02-7.47) and 45% higher odds of mortality after SAE (OR 1.43 95% CI 1.20-1.70) compared to A. Despite increasing overall odds of mortality, in A, SAE was protective against failure of NOM. This relationship was not seen in the G cohort, with SAE having no benefit to G in terms of preventing failure of NOM. G were more sensitive to failure of NOM than A.

Conclusion: In the G decompensating secondary to an active splenic bleed, operative intervention is the optimal management, and time should not be wasted with SAE as it increases mortality without a reduction in odds of NOM failure.



Session X: Papers 35-42

Paper 37: 8:10 AM – 8:30 AM

SEAL OF APPROVAL: CELOX GRANULES ARE AN EFFECTIVE TOOL FOR HEMORRHAGE CONTROL IN BLUNT AND PENETRATING CIVILIAN TRAUMA PATIENTS

Kyle Checchi, MD; Justin Mis, RN; Andrew Dennis, DO

Cook County Hospital

Invited Discussant: Kenji Inaba, MD

Introduction: Hemorrhage remains the most common cause of avoidable mortality in trauma patients. Celox™ (MedTrade Products Ltd, Cheshire, UK) granules, a chitosan agent that promotes coagulation independent of classic coagulation pathways, is one of many products developed to aid in hemostasis. Prior animal studies and off label human case reports have demonstrated the safety and effectiveness of intracavitary use of Celox granules. Despite the abundance of experience and data supporting it's success as an adjunct to extra cavitary hemorrhage control, the intra operative use of Celox granules remains off label as published data is limited. Celox granules have been especially impactful for surgically inhospitable locations including the liver and pelvis. We hypothesized that intracavitary use of Celox granules is an effective adjunct to achieving hemorrhage control in both blunt and penetrating civilian trauma patients.

Methods: Cases were identified using a prospectively maintained registry from a single, large, urban, level 1 trauma center from 2016-2024. Trauma patients whose operative reports documented intracavitary Celox granule utilization were included. Subsequent operative reports and progress notes were reviewed retrospectively to determine Celox's effect at achieving hemostasis.

Results: Our study identified 110 trauma patients who received intracavitary Celox granules during surgical procedures following traumatic injury. The patient demographics and Celox treatment sites are listed in **Table 1**. Intracavitary Celox granules were effective at achieving hemostasis in a single application in 92% of patients. Including early and late mortality the effectiveness was 81% and 72%, respectively. In 8 patients who did not achieve hemostasis from the first application and received a second application of Celox granules, they were effective in 6 cases (75%). Celox granules were effective at resolving liver and presacral bleeding 89% and 92% of the time, respectively.

Conclusion: This large case series demonstrates intracavitary Celox granule use to be a highly effective adjunct to achieve hemorrhage control in both blunt and penetrating trauma patients. This effectiveness is especially valuable when considering penetrating injuries to the liver and pelvis where surgical control of hemorrhage is challenging.

Table 1. Patient Demographics and locations of Celox treatments

Demographics		Celox treamtnet Sites (n, % overall)			
Age (mean, SD)	29.8, 11.7	Abdomen	73, 66%	Pelvis	37, 34%
Gender (n, %)	-	Liver	44, 40%	Presacral	20, 18%
Male	100, 91%	Kidney	8, 7%	Iliac vessles	10, 9%
Female	11, 10%	IVC	6, 5%	Pelvic wall	7, 6%
ISS (median, IQR)	22, 16-32	Aorta	5, 5%	Chest	8, 7%
Mecahanism (n, %)	-	Pancreas	5, 5%	Chest wall	4, 4%
Penetrating	99, 90%	Spleen	4, 4%	Lung	3, 3%
Blunt	11, 10%	Other*	18, 16%	Aorta	1, 1%
Number of surgeries (median, IQR)	2, 2-4				

Session X: Papers 35-42
Paper 38: 8:30 AM – 8:50 AM

PLATELET FUNCTION ASSAYS FAIL TO DETECT DIFFERENCES BETWEEN TRANSFUSION OF COLD OR ROOM TEMPERATURE PLATELETS IN TRAUMATIC BRAIN INJURY PATIENTS

Jack R. Killinger, BS; Nijmeh Alsaadi, MD; Reem Younes, MD;
Jim Luther, BS; Stephen Wisniewski, PhD; Ava Puccio, RN, MSN, PhD;
Allison Agnone, BSN, RN; Laura Vincent, MS, RN;
Emily P. Mihalko, PhD; Philip C. Spinella, MD;
David Okonkwo, MD, PhD; Francis Guyette, MD, MS, MPH;
Jason L. Sperry, MD, MPH; Susan M. Shea, PhD;
Matthew D. Neal, MD, FACS
University of Pittsburgh
Invited Discussant: Michael Goodman, MD

Introduction: Traumatic brain injury (TBI) patients on antiplatelet medications receive platelet (PLT) transfusions to reverse platelet inhibition. *In vitro*, cold-stored PLT (CS-PLT) exhibit superior hemostatic function to room-temperature PLT (RT-PLT). We conducted a post-hoc analysis of a pilot randomized clinical trial to test the hypothesis that improved platelet function after CS-PLT transfusion would be associated with superior clinical outcomes.

Methods: TBI patients on antiplatelet medications requiring PLT transfusion were randomized to receive 1–2 CS- or RT-PLT. Whole blood was collected pre- and post-transfusion for VerifyNow (VN) and thromboelastography with platelet mapping (TEG-PM). A mediation analysis evaluated the effects of PLT temperature on clinical outcomes via assay performance.

Results: Data from 94 patients ($N_{CS\text{-}PLT}$=49; $N_{RT\text{-}PLT}$=45) were analyzed. Baseline characteristics and pre-transfusion assay results were similar between groups. The change in assay value (post *minus* pre) of TEG-PM's kaolin maximal amplitude (MA) was significantly larger for RT-PLT (2.4 mm [0.5–4.4]) than CS-PLT (0.6 mm [-0.4–2.3]; p=0.004). Compared to RT-PLT, CS-PLT did not improve any other platelet assay value. Patients receiving CS-PLT had lower odds of neurosurgical intervention than patients receiving RT-PLT (OR 0.17; 95% CI 0.04–0.084; p=0.029). The only potential mediator, change in TEG-PM kaolin MA, was not associated with need for neurosurgical intervention (OR 1.06; 95% CI 0.96–1.18; p=0.24).

Conclusion: PLT storage temperature did not significantly affect *ex vivo* platelet hemostatic function despite improved clinical outcomes in the CS-PLT group. The relationship between platelet function testing and clinical outcomes requires further exploration in a definitive RCT

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Paper 39: 8:50 AM – 9:10 AM

A NATIONWIDE COMPARISON OF ICP MONITORING DEVICES IN PEDIATRIC SEVERE TBI: IMPACT ON SURGICAL INTERVENTION AND MORTALITY

Collin Stewart, MD, FACS; Francisco Castillo Diaz, MD;
Christina Colosimo, DO, MS, FACS; Mohammad Al Ma'ani, MD;
Audrey L. Spencer, MD, FACS; Muhammad Haris Khurshid, MD;
Adam Nelson, MD, FACS; Omar Hejazi, MD;
Louis J. Magnotti, MD, MS, FACS; Bellal Joseph, MD, FACS
University of Arizona
Invited Discussant: Charles Cox, Jr., MD

Introduction: The aim of this study is to analyze the differences in invasive monitors and their impact on outcomes.

Methods: This is a 5-year analysis of the ACS TQIP (2017-2021). We included all pediatric (< 18 years) trauma patients with severe TBI (Head-AIS ≥3) who received invasive ICP monitoring and were admitted for ≥24 hours. Patients were stratified based on type of ICP monitoring into extra ventricular drain (EVD) and intraparenchymal monitor (IPM). Patients who received both or other invasive monitoring devices were excluded. Primary outcomes included mortality and need for surgical intervention. Multivariable regression analysis was performed to identify the independent effect on outcomes.

Results: 4,250 met our inclusion criteria. The mean age was 10 years, with 67% being male. On arrival, the median ISS was 27. Majority of patients (64.6%) underwent IPM placement. EVD was more commonly placed in adult trauma centers (77.7% vs 70%, **p< 0.001**) and IPM was placed more frequently in pediatric centers (22.3% vs 26.8%, **p< 0.001**). The overall rate of mortality was 20% with no significant differences between the two groups (p=0.432). However, patients in the EVD group had a lower rate of surgical intervention (46% vs 56.9%, p< 0.001). On multivariable regression analysis, EVD was independently associated with decreased need for surgical intervention (aOR = 0.702, 95% CI = 0.590–0.835, **p< 0.001**).

Conclusion: Despite the lack of guidelines on choice of ICP monitoring for pediatric patients with severe TBI, undergoing EVD placement alone was associated with a 30% reduction in the need for surgical intervention.

Session X: Papers 35-42

Paper 40: 9:10 AM – 9:30 AM

AORTIC CARDIOPULMONARY RESUSCITATION IN TRAUMA: CONTROLLED EXTRACORPOREAL CPR SIGNIFICANTLY OUTPERFORMS CONVENTIONAL RESUSCITATIVE THORACOTOMY IN A PORCINE MODEL OF EXSANGUINATION CARDIAC ARREST

Meredith Lackie, MD; Kyle Patterson, MD; John Mares, BS;
Keith Amberman, CCP, LP; John Green, MD; Woo Do, MD;
Jonathan Morrison, MBChB, PhD; Elizabeth Powell, MD;
Jason Radowsky, MD; Ian Stewart, MD; Brandon Propper, MD;
Mark Haigney, MD; Matthew Bradley, MD;
David Burmeister, PhD; Patrick Walker, MD
Walter Reed National Military Medical Center
Invited Discussant: Deborah Stein, MD, MPH

Introduction: Exsanguination cardiac arrest (ECA) remains associated with extremely poor survival. We hypothesized that Aortic Cardiopulmonary Resuscitation in Trauma (ACT), a controlled extracorporeal cardiopulmonary resuscitation (eCPR) technique to reduce reperfusion injury after ECA, improves sustained return of spontaneous circulation (ROSC) compared to resuscitative thoracotomy (RT) in swine.

Methods: Twelve swine were bled to mean arterial pressure (MAP) < 20 mmHg and end-tidal CO_2 < 10 mmHg, defining ECA. After 10 minutes of ECA, animals were randomized to: (1) RT with aortic cross-clamp, open cardiac massage, whole blood transfusion, and 100% FiO_2 (n=6) or (2) ACT with venoarterial extracorporeal membrane oxygenation (ECMO) and graded FiO_2 advancement (n=6). Both groups underwent 30 minutes of resuscitation followed by 90 minutes of critical care. The primary endpoint was sustained ROSC with MAP >50mmHg at the end of critical care. Secondary outcomes included coronary and carotid flow rates.

Results: The primary endpoint was achieved in 100% of ACT animals vs 0% of controls ($p< 0.0001$). All subjects demonstrated pulseless electrical activity (PEA) during ECA; 100% of controls developed ventricular fibrillation during resuscitation compared with 33.3% in ACT ($p=0.06$). During resuscitation, mean left anterior descending (LAD) artery flow was 85.8±27.1 vs. 0.97±0.13 mL/min ($p=0.005$), and mean right carotid artery flow was 70.4±9.6 vs. 28.7±1.7 mL/min ($p< 0.0001$) for ACT vs. controls, respectively.

Conclusion: ACT achieved sustained ROSC at significantly higher rates than conventional RT after ECA, with marked improvements in coronary and carotid artery flow. This eCPR technique shows promise for improving survival from ECA.

Session X: Papers 35-42

Paper 41: 9:30 AM – 9:50 AM

EVERY HOUR COUNTS: VENOUS THROMBOEMBOLISM PROPHYLAXIS AFTER SPINAL TRAUMA

Alexandra Campbell, BS; Michael Rubsamen, BS; Ryan Adkins, BS; Katherine Sparling, BS; Danielle Tatum, PhD; Kevin Harrell, MD; Jeanette Zhang, MD, FACS; Clifton McGinness, MD; Berje Shammassian, MD; Sharven Taghavi, MD, FACS

Tulane University School of Medicine

Invited Discussant: Maxwell Braverman, DO

Introduction: Spinal trauma patients are at risk for venous thromboembolism (VTE) due to immobilization, endothelial injury, and hypercoagulability after acute injury. Current guidelines recommend initiating VTE prophylaxis (VTEp) 24-72 hours after spinal trauma, yet optimal timing remains unclear. We sought to investigate the optimal time to administer VTEp in patients with isolated, blunt spinal trauma (IBST) requiring operative management, hypothesizing that early VTEp initiation is effective in preventing VTE events.

Methods: The TQIP database (2018-22) was analyzed for patients ≥16 years old with IBST (Abbreviated Injury Scale Spine ≥3, ≤2 for other regions) requiring surgery. VTEp timing categories were early (< 24 hours), intermediate (24-72 hours), and late (>72 hours). Outcomes were VTE incidence and mortality.

Results: 49,854 IBST patients had surgery. On multivariate analyses, early VTEp was associated with decreased VTE events and mortality. Combined vertebral and spinal cord injury was associated with increased VTE (Table 1). When examined as a continuous variable, each passing hour without VTEp was associated with VTE events (OR: 1.004, 95%CI: 1.003-1.004, p< 0.001) and mortality (OR: 1.002, 95%CI: 1.001-1.002, p< 0.001).

Conclusion: Early VTEp is associated with lower thrombotic events and mortality. IBST patients undergoing surgery may benefit from early VTEp.

Table 1: Multivariate Regression Summarizing Significant Variables Associated with VTE and Mortality

VTE[1]				**Mortality**			
Time to VTEp	*OR*[2]	*95% CI*[3]	*p-value*	*Time to VTEp*	*OR*	*95% CI*	*p-value*
Early VTEp	Ref	Ref	Ref	Early VTEp	0.73	0.60-0.89	0.002
Intermediate VTEp	1.62	1.35-2.03	<0.001	Intermediate VTEp	0.99	0.84-1.16	0.90
Late VTEp	2.28	1.86-2.81	<0.001	Late VTEp	0.97	0.82-1.15	0.70
Spinal Injury Type				*Spinal Injury Type*			
Vertebral Injury	Ref	Ref	Ref	Vertebral Injury	Ref	Ref	Ref
Spinal Cord Injury (SCI)	1.88	1.54-2.29	<0.001	Spinal Cord Injury (SCI)	1.80	1.48-2.20	<0.001
Vertebral + SCI	2.37	2.01-2.81	<0.001	Vertebral + SCI	3.31	2.66-3.66	<0.001

[1]Deep Vein Thrombosis and Pulmonary Embolism, [2]Odds Ratio, [3]Confidence Interval

Session X: Papers 35-42

Paper 42: 9:50 AM – 10:10 AM

A NOVEL FILTRATION DEVICE TO INCREASE THE EFFICACY OF PLASMA IN HEMORRHAGIC EVENTS

Adam Lee Goldstein, MD; Mordechai Shimonov; Francesco Franceschi; Chaled Alnakib; Asher Winder; Jan Manak; Pavel Svoboda; Ondrej Urban; Nir Wasserberg; Vered Yahalom; Galia Spectre; Abd-Alroof Higazi

Tel Aviv Sackler School of Medicine, Wolfson Medical Center

Invited Discussant: Navpreet Dhillon, MD

Introduction: Upper gastrointestinal bleeding (UGIB) is one of the most common acute care emergencies with a significant utilization of resources, morbidity and mortality. Blood products, including plasma, are commonly used in this population for resuscitation and reversal/correction of anticoagulation therapies and abnormal coagulation parameters. ClearPlasm is a single-use extracorporeal filtration device that removes plasminogen from plasma donors resulting in infusion of plasminogen-depleted plasma (PDP). This is expected to reduce bleeding and a decreased need for blood products by preventing fibrinolysis and enhancing the stabilization of newly formed clots. Here we examine the safety and efficacy of using ClearPlasm in UGIB patients requiring plasma transfusion.

Methods: An international multi-centered randomized, double-blind, controlled trial was conducted evaluating the safety and efficacy of transfusion PDP in patients presenting with an acute UGIB. This was compared to a match cohort transfused with standard fresh frozen plasma (FFP).

Results: No significant differences were observed in the rate of major adverse events (defined as death, transfusion-related serious adverse events, or re-bleeding requiring hospitalization within 30 days of follow-up). Two deaths were reported in the standard FFP group during the 30-day follow-up compared to none in the ClearPlasma group. There were no adverse events during transfusion in the ClearPlasma group, while 2 adverse events were reported in the FFP group. In the first 8 hours the PDP group had a smaller increase in D-dimer levels ($p=0.04$). There was also a trend for a shorter time from intervention to discharge (4.7d vs. 6d, $p= 0.21$), and a trend for shorter overall length of hospitalization (5.2d vs. 6.4d, $p= 0.22$). There were also no platelets given in the ClearPlasma group (0% vs. 7.7%, $p= 0.032$).

Conclusion: Use of the ClearPlasma filter was safe, with findings suggesting a lower systemic fibrinolytic activity represented by the decreased D-dimer. There was also no need for platelet transfusion in the PDP group, and a trend towards a decrease in length of hospitalization. ClearPlasma has a potential beneficial both clinically and regarding resource utilization in the care of unstable trauma and acutely bleeding patients who receive FFP transfusion. Larger studies are needed to examine the benefit of the ClearPlasma filter to improve the outcome of trauma patients.

Session XIIIA: Papers 43-51

Paper 43: 2:00 PM – 2:20 PM

ASSESSING EQUITY WITHIN TRAUMA CENTERS: A CALL TO INTEGRATE EQUITY MEASURES INTO QUALITY IMPROVEMENT PROGRAMS

Kennedy E. Jensen, MD; Joshua J. Horns, PhD;
Sarah Lombardo, MD, MSc; Marta L. McCrum, MD, MPH
University of Utah
Invited Discussant: Avery Nathens, MD, PhD, MPH

Introduction: Equity is the "sixth domain" of health care quality but is not explicitly assessed by the ACS TQIP Program. We sought to assess equitable outcomes within hospitals using stratified analyses for populations that experience health disparities.

Methods: Analysis of 2018-20 TQIP data from Level 1/2 trauma centers (TCs) and adult patients with ISS ≥9. Following TQIP methodology, we applied multivariable regression to calculate hospital-level risk-adjusted mortality and observed vs expected (O/E) ratios to identify low-, average and high-mortality TCs. Using stratified analysis, we evaluated within-TC equity by race (Black vs White) and insurance (Medicaid, uninsured vs commercial) by assessing 1) concordance with reference group, 2) presence of narrow mortality gap (< 5% difference) and 3) meeting criteria 1 and 2.

Results: We analyzed 892,583 patients at 380 TCs, of which 194 (50.5%) were classified as "low-mortality" (median O/E 0.85 [0.76-0.93]), 18 (4.7%) as average and 172 (44.8%) "high-mortality" (O/E 1.13 [1.06-1.22]). Compared to average TCs, low-mortality TCs treated higher proportions of White (79% vs 72%), lower Medicaid (10% vs 14%) and similar ISS. Among low-mortality TCs, 93(50%) had concordant low-mortality O/E for both Black and White populations, 11(6%) had a narrow gap and 10(5%) met both criteria. By payor, concordance was achieved by 120(62%) of TCs for Medicaid and 42(22%) for uninsured patients; narrow gap for 14(7.2%) and 13(6.7%), and both criteria for 14(7%) and 8(4%) of TCs.

Conclusions: A minority of low-mortality TCs achieve equitable outcomes, with both minoritized and socioeconomically vulnerable populations affected. Such inequities are masked in typical QI reports of total populations. Equity measures including stratified analyses should be incorporated into TQIP reports to inform hospital-level QI initiatives and purposefully improve care for populations that experience health disparities.

Session XIIIA: Papers 43-51

Paper 44: 2:20 PM – 2:40 PM

THE IMPACT OF VIOLENCE INTERVENTION PROGRAMS ON POST-DISCHARGE SERVICES AMONG PATIENTS INJURED BY GUNFIRE: REVIEW OF A MULTICENTER DATABASE

Amir Ebadinejad, MD; Sara Larosiliere, BS; Jonathan Gates, MD;
Ya-Huei Li, PhD; Sara Saeidishahri, MD;
Matthew Lissauer, MD; Jane Keating, MD
Hartford Hospital
Invited Discussant: Stephanie Bonne, MD

Introduction: Post-discharge services, such as outpatient rehabilitation and home health care, are critical to trauma patient recovery; however, disparities exist in the allocation of these resources. We hypothesized that patients seen by Hospital/Community-Based Violence Intervention Programs (VIPs) would have more equitable access to post-discharge services.

Methods: The ACS COT Firearm Study Dataset was queried for adult patients and divided into those who did and did not receive VIP services. Multivariate logistic regression was used to identify differences in post-discharge service access based on VIP participation.

Results: Among 12,134 patients, 1,413 (12%) received VIP services. The VIP group was younger, more often Black, and more likely unemployed with a higher ISS compared to non-VIP patients ($p < 0.001$). Outpatient rehabilitation and home health care were significantly more often recommended for VIP patients than non-VIP patients (19% vs. 13% and 14% vs. 8%, respectively, $p < 0.001$). VIP status was independently associated with a 40% increase in outpatient rehabilitation (odds ratio [OR]: 1.4, 95% confidence interval [CI] = [1.1 – 1.6], $p < 0.001$) and a 70% increased chance of home health care (OR = 1.7, CI = [1.4 – 2], $p < 0.001$). Importantly, Black patients had a lower chance of outpatient rehabilitation compared to White patients (OR: 0.7, CI: 0.6 - 0.9, $p < 0.001$).

Conclusions: Violence Intervention Programs significantly improve access to post-discharge services for patients injured by gunshot wounds, effectively reducing disparities. However, important racial inequities persist, highlighting the need for additional efforts to eliminate these gaps.

Session XIIIA: Papers 43-51

Paper 45: 2:40 PM – 3:00 PM

DEVELOPMENT AND VALIDATION OF THE AIR MEDICAL INTERFACILITY TRIAGE SCORE: PREDICTING THE BENEFIT OF INTERFACILITY HELICOPTER TRANSPORT FOR TRAUMA PATIENTS

Sebastian M. Boland, MD, MBA; Joshua Brown, MD, MSc, FACS; Liling Lu, MS; David Silver, MD, MPH; Tamara Byrd, MD, MPH

University of Pittsburgh Medical Center

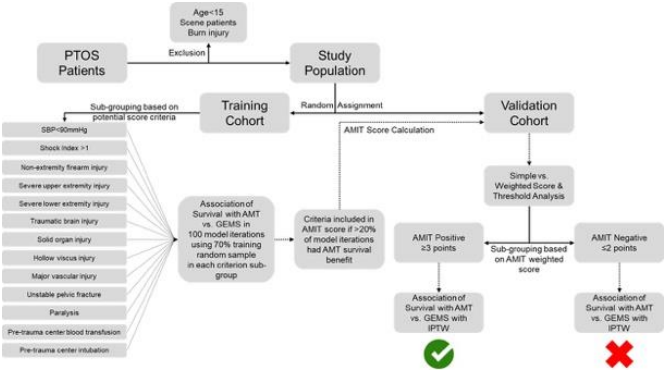
Invited Discussant: David Shatz, MD

Introduction: Air medical transport (AMT) improves survival in selected trauma patients. Little guidance exists for interfacility (IF) transport mode triage where additional evaluation and therapy may be undertaken compared to scene transport. Our objective was to develop a transport mode triage tool for IF transfer of trauma patients.

Methods: Retrospective cohort study of injured adult patients undergoing IF transfer in PTOS 2000-2020. The data were divided into training and validation sets. In the training set, patients were grouped by potential criteria and propensity score matching identified criteria in which AMT was associated with a survival benefit using cross-validation. Criteria evaluated included SBP< 90mmHg, shock index >1, non-extremity firearm injury, mangled extremity, severe TBI, solid organ injury, hollow viscus injury, major vascular injury, unstable pelvic fracture, paralysis, and pre-trauma center blood transfusion or intubation. Each criterion with a survival benefit for AMT was assigned a point value and summed to create the Air Medical Interfacility Triage (AMIT) score. The score threshold that predicted AMT risk-adjusted survival benefit was evaluated in the validation set.

Results: 226,115 subjects were included. Criteria associated with AMT survival benefit were solid organ injury, pre-trauma center blood transfusion, shock index >1, and mangled extremity (Fig), each assigned 1 point. An AMIT score ≥2 showed a survival benefit for AMT (ARR -0.07; 95% CI -0.13, -0.01, p=0.02). Among patients with a score < 2, transport mode was not associated with survival (p=0.21).

Conclusion: The AMIT score identifies patients with a survival after AMT IF transport compared to ground. These data may inform triage protocols for IF transport mode selection in trauma patients.



Session XIIIA: Papers 43-51
Paper 46: 3:00 PM – 3:20 PM

STATE-LEVEL VARIABILITY IN DISCHARGE TO INPATIENT REHABILITATION AFTER SEVERE TRAUMATIC INJURIES

Alexander J. Ordoobadi, MD; Kimberly K. Greenberg, OTD;
Saba Ilkhani, MD, MPH, MBA; Zain Hashmi, MD;
Craig Newgard, MD, MPH; Ali Salim, MD; Molly P. Jarman, PhD, MPH
Brigham & Women's Hospital
Invited Discussant: Niels Martin, MD

Introduction: Rehabilitation care at an inpatient rehabilitation facility (IRF) has been shown to improve seriously injured patients' long-term functional independence. However, not all eligible injured patients are discharged to IRF. We examined differences in the proportion of severely injured patients discharged to IRF across US states.
Methods: We analyzed the 2021 Healthcare Cost and Utilization Project State Inpatient Databases for 13 states. We included all severely injured (ISS >15) adult patients who survived to hospital discharge. We calculated the marginal probability of discharge to IRF, skilled nursing facility (SNF), or home across different states using a logistic regression model to control for patient demographics, insurance, injury severity, comorbidities, and trauma center level. We also performed a mixed effects logistic regression to evaluate the association between the supply of IRFs (defined as the number of IRFs per 1,000,000 population) and the likelihood of discharge to IRF.
Results: We identified 104,017 severely injured patients. Across all states, 13% of patients were discharged to IRF, 19% to SNF, and 42% to home. The adjusted probability of discharge to IRF varied between states, ranging from 6.3% in Oregon (95% CI: 5.6-7.1%) to 21.1% in Arkansas (95% CI: 19.9-22.4%). The state-level supply of IRFs ranged from 0.49 to 8.63 per 1,000,000 in Maryland and Arkansas, respectively. Each additional IRF per 1,000,000 population was associated with 11% increased odds of discharge to IRF (95% CI: 1.03-1.21, P=0.009).
Conclusion: Severely injured patients face substantial variation in accessing high-level rehabilitation care at an IRF depending on their state of residence. Increasing the availability of IRFs within underserved states may improve access to specialized rehabilitation care for injured patients.

Session XIIIA: Papers 43-51
Paper 47: 3:20 PM – 3:40 PM

RADIOGRAPHIC PROGRESSION GUIDELINES FOR WORSENING TRAUMATIC BRAIN INJURY ON HEAD CT SCANS

Kgomotso Bonda, DO; Bjarne Faraon, BS; Steven Epstein, MD;
Ralph Rahme, MD; Karev Dmitriy, MD; Stephen Cohn, MD;
Steven Blau, MD; Ridwan Shabsigh, MD; Peter Rhee, MD
St. Barnabas Hospital
Invited Discussant: Brittany Bankhead, MD

Introduction: Traumatic Brain Injury (TBI) often necessitates serial CT scans, as up to 30% of patients show radiographic worsening. Traditional binary classifications "YES" or "NO" lack nuance, leading to unnecessary imaging and increased costs. The Radiographic Progression Guidelines introduce a three-tiered system; NOT CONCERNING, CONCERNING, and ALARMING to improve decision-making and optimize resources.
Methods: A 14-month prospective cohort study of 281 patients applied RPG classifications to serial CT scans while tracking changes in management. Non-invasive interventions included adjustments in fluids, medications, nursing care, and ventilator settings, while invasive interventions encompassed craniotomy, craniectomy, or ICP monitoring. Statistical analyses assessed associations between RPG classifications and intervention likelihood. Criteria for RPG are illustrated in Table 1.
Results: Among 129 patients receiving serial CTs, worsening was observed in 32% at the second scan, 34% at the third, and 59% at the fourth. Of 99 worsening cases, 69 were NOT CONCERNING or CONCERNING, while 30 were ALARMING. No patients in the lower tiers required intervention, whereas four ALARMING cases required invasive procedures. RPG effectively identified all patients needing intervention while preventing unnecessary escalation
Conclusion: RPG enhances TBI classification, improving communication and targeted management. By distinguishing lesion severity, it helps optimize resource use and reduce unnecessary imaging for lower-risk patients. Further multi-center studies are needed to refine classification criteria and validate RPG across diverse clinical settings.

RADIOGRAPHIC PROGRESSION GUIDELINES – (RPG)

Classification	Size	MAX size	Midline Shift	Additional Findings
NOT CONCERNING	Less than double the size of the original	<10 mm	None	None
CONCERNING	More than double the initial size	<10 mm	<5mm	None
ALARMING	Any size	>10 mm	>5mm	Effacement of sulci or gyri

Table 1: Radiographic Progression Guidelines (RPG) Classification and corresponding criteria

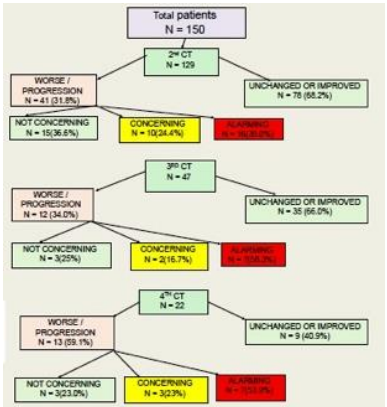


Figure 1: Flowchart for CT outcomes based on RPG

Session XIIIA: Papers 43-51

Paper 48: 3:40 PM – 4:00 PM

INTRACRANIAL HEMORRHAGE IN ISOLATION: IS THE SUM BETTER THAN ITS PARTS? AN ANALYSIS OF THE MODIFIED BRAIN INJURY GUIDELINES

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Robert McIntyre, MD; Thomas Schroeppel, MD
University of Colorado Health
Invited Discussant: Mohammad Zain Hashmi, MD

Introduction: Traumatic brain injury (TBI) with small volume intracranial hemorrhage (ICH) can be managed in a streamlined fashion. The modified Brain Injury Guidelines (mBIG) stratify TBI severity and provide management protocols. Unlike other TBI triage protocols, mBIG does not differentiate between isolated and combined ICH. Combined ICH, defined as ≥2 ICH types may have distinct clinical trajectories, but current guidelines are discordant on this subgroup's optimal management. This study aims to characterize outcomes of combined ICH.

Methods: This is a retrospective analysis of prospectively collected data of trauma patients with ICH at two level 1 trauma centers between 2017-22. All mBIG 3 injuries including displaced skull fractures, epidural hematomas, or intraventricular hematomas were excluded. ICH were classified as isolated (iICH) or combined (cICH). Primary outcome was clinical deterioration, defined as worsening neurological exam. Secondary outcomes were radiographic progression, neurosurgical (NSG) intervention, & readmission.

Results: 633 patients were included. 189 (29.9%) had cICH. There were no significant differences in age or arrival GCS between groups. cICH patients had higher ISS (13.3 vs 11.5, $p< 0.001$), longer ICU length of stay (1 vs 0 days, $p< 0.001$), and more frequent CTH (2 vs 2, $p< 0.001$) compared to iICH. Both radiographic progression (20.3 vs 10.6%, $p=0.004$) and NSG consultation were more frequent in cICH (83.1 vs 74.1%, $p=0.015$), though only 2 patients (0.5%) with cICH had clinical deterioration or NSG intervention. There were no significant differences in clinical deterioration, NSG intervention, or readmission between cICH and iICH.

Conclusion: While cICH patients are more likely to have radiographic progression, this does not translate to additional clinical progression or NSG intervention compared to iICH. Current mBIG protocols can be safely applied to cICH without routine escalation of care.

Session XIIIA: Papers 43-51
Paper 49: 4:00 PM – 4:20 PM

REMOTE TELEMENTORING LEADS TO ORTHO TRAUMA AND ORTHOPLASTIC SURGICAL INDEPENDENCE IN A HUMANITARIAN CRISIS

Lewis J. Kaplan, MD, FACS; Samir Mehta, MD; Patrick J. Brennan, MD; Kierstyn Claycomb, BA; Evhen Filhonenko, MD; Yaroslaw Radega, MD; Maisie Savchenko-Fullerton, BA; L. Scott Levin, MD, FACS
Perelman School of Medicine at the University of Pennsylvania
Invited Discussant: Parker Hu, MD

Introduction: To determine whether remote digital platform telementoring enables surgical independence for complex care during a humanitarian crisis.
Methods: A senior mentoring team (Orthoplastic Surgery, Ortho Trauma, Trauma/Surgical Critical Care, ID Administration) partnered with an Orthopedic team and a NGO at a Ukraine civilian hospital treating complex war-injured patients. Weekly teleconsultation evaluated patients, imaging, and labs to address patient care including OR management, antibiotics, organ failure, nutrition, and rehabilitation. Prospective data included injuries, recommendations, and the presence of a plan generated by Ukraine surgeons prior to consultation. Data were explored using descriptive statistics or Chi-square; significance for $p < 0.05$.
Results: Telementoring (135 events) occurred (4/2022 – 11/2024) for 222 patients (85% military, 15% civilian). Most were male 89% (mean age = 37.8$\pm$14.8 yr). Injured regions included: thigh (24.8%), ankle (24.8%), wrist (21.2%) hand (21.2%). Injuries mainly involved: bone (93.4%), joint (76.6%), and soft tissue (70.1%); infection present in 36.5%. Recommendations principally addressed: surgical decision-making (97.8%), OR plans (98.5%), implants (31.3%), rehabilitation (32.1%), antibiotics (21.9%) and culture data (18.2%). Procedural recommendations were for: re-debridement (48.1%), ORIF (27%), NPWT (22.6%), local flap (22.6%), IM nail (20.4%), ex-fix removal (18.9%), free flap (15.3%), and bone grafting (13.8%); amputation was rare (10.9%) The Ukraine team transited from needing a plan to articulating one by patient 136 (61.2% of consult patients; 6/2023). Free flap plans vastly increased after surgical independence through direct experiential and mentored training (3 before vs. 18 after, $p < 0.01$).
Conclusions: Remote platform telementoring during a humanitarian crisis can develop local expertise regarding surgical decision-making, OR planning, and complication management of complex injured patients. The capability of successful complex operative management is supported by a stable and experienced consultant group that fosters durable relationships.

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Paper 50: 4:20 PM – 4:40 PM

IMPLEMENTATION OF A SMARTPHONE BASED ULTRASOUND PROGRAM TO IMPROVE TIMELY DIAGNOSIS OF LIFE-THREATENING INJURIES IN CAMEROON: RESULTS FROM A PROSPECTIVE, MULTISITE FEASIBILITY STUDY

S. Ariane Christie, MD; Agbor N. Emeh, MD, MPH, PhD;
Liza Rosenbloom, BA; Joshua Tambe, MD; Mbome Marpha, MD;
Christelle Joviale Maffo, MD; Ewane F. Mbebi, MD;
Matthew Driban, MD; Mark Yost, MD, MPH; Rasheedat Oke, MD, MPH;
Isaac Obeng-Gyasi, MD, MPH; Catherine Juillard, MD, MPH;
Alain Mefire Chichom, MD
University of California, Los Angeles
Invited Discussant: Paula Ferrada, MD

Introduction: Undiagnosed hemorrhage is the leading cause of preventable trauma death in Cameroon, yet only 4% of injured patients receive imaging to diagnose hemorrhage. A smartphone-based ultrasonography (SBU) curriculum was developed to rapidly train Cameroonian providers to perform and interpret eFAST. SBU has demonstrated promising educational efficacy, but its clinical feasibility in this technology-constrained setting is unknown. We evaluate the feasibility and acceptability of a SBU pilot at three trauma centers in Cameroon.

Methods: We implemented a six-month feasibility pilot at three Cameroonian hospitals participating in the Cameroon Trauma Registry (CTR). Trauma providers were trained to perform SBU eFAST using a novel 5-hour curriculum, then asked to perform SBU on all injured patients as part of the trauma evaluation. Feasibility was assessed as the proportion of CTR patients with completed eFAST. Acceptability was assessed as the proportion of users rating SBU ≥68 on the previously validated System Usability Scale (SUS).

Results: Trauma care providers completed SBU eFAST on 316 (87.2%) of 360 eligible patients, compared to a diagnostic imaging rate of 3.6% in the pre-study period. Completion was highest at low volume referring centers (100%, n= 40) and lower at tertiary referral centers (82%, n=211 p=0.05). Overall, 86% of providers rated the program as highly acceptable (SUS scores ≥68).

Conclusions: Implementation of a SBU program is highly feasible and acceptable in Cameroon, with an associated 81% increase in diagnostic imaging completion among trauma registry patients. A multisite prospective clinical trial is planned to assess the impact of SBU on patients' outcomes, including preventable trauma deaths.

Session XIIIA: Papers 43-51

Paper 51: 4:40 PM – 5:00 PM

DISCHARGE FUNCTIONAL STATUS AND PREDICTORS OF ALL-CAUSE GERIATRIC TRAUMA READMISSION ACROSS A MATURE TRAUMA NETWORK

Annette Palladino, DO; Emily Wheeler, MD; Megan Welborn, DO; Adam Lizak, BS; Jill Stoltzfus, PhD; Rebecca Boyer, MSN, RN; Lisa Robins, MSN, RN; Rebecca Wilde-Onia, MSN, RN; James Cipolla, MD, FACS; Peter Thomas, DO, FACS; Roberto Castillo, DO, FACS; Maxwell Braverman, DO, FACS

St. Luke's University Hospital, Bethlehem, Pennsylvania

Invited Discussant: Peter Hammer, MD

Introduction: Readmission after trauma remains a significant challenge in the geriatric population. Few studies have looked at geriatric all cause re-admission (RA) across a mature trauma network including at level IV centers. Our objective was to determine if discharge functional status predicts RA across all levels of trauma centers. Secondary objective was to determine incidence and reason for RA.

Methods: Institutional trauma registries were queried for all geriatric trauma admissions across our network (2018-2023). This data was merged with all cause network RA data. Demographics, injury characteristics, trauma center level, frailty, discharge functional status (FIM), disposition, and payor status were compared between non-RA and RA patients. Univariate, followed by multivariate, logistic regression was used to identify predictors of readmission. Reason for RA and time to RA were examined.

Results: 11,270 patients were admitted across the network with median age 81 (IQR 74-88) and median ISS of 5 (4-9) while 6.6% (n=741) had ISS >16. All-cause RA rate was 6.2% (n=700). On multivariate analysis, FIM score (OR 0.99 (0.95-1.02), p=0.60), treatment at a level IV center and disposition were not predictors of RA. The results were similar after adjusting for frailty, with >3 comorbidities (OR 1.708 (1.16-2.51), p< 0.01) and HLOS (OR 1.05 (1.01-1.09), p< 0.01) representing the highest predictors of RA. 14% (n=101/700) of RA patients were readmitted for a trauma complication, 11% (n=75) for new injury, 63% (n=439) for a medical condition and 12% (n=84) due to prior refusal for rehab. Median time to RA was 14 days (IQR 6-21). 57% (n=396) had incomplete follow-up prior to RA. \

Conclusion: HLOS and >3 comorbidities but not FIM score predict all cause RA with most RA for a new or pre-existing medical condition. These variables represent suitable targets for RA reduction.

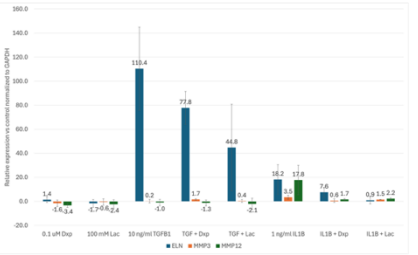
Session XIIIB: Papers 52-60
Paper 52: 2:00 PM – 2:20 PM

LACTATE MODULATES TGF-B1- AND IL-1B-INDUCED TRANSCRIPTIONAL PROGRAMS IN HUMAN DERMAL FIBROBLASTS: POTENTIAL IMPLICATIONS FOR WOUND MANAGEMENT

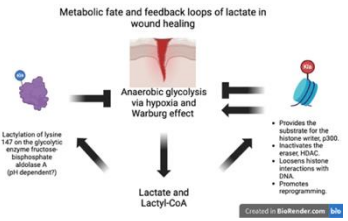
Gregory Thomas, BS; Kaysie Banton, MD;
R. Joseph Sliter, MD; Carlos Palacio Lascano, MD;
Christopher Zaw-mon, MD; David Bar-Or, MD
Swedish Medical Center
Invited Discussant: Matthew Kutcher, MD, MS

Introduction: Cutaneous wounds are susceptible to metabolic imbalances, which can lead to excessive lactate accumulation that delays healing. It is also accepted that lactylation of histone and other proteins is important in the epigenetic regulation of cells. Thus, a greater understanding of how lactate affects fibroblasts could lead to new therapeutic approaches. This study aimed to investigate how lactate impacts TGFb1- and IL-1b-induced transcriptional programs in normal human dermal fibroblasts (NHDF).

Methods: qRT-PCR was used to evaluate transcriptional changes in key remodeling markers in NHDF treated with 100 mM sodium lactate (Lac) or 0.1 mM dexamethasone-21-phosphate (Dxp) and then activated with 10 ng/ml TGFb1 or 0.1 ng/ml IL-1b for 24 hours. Total mRNA was isolated and DDCp relative expression was calculated versus untreated medium controls, normalized to the housekeeping gene, *GAPDH*.



Results: We observed that 100 mM lactate treatment inhibited the increased relative expression (fold changes) of *elastin*(*ELN)* following activation with TGFb1 or IL-1b (TGFb1=110 $\pm$ 35, TGFb1 + Lac = 45 $\pm$ 36, IL-1b = 18 $\pm$ 12, IL-1b + Lac = 0.86 $\pm$ 3; n=3). Dxp also reduced cytokine-induced *ELN* expression (TGFb1 + Dxp = 78 $\pm$ 14, IL-1b + Dxp = 7.8 $\pm$ 4). Additionally, both Lac and Dxp exhibited an ability to reduce IL-1b-induced increases (fold changes) in *matrix metalloproteinase 3* (*MMP3*) (IL-1b= 3.5 $\pm$ 1.7, IL-1b + Lac = 1.5 $\pm$ 0.8, IL-1b $\pm$ Dxp = 0.6 $\pm$ 1.5) and *MMP12* (IL-1b = 17.8 $\pm$ 12.3, IL-1b + Lac = 2.2 $\pm$ 0.8, IL-1b + Dxp = 1.7 $\pm$ 0.6).



Conclusions: These findings indicate that lactate treatment of NHDF exhibits anti-inflammatory effects, suggesting that metabolic regulation may help reduce tissue damage. Additionally, histone lactylation may serve as a potential target for pharmacological interventions in wound healing disorders.

Session XIIIB: Papers 52-60
Paper 53: 2:20 PM – 2:40 PM

PLATELET RECEPTOR SHEDDING: AN IN VITRO STUDY IN SHOCK RELATED PLATELET FUNCTIONAL IMPAIRMENT

Lawrence Diebel, MD; David Liberati, MS;
Alita Pitogo, BSN; Wazim Mohamed, MD
Wayne State University
Invited Discussant: Carrie Sims, MD

Introduction: Early platelet dysfunction has been recognized as an important component of the acute coagulopathy of trauma. The exact mechanism(s) remain unclear; a current hypothesis suggests that functional platelet exhaustion results from exposure to trauma/shock related catecholamine plasma concentrations. Platelet receptor proteolysis (shedding) is important in normal physiologic as well as pathophysiologic conditions. Catecholamines play an important role in controlling platelet responses *in vivo.* Excess catecholamine concentrations in plasma following shock conditions may increase platelet receptor cleavage and result in decreasing platelet reactivity. We therefore studied the effect of catecholamine exposure on platelet receptor shedding and platelet aggregation and adhesion *in vivo*.

Methods: Blood samples were obtained from healthy volunteers in sodium citrate tubes. Whole blood was treated with epinephrine (10 and 50 ng/ml) for 5-30 minutes. Platelet receptor shedding (P-selectin, CD40L and GpIIb/IIIa) was quantitated using ELISA(s) specific for each receptor. In other experiments, collagen coated microfluidic channels or microfluidic channels perfused with Human umbilical vein endothelial cell (HUVEC) monolayers were established in microfluidic flow devices. Epinephrine (epi) containing media or media alone was perfused for 5 -30 minutes. Whole blood was subsequently labelled with a fluorescently labeled antibody specific for platelets (PE-Anti CD41/CD61) and perfused through the microfluidic device. Platelet aggregation was determined by fluorescent microscopy in the microfluidic channels coated with collagen. Platelet adhesion to the HUVEC coated microfluidic channels was determined by dual fluorescent staining of the endothelial monolayer (FITC-wheat germ agglutinin) and platelets (PE-anti CD41/CD61).

Results: (Please see attached Table)

Results: Mean ± SD, N = 4 for each group.

	P-selectin (ng/ml)	CD40L (ng/ml	GpIIb/IIIa (ng/ml)	Platelet Adhesion (fluorescent intensity)	Platelet aggregation (fluorescent intensity)
Control (no epi)	4.3 ± 0.4	2.9 ± 0.1	4.9 ± 0.4	290 ± 14	475 ± 26
10ng/ml epi 5min	7.6 ± 0.6*	4.4 ± 0.5*	11.2 ± 1.2*	170 ± 16*	310 ± 15*
10ng/ml epi 30 min	10.4 ± 0.7*	7.3 ± 1.0*	20.1 ± 1.7*	159 ± 17*	246 ± 10*
50ng/ml epi 5 min	16.8 ± 1.2*#	9.0 ± 1.3*#	24.5 ± 2.4*#	139 ± 12*#	235 ± 13*#
50ng/ml epi 30 min	28.2 ± 2.3*$	17.1 ± 1.7*$	50.6 ± 3.0*$	54 ± 5*$	86 ± 7*$

*p<0.05 vs. Control, #p<0.05 vs. 10ng/ml epi (5 and 30), $p<0.05 vs. All groups.

Conclusion: Epinephrine exposure increased platelet receptor shedding in a time and concentration dependent manner. Enhanced platelet receptor shedding was associated with impaired platelet adherence and aggregation in microfluidic flow devices. “Early” platelet functional impairment following catecholamine excess may be a therapeutic window to investigate in future studies.

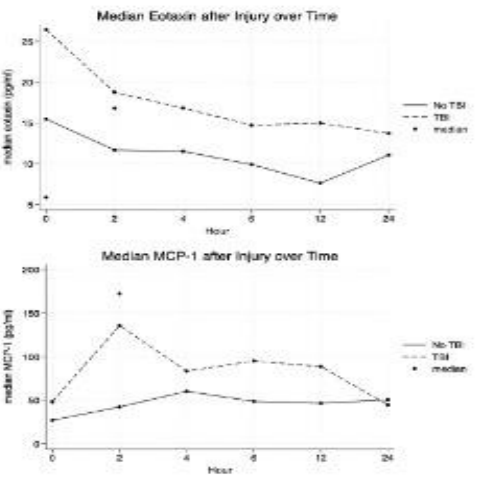
WITHDRAWN

Session XIIIB: Papers 52-60
Paper 55: 2:40 PM - 3:00 PM

EOTAXIN & MCP-1 DOMINATE TIME-DEPENDENT CHEMOKINE SIGNATURES IN TRAUMATIC BRAIN INJURY

Anamaria J. Robles, MD; James T. Ross, MD; Sarah Mahdavi, MD; Matthew W. Mell, MD; Rachael A. Callcut, MD
UC Davis Medical Center
Invited Discussant: Steven Schwulst, MD

Introduction: Inflammation after traumatic brain injury (TBI) is known to impact outcomes, possibly through immune dysregulation. Cytokines and chemokines are key inflammatory mediators whose levels are highly dynamic in the hours after TBI. We sought to characterize the initial levels and temporal profiles of critical plasma inflammatory mediators after TBI.
Methods: Adult trauma patients were prospectively enrolled at a level 1 trauma center (2021-2024). Venous blood was collected within 30 mins of ED arrival (prior to transfusion) and at 2, 4, 6, 12, and 24h. Biomarkers were measured with a 27-plex Luminex panel; individual timepoints and temporal patterns were compared between patients with and without TBI.
Results: 375 patients were enrolled; 16% with TBI. Patients with TBI were older (median 55 vs. 41y, p=0.005), more likely to have blunt injury (95% vs. 65%, p< 0.001), more severely injured (median ISS 25 vs. 5, p< 0.001), and had higher 28-day mortality (34% vs. 2%, p< 0.001). On bivariate analysis, TBI patients had significantly higher median eotaxin, FGF-2, IL-1β, IL-6, IL-7, IL-9, IL-10, IL-12, IP-10, and MCP-1 with lower GM-CSF and IL-2 at the time of injury (p< 0.05). Controlling for ISS, pro-inflammatory chemokines eotaxin (p=0.026) and MCP-1 (p=0.018) were significantly higher in TBI patients. Over time, eotaxin was significantly higher in TBI patients at 0, 2, 6, and 12h, with MCP-1 also higher at 0 and 2h after injury (all p< 0.05).
Conclusion: Initial absolute values of inflammatory chemokines eotaxin and MCP-1 were higher in TBI patients vs. non-TBI patients, and those elevations in eotaxin persist in the TBI cohort over 24 hours. The role of these cytokines in secondary brain injury are not well known and may provide clues for future diagnostic and therapeutic targets.

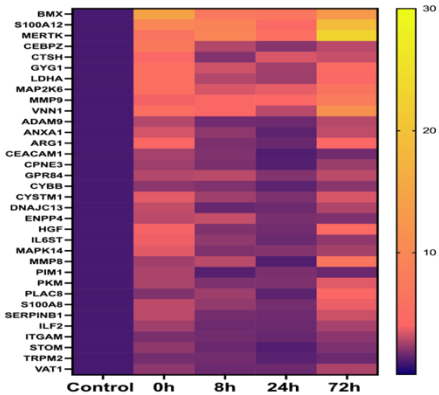


Session XIIIB: Papers 52-60
Paper 56: 3:00 PM - 3:20 PM

BLUNT TRAUMA INDUCES A PRO-INVASIVE TRANSCRIPTIONAL PROGRAM IN ISOLATED CIRCULATING HUMAN NEUTROPHILS

Anaar Siletz, MD, PhD; Jeremy Yu, MS; Justin Wang, MS;
Ajay Prasad, BS; C. Isabella Bent, BS; Monica Wong, MS;
Catherine Beni, MD, PhD; Kazuhide Matsushima, MD; Kenji Inaba, MD;
Matthew Martin, MD; Joseph Cuschieri, MD;
Kelly Street, PhD; J. Perren Cobb, MD
LA County
Invited Discussant: Matthew Rosengart, MD, MPH

Introduction: Trauma induces a "genomic storm" of gene expression in circulating leukocytes. We hypothesized that the neutrophil contribution to this response after blunt trauma varies with the magnitude of physiologic insult and with exposure to additional and subsequent inflammatory stimuli.
Methods: Blunt trauma patients had blood samples taken at 0, 8, 24, and 72h post-injury. Clinical data on injury pattern, treatment, and outcomes were collected. Circulating neutrophils were isolated for whole transcriptome RNAseq. Genes with ³2-fold increased or decreased expression compared to healthy control neutrophils with p< 0.0005 were considered for further analysis and correlation to clinical outcomes.
Results: Nineteen patients were enrolled (median ISS 25, IQR 14-36) with 16377 genes analyzed. 3153 genes were differentially expressed compared to controls and clustered by dynamic expression. Top biological processes implicated were neutrophil degranulation, lysosomal regulation, and cellular migration. Exposure to major surgery and/or blood transfusion between timepoints was associated with deflections in transcriptome dynamics on principle component analysis. Expression of a pro-invasive transcriptional program common to septic shock was identified following injury (**Figure**) and was more pronounced in patients with elevated serum lactate and organ failure.
Conclusions: Cell type-specific analysis teases out the time- and insult-dependent neutrophil signal from the circulating leukocyte "storm". Neutrophil activation by severe trauma induces a pro-invasive transcriptome signal, a potential link between the circulating and tissue phenotypes associated with poor clinical outcomes.



Session XIIIB: Papers 52-60
Paper 57: 3:20 PM - 3:40 PM

TRAUMA-INDUCED ALTERATIONS IN BONE MARROW EXOMSOME MIRNA PROFILES

Athina Yoham, MD; Letitia Bible, MD; Kolenkode Kannan, PhD; Casey Wheeler; Robert Maile, PhD; Philip Efron, MD; Alicia Mohr, MD
University of Florida - Gainesville
Invited Discussant: Obeid Ilahi, MD

Introduction: Severe trauma disrupts bone marrow function, triggering physiological changes that impair hematopoiesis, immune cell production, and the bone marrow microenvironment. Bone marrow-derived exosomes play a critical role in intercellular communication, but their contribution to the cellular response to injury remains poorly understood. This study investigates bone marrow exosome miRNA expression in rodents subjected to polytrauma (PT) with and without chronic stress exposure, a model simulating chronic critical illness following injury.
Methods: Bone marrow was collected from rats (N=6/group) subjected to PT, including lung contusion, hemorrhagic shock, cecal ligation, and pseudo fracture. A second group underwent PT with daily restraint stress (PTRS) to model chronic critical illness. Bone marrow-derived exosomes were isolated seven days post-injury, and miRNA expression was quantified using ROSALIND Bioinformatics Software (Healthcare Technology Systems, San Diego, CA) with significance defined as $p< 0.05$.
Results: Nine miRNAs were differentially expressed in the PTRS group compared to PT alone ($p< 0.05$). Significant upregulation was observed in miR-433 (2.89 log2 fold change), miR-689 (2.28), miR-496 (2.24), miR-1395 (2.11), and miR-875 (2.11). Additional upregulated miRNAs included miR-M1-7, miR-466, and miR-3471. In contrast, miR-216B was downregulated (-1.58) in the PTRS group. Notably, miR-433 and miR-3471 have been linked to impaired erythropoiesis and maladaptive stress responses.
Conclusion: Chronic critical illness following severe trauma alters bone marrow exosome miRNA profiles, modulating gene regulatory mechanisms involved in injury response, inflammation, and recovery. Upregulated miRNAs, such as miR-433 and miR-3471, may contribute to maladaptive stress responses and impaired erythropoiesis, while downregulation of miR-216B suggests disruption of stress resilience pathways. These findings identify potential molecular targets for therapeutic intervention to mitigate trauma-related complications and improve recovery outcomes.

Session XIIIB: Papers 52-60
Paper 58: 3:40 PM - 4:00 PM

GERIATRIC TRAUMA COAGULATION PROFILES: IMPACT OF GENDER ON CLOT FORMATION

Francisco Castillo Diaz, MD; Anastasia Kunac, MD, FACS;
Mohammad Al Ma'ani, MD; Tanya Anand, MD, MPH, MT(ASCP), FACS;
Muhammad Haris Khurshid, MD; Adam Nelson, MD, FACS;
Omar Hejazi, MD; Stanley E. Okosun, MD, MS, FACS;
Louis J. Magnotti, MD, MS, FACS; Bellal Joseph, MD, FACS
University of Arizona
Invited Discussant: Gail Tominaga, MD

Introduction: There is a paucity of data on the role of gender on coagulation characteristics among geriatric trauma patients. We aimed to assess the gender-based differences in TEG and conventional coagulation profiles among geriatric trauma patients.
Methods: We performed a 5-year (2018-2023) retrospective review at a Level I trauma center and included geriatric (≥65 years) trauma patients with the highest activation level and for whom a rapid TEG was obtained on arrival. Patients with bleeding disorders, taking anticoagulation or antiplatelets medications, or who received whole blood, frozen fresh plasma, platelets, and antifibrinolytic medications prior to TEG were excluded. Patients were stratified based on gender. Rapid TEG results included activation time (ACT), α-angle, maximum amplitude (MA), and percent fibrinolysis 30 minutes after MA (LY30). TEG values and conventional coagulation profiles (prothrombin time [PT] and international normalized ratio [INR]) were compared.
Results: 349 geriatric trauma patients met our inclusion criteria and 36.7% were Female. Median time to TEG was 21 minutes. Females had shorter median TEG ACT (seconds, 105 vs 113, p=0.037), and higher α-angle (degrees, 77 vs 75, p< 0.001), MA (mm, 68 vs 65, p< 0.001). There was no difference in LY30. After controlling for confounding factors, male gender was independently associated with lower TEG α-angle (β= -2.081, 95%CI [-3.972 to -0.189], p=0.031) and MA (β= -3.282, 95%CI [-5.412 -1.152], p=0.003). Gender was not identified as an independent predictor of TEG ACT and LY30, PT and INR.
Conclusion: Geriatric female trauma patients are more likely to have faster clot formation and higher clot propagation and strength, indicating a hypercoagulable profile following traumatic injuries.

Session XIIIB: Papers 52-60
Paper 59: 4:00 PM - 4:20 PM

DOES CORRECTING PLATELET INHIBITION DESPITE NORMAL TEG MA IMPROVE OUTCOMES IN ISOLATED NEUROSURGICAL TRAUMA?

Taylor W. Cardwell, MD; Irma Vazquez, MD; Danis Lester, DO;
Khafra Garcia Henry, MD; Darwin Ang, MD
University of Central Florida
Invited Discussant: Carlos Brown, MD

Introduction: Thromboelastogram (TEG) with platelet mapping (PM) assesses coagulopathy in traumatic brain and spinal injuries. Platelet function correction based on PM values is common before neurosurgery, but its impact remains unclear. This study evaluates whether correcting abnormal PM values in patients with normal maximal amplitude (MA) improves outcomes after adjusting for injury type, mechanism, demographics, and comorbidities.

Methods: A retrospective cohort study of adult patients (16–89 years) with isolated traumatic brain (head AIS ≥ 3) or spinal injuries who underwent TEG with PM upon admission across 53 ACS-verified Level 1 and 2 trauma centers. Patients were stratified by injury type (TBI vs. spinal), platelet function correction, and surgical intervention. Primary outcomes included hospital length of stay (LOS), time to surgery, and discharge disposition. Multivariable regression adjusted for age, gender, race, insurance, injury mechanism, and comorbidities.

Results: Among 21,851 patients, those undergoing cranial surgery with platelet correction had worse disposition outcomes (59.4% vs. 38.4%, aOR: 2.30, 95% CI: 1.72–3.08). Spinal surgery patients with platelet reversal had longer LOS (18.1 ± 19.5 vs. 14.1 ± 14.5 days, $p = 0.0019$) and worse disposition (29.4% vs. 10.6%, aOR: 2.47, 95% CI: 1.66–3.68). Non-surgical patients receiving platelet reversal also had higher odds of poor disposition (Cranial: aOR: 2.28; Spinal: aOR: 5.96; Both: aOR: 2.72, all $p < 0.001$). No significant difference in time to surgery was found.

Conclusion: After adjusting for confounders, platelet correction in cases with normal MA but abnormal PM showed no benefit and was associated with worse outcomes, particularly in neurosurgical patients. These findings challenge routine platelet function reversal in isolated brain and spinal injuries and highlight the need for refined transfusion strategies.

Session XIIIB: Papers 52-60
Paper 60: 4:20 PM - 4:40 PM

WHOLE BLOOD RESUSCITATION IS ASSOCIATED WITH DECREASED END-ORGAN DYSFUNCTION IN PEDIATRIC TRAUMA PATIENTS

Erin Feeney, MD; Leah M. Furman, MD; Katrina Morgan, MD;
Barbara A. Gaines, MD; Christine M. Leeper, MD
Children's Hospital of Pittsburgh of UPMC
Invited Discussant: Alicia Mohr, MD

Introduction: Low Titer O Whole Blood (WB) has emerged as a safe and effective therapeutic agent for hemostatic resuscitation in traumatically injured children. The relationship between type of blood product transfused and incidence of end-organ dysfunction is not well elucidated. We hypothesize that WB transfusion is associated with decreased end-organ dysfunction compared to patients receiving Component Therapy (CT).
Methods: This is a multicenter, observational study of injured children ages 0-17 utilizing a national trauma database (2020-2022). Inclusion criteria were receipt of any blood product within 4 hours of ED arrival and survival to 72 hours. Subjects were categorized by receipt of WB. Primary outcome was a composite variable of multi-organ dysfunction (MODS) and respiratory failure, defined as presence of any of the following: mechanical ventilation greater than 6 days, sepsis, acute respiratory distress syndrome, pneumonia, acute kidney injury, urinary tract infection, or myocardial infarction. Data were analyzed using logistic regression, adjusting for age, sex, trauma mechanism, injury severity score (ISS), head abbreviated injury score (AIS), GCS, shock, interfacility transfer, site, total transfusion volume of all blood products (mL/kg), and WB transfusion volume (mL/kg).
Results: 408/2308 (18%) subjects receiving transfusion were given WB. Median (IQR) age was 16 years (15-17), 56% penetrating mechanism, median (IQR) injury severity score 24 (13-44), median (IQR) total transfusion volume 20 mL/kg (12-52), and median (IQR) WB transfusion volume 13 mL/kg (8-20). The incidence of respiratory failure, either isolated or in combination with additional parameters, was 61% (1487/2308), and incidence of MODS was 7% (165/2308). In the adjusted model, WB transfusion was associated with decreased odds of respiratory failure and MODS (Odds Ratio 0.71 (Confidence Interval 0.52-0.97, p=0.03)). On sensitivity analysis, inclusion of additional subjects with 72-hour mortality minimally impacted the predicted outcome of respiratory failure and MODS (OR 0.70, CI 0.55-0.92, p=< 0.01)), suggesting minimal influence of survival bias in the model.
Conclusion: WB resuscitation was associated with reduced end-organ dysfunction, including MODS and respiratory failure, in pediatric trauma patients. Further large, prospective, and mechanistic studies are needed.

Session XIV: Quickshot Session I 1-13
Paper 1: 8:00 AM – 8:06 AM

PERSONALIZED STROKE RISK IN BLUNT CEREBROVASCULAR INJURY (BCVI): AN INTERACTIVE ONLINE TOOL

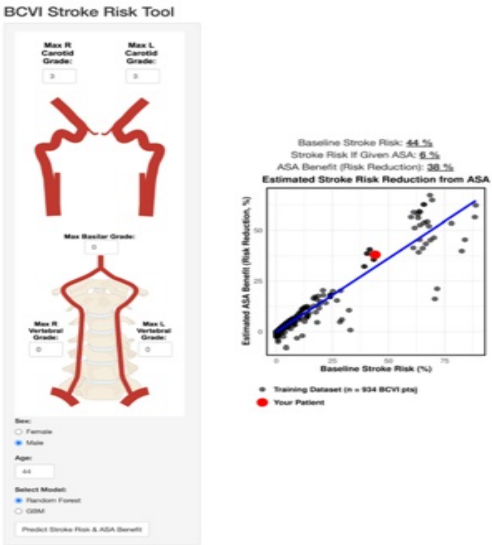
Victoria Wagner, MD; Joshua Preston;
Luis Alejandro De Leon Castro, MD; Jonathan Nguyen, DO;
Manuel Garcia-Toca, MD; Elizabeth R. Benjamin, MD;
S. Rob Todd, MD; Jason D. Sciarretta, MD, FACS
Grady Memorial Hospital
Invited Discussant: Haytham Kaafarani, MD

Introduction: Stroke risk generally correlates to the Biffl grading system in BCVI. Although antiplatelet (AP) therapy is the mainstay of stroke prevention, no point-of-care clinical decision-support tool exists to guide optimal timing for AP therapy. We sought to develop an interactive online calculator that incorporates patient-specific demographics and injury characteristics to estimate stroke risk and risk reduction with AP administration.

Methods: BCVI patients (n=934) >15 years at a Level I Trauma Center were retrospectively collected (January 2016-December 2023) and analyzed. Machine learning methods (random forests and gradient boosting machines) were employed to predict stroke risk and AP risk reduction. The model was implemented as an R-based Shiny online application.

Results: Strongest predictors for stroke were the greatest Biffl grade of carotid (OR [95%CI] =1.89 [1.42–2.48]), the greatest Biffl grade of vertebral injuries (1.27 [1.00–1.62]), and the multifocal carotid injuries (2.71 [0.99–7.02]). Patients treated with AP were 70% less likely to have a stroke (number needed to treat = 20). Utilizing patient demographics and injury characteristics, the machine learning models provided stroke risk and risk reduction with AP, and this was successfully integrated into an interactive online tool (Figure 1).

Conclusion: We identified key stroke risk factors and developed a generalizable predictive model for personalized risk assessment. The integration of patient-specific risk-benefit assessments into clinical decision-making will guide the optimal timing of AP initiation while reducing variability in AP therapy. External validation is warranted to further predict and prepare this tool for broader clinical applicability.



Session XIV: Quickshot Session I 1-13
Paper 2: 8:06 AM – 8:12 AM

TO DIVERT OR NOT TO DIVERT: RETHINKING PROXIMAL DIVERSION IN ISOLATED NON-DESTRUCTIVE PENETRATING RECTAL TRAUMA

Riddhi Mehta, MD; Kartik Prabhakaran, MD; Anna Jose, MD; Rishwanth Vetri, MD; Jordan Kirsch, DO; Ilya Shnaydman, MD; Gabriel Froula, DO; Matthew Bronstein, MD; Bardiya Zangbar, MD
Westchester Medical Center
Invited Discussant: Richard Gonzalez, MD

Introduction: This study evaluates the impact of proximal diversion vs primary repair and/or non-operative management on outcomes in isolated extraperitoneal penetrating rectal injuries.
Methods: Retrospective analysis of TQIP (2017-2022) was done to isolate adults with penetrating rectal trauma. Patients with other injuries of AIS≥ 3 were excluded. Patients were dichotomized into proximal diversion (PD+) and no proximal diversion (PD-). PD (+) included patients who underwent isolated PD and PD in conjunction with repair or resection while PD (-) included patients who underwent primary repair without PD or non-operative management. Propensity score matching (PSM) was performed in 1:1 ratio to adjust for age, race, sex, mechanism of injury, shock index and AAST grade of injury. In-hospital outcomes were assessed.
Results: Out of 2,396 patients, 48.3% had high grade injury and most common mechanism was firearms. 55.2 % were in PD (+) out of which 56.9% were only diversion. In PD (-) 58.7% were managed non-operatively. After PSM, there were 498 patients in each group. There was no significant difference in mortality between PD (+) and PD (-). Lower complications and higher routine discharge were seen in PD (-). Length of hospital stay was lower in PD (-).

	PD (+) (n = 498)	PD (-) (n = 498)	*p*-value*
Routine Discharge	246 (49.4%)	330 (66.8%)	<0.001
Inpatient Rehab	50 (10.0%)	38 (7.7%)	<0.001
Hospital LOS	17.48 ± 19.02	11.59 ± 13.10	<0.001
Unplanned OR	39 (7.8%)	16 (3.2%)	0.001
Sepsis	15 (3.0%)	1 (0.2%)	<0.001
AKI	20 (4.0%)	8 (1.6%)	0.021

LOS: Length of Stay, AKI: Acute Kidney Injury.
*Independent T-test and Chi-square test.

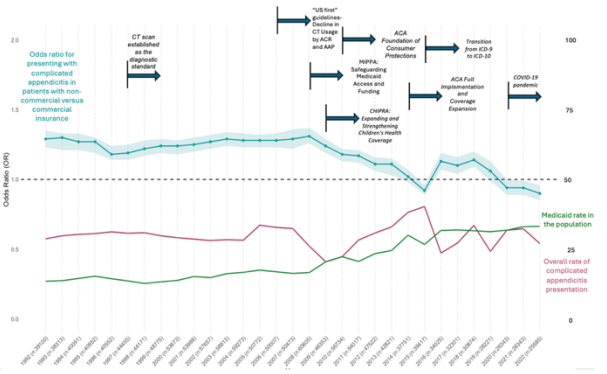
Conclusion: While management of high grade and firearm injuries do require expert clinical judgement, the majority of patients with isolated extraperitoneal penetrating rectal injuries can be safely managed without proximal diversion.

Session XIV: Quickshot Session I 1-13
Paper 3: 8:12 AM – 8:18 AM

THE IMPACT OF MEDICAID POLICIES ON REDUCING INSURANCE-BASED DISPARITIES IN COMPLICATED APPENDICITIS RATES: A 30-YEAR ANALYSIS

Saba Ilkhani, MD, MPH, MBA; Ghazal Sanadgol, MD MBA; Brittany Dacier, MD; Alexander J. Ordoobadi, MD; Hiba Dhanani, MD; Molly P. Jarman, PhD, MPH; Stephanie Nitzschke, MD; Reza Askari, MD; Ali Salim, MD; Gezzer Ortega, MD MPH
Brigham & Women's Hospital
Invited Discussant: John Scott, MD, MPH

Introduction: Complicated appendicitis (CA) is often considered a proxy for delayed care and barriers to timely healthcare access. This study examines trends in the proportion of commercially insured (CI) and non-commercially insured (NCI) patients diagnosed with CA over 30 years, along with changes in Medicaid coverage.
Methods: Using the 1992-2022 AHRQ-HCUP National Inpatient Sample databases, we identified appendicitis patients under 65, excluding those with Medicare or immunosuppression. Logistic regression with survey weights compared the annual odds of CA between CI and NCI patients, adjusting for age, sex, and comorbidities. We also analyzed Medicaid coverage trends and assessed major policy changes affecting access.
Results: We analyzed 1,360,077 patients, with the annual proportion of patients with CA ranging from 20.1% to 40%. Patients with NCI had higher odds of CA from 1992 to 2013, but this trend declined starting in 2008. By 2014, the likelihood was similar between insurance groups. Medicaid coverage increased from 13.5% to 33.2%, with the most notable increase in coverage starting in 2008, coinciding with the implementation of the MIPPA (2008), CHIPRA (2009), and ACA (2010 and 2014).
Conclusion: Over three decades, the gap in CA rates between commercially and non-commercially insured patients has narrowed, aligning with Medicaid expansion. This suggests that policy-driven healthcare improvements promote timely healthcare access.



Session XIV: Quickshot Session I 1-13
Paper 4: 8:18 AM – 8:24 AM

TRAUMATIC INJURY IN PREGNANCY - AN AAST-SPONSORED MULTI-INSTITUTIONAL REVIEW OF FETAL OUTCOMES

John Simpson, MD; Patrick Mcgrew, MD;
Traumatic Injury in Pregnancy Study Group (TIPSG)
Tulane School of Medicine
Invited Discussant: Meghan Lewis, MD

Introduction: Traumatic injury occurs in approximately 6-8.3% of pregnancies and is the leading cause of non-obstetrical maternal death, accounting for 20-46% of maternal deaths during pregnancy. Data regarding traumatic injury in this cohort is limited and lacks granularity. We sought to examine the impact of post-injury maternal-fetal risk factors on pregnancy loss.
Methods: This was an AAST sponsored multi-institutional study of traumatically injured pregnant females (TIPF) at 20 U.S. trauma centers (18 Level 1, 2 Level 2) between 2009-2024. The primary outcome of interest was pregnancy loss.
Results: 2,034 TIPF with a mean maternal age of 26.6 (±6.3) years were included. Mean gestational age was 29 (±9.3) weeks and injury during the 3rd trimester was most frequent (44.1%). The most common injury mechanisms were MVC (70.8%), falls (10.1%), assaults (6.5%), and gunshot wounds (4.6%). Pregnancy loss occurred in 4.7% of patients. Risk factors for pregnancy loss on multivariate logistic regression are demonstrated in Table 1.
Conclusion: Traumatically injured pregnant females are at high risk of adverse outcomes. Identification of key risk factors for pregnancy loss may guide future trauma care protocols and improve outcomes.

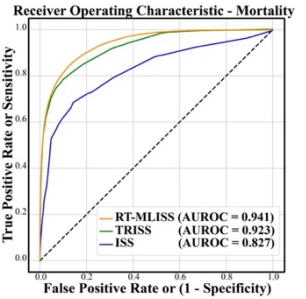
Session XIV: Quickshot Session I 1-13
Paper 5: 8:24 AM – 8:30 AM

IS IT TIME TO RETIRE THE INJURY SEVERITY SCORE (ISS)? ISS IS OUT, REAL-TIME MACHINE LEARNING-ISS (RT-MLISS) IS IN

Michael D. Cobler-Lichter, MD; Jessica M. Delamater, MD, MPH;
Ana M. Reyes, MD, MPH; Talia R. Arcieri, MD;
Jonathan P. Meizoso, MD, MSPH; Carl I. Schulman, MD, PhD, MSPH;
Brandon M. Parker, DO; Kenneth G. Proctor, PhD; Nicholas Namias, MD, MBA
University of Miami, Miller School of Medicine
Invited Discussant: Rachael Callcut, MD, MSPH

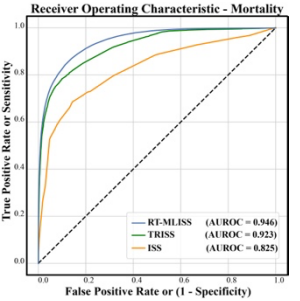
Introduction: Injury Severity Score (ISS) standardizes traumatic injury severity but does not account for patient physiology and is not available in real-time. Augmented scoring systems such as RTS and TRISS also have limitations and cannot be computed in real-time. We hypothesized that machine learning (ML) techniques could derive a score which can be computed in real-time and better predicts mortality than ISS or TRISS.

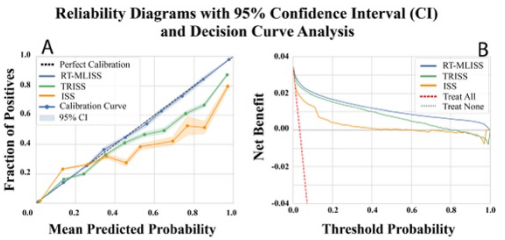
Methods: The American College of Surgeons Trauma Quality Improvement Project Databank (2017-2021) was reviewed, excluding burns, mechanism of injury of "other", and patients with missing data for trauma type, mortality, ISS or TRISS. A preliminary ML model determined the eight most influential variables: age, initial GCS, SBP, heart rate, temperature, weight, ISS, and mechanism. A final Real-Time, Machine Learning Injury Severity Scoring model (RT-MLISS) was then created using only these eight variables while substituting ISS with "number of injuries," and optimizing for area under the receiver operator curve (AUROC). This was compared to both ISS and TRISS predictions using paired bootstrap testing.



Results: Among 4,521,790 patients (3.5% mortality), RT-MLISS (AUROC 0.941 [95% CI 0.940-0.942]) outperformed ISS (AUROC 0.827 [95% CI 0.824-0.829]) and TRISS (AUROC 0.923 [95% CI 0.921-0.924]) in the prediction of in-hospital mortality ($p<$ 0.0001, Figure 1).

Conclusion: RT-MLISS has higher discriminatory ability than ISS and TRISS in the prediction of mortality and can be derived in real-time, offering potential early risk stratification in trauma populations.





Session XIV: Quickshot Session I 1-13
Paper 6: 8:30 AM – 8:36 AM

HAVE WE LEVELED THE PLAYING FIELD IN ACCESS TO PELVIC ANGIOEMBOLIZATION IN PATIENTS WITH PELVIC FRACTURE ASSOCIATED HEMORRHAGE? A MULTICENTER AAST STUDY

Bryana Baginski, MD; Kyle M. Campbell, DO; Thomas Schroeppel, MD; Jennifer Rodriquez, MD; Brian Sheehan, MD; Jeffry Nahmias, MD; Tatiana Cardenas, MD; James Bradford, MD; Todd Costantini, MD; Laura N. Haines, MD, FACS; Elizabeth R. Benjamin, MD; Deepika Koganti, MD; Linda Dultz, MD; Gerald Ogola, PhD; Jennifer Mooney, MD
Baylor University Medical Center, Dallas
Invited Discussant: Lawrence Diebel, MD

Introduction: Time to angioembolization (PAE) for pelvic fracture related hemorrhage may be associated with worse outcomes. It has been suggested in the literature that patients admitted during nights and weekends may have a significant increase in time to PAE compared to those admitted during weekdays. This delay in intervention has also been correlated with increased mortality. However, these studies were performed prior to the creation of a standard criterion in 2014 by the American College of Surgeons regarding interventional radiology response time. We hypothesized that patients presenting during nights and weekends would have similar time to intervention and mortality, compared to those who arrive during the weekday (Monday-Friday 7am to 7 pm).
Methods: We conducted a multicenter prospective (2018-2022) observational study of patients with blunt pelvic fracture related hemorrhage who underwent PAE. Patients were divided into those who were admitted during nights and weekends versus those who arrived during the weekday (Monday-Friday 7am to 7 pm). Our primary outcomes were time to intervention and mortality. We performed an additional subgroup analysis on patients at greatest need of an emergent intervention by excluding patients not transfused within 24 hours of arrival and those who underwent angiography >4 hours from arrival.
Results: Of 381 included patients, 236 (61.9%) arrived during nights or weekend and 145 (38.1%) arrived during weekdays. There was no difference between the groups in time to angiography (195.0 min vs 188.0 min; p=0.34) or mortality (17.8% vs 15.2%; p=0.5). On subgroup analysis of the 199 patients most in need of PAE there was again no difference in mortality in the cohorts (p=0.76).
Conclusion: Evolving standards for trauma center verification continue to strengthen the care of the injured patient as this study demonstrated similar time to intervention and mortality regardless of when patients arrived to the trauma center.

Session XIV: Quickshot Session I 1-13
Paper 7: 8:36 AM – 8:42 AM

TRANEXAMIC ACID ADMINISTRATION FOLLOWING SHOCK: PROTECTIVE OR INJURIOUS EFFECTS ON THE MICROCIRCULATION?

Farhan Chaudhry, MD; Stephanie Agudelo, DO;
David Liberati, MS; Lawrence Diebel, MD
Detroit Medical Center
Invited Discussant: Michael Dalton, MD, MPH

Introduction: The glycocalyx is an extracellular matrix which has significant prognostic implications for the microcirculation. Tranexamic acid (TXA) reduces fibrin degradation, thus may be protective of the glycocalyx. We assessed if early TXA administration would be protective of the glycocalyx in a shock-induced cellular microfluidic model.
Methods: Human umbilical vein endothelial cells (HUVEC) were established in microfluidic flow devices and subjected to control or shock conditions (1% O_2 + epinephrine; Shock) in whole blood labelled with fluorescent fibrinogen. TXA was added at 1hr or 3 hr after shock. Glycocalyx integrity was indexed by shedding syndecan-1(Syn-1) and glycocalyx thickness. We assessed A Disintegrin and Metalloproteinase-17 (ADAM-17) and matrix metalloproteinase (MMP) activities. Fibrin deposition assessed clot formation.
Results: Syn-1, glycocalyx thickness, ADAM-17 activity, MMP activity, and Fibrin deposition were all significantly different among groups (Table 1).
Conclusion: TXA reduces proteinase activity and protects the glycocalyx. However, TXA's effect is more profound with earlier administration. The administration of TXA at 3 hours following shock did not prevent clot formation (fibrin deposition) in our microfluidic flow model.

Table 1: Mean ± SD, N = 6 for each group, *p<0.05 vs. Control, #p<0.05 vs Shock (No TXA), $p<0.05 vs. Shock + TXA 1h

	Syn-1 (pg/ml)	Glycocalyx thickness (Fluor intensity)	ADAM-17 activity (RFU/µg/protein)	MMP activity (RFU/min))	Fibrin deposition (Fluor intensity)
HUVEC control (TXA 1hr)	29.8 ± 5.5	260 ± 22	2.15 ± 0.9	44.3 ± 4.4	65 ± 12
Shock(1hr)	94.9 ± 5.4*	119 ± 14*	8.79 ± 1.9*	205.8 ± 16.3*	705 ± 26*
Shock (3hr)	91.9 ± 5.8*	130 ± 18*	8.25 ± 1.4*	201.2 ± 15.4*	690 ± 27*
Shock+ TXA 1 hr.	39.3 ± 4.3#	253 ± 21#	2.75 ± 0.4#	62.5 ± 6.1*	82 ± 15#
Shock+ TXA 3hr.	62.9 ± 4.4*#$	182 ± 14*#$	6.23 ± 1.3*#$	96.6 ± 6.2*#$	600 ± 33*#$

Session XIV: Quickshot Session I 1-13
Paper 8: 8:42 AM – 8:48 AM

PROLONGED PARTIAL AORTIC OCCLUSION WORSENS NEUROLOGIC OUTCOMES WITHOUT AFFECTING BRAIN LESION SIZE IN A SWINE MODEL OF TRAUMATIC BRAIN INJURY AND HEMORRHAGE

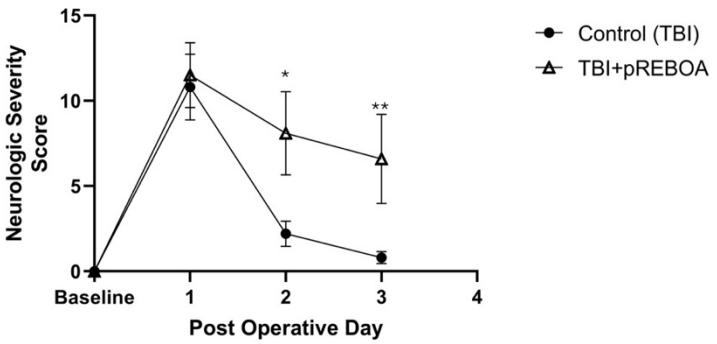
Marjorie Liggett, MD; Zaiba Dawood, MD; Daniel Couchenour, MD; Maxime Visa, BS; Andrew Yoon, BS; Kiril Chtraklin, DVM; Alvin Anad, BS; Bowen Wang, PhD; Hasan Alam, MD
Northwestern University
Invited Discussant: Lucas Neff, MD

Introduction: Traumatic brain injury (TBI) and hemorrhagic shock are the leading causes of death in trauma. The partially occluding resuscitative endovascular balloon occlusion of the aorta device (p-REBOA) has emerged as a tool for hemorrhage control with reduced ischemic consequences, allowing for prolonged use. Prior studies in swine show no increase in brain lesion size with prolonged p-REBOA use, but long-term neurologic outcomes remain unknown. We hypothesized that prolonged p-REBOA deployment would worsen neurological outcomes.

Methods: Female Yorkshire swine (n=5/group; 37-42 kg) were subjected to a controlled cortical impact plus common iliac artery injury and randomized to either: 1) p-REBOA for two hours (p-REBOA group) followed by vascular repair, or 2) immediate vascular repair with no p-REBOA for 2-hours (control). Daily neurologic severity scores [NSS; 0 (normal)-32 (comatose)]), and brain lesion size on day 3 were compared.

Results: Blood loss, resuscitation, and physiologic parameters were similar between both the groups. While the brain lesion size did not differ between the two groups (p= 0.55), NSS were significantly worse in the p-REBOA group compared to controls (*, p=0.048 at 48 hours and **, p=0.006 at 72 hours, respectively).

Conclusion: This is the first study to show that prolonged p-REBOA is associated with worse neurologic outcomes, independent of the brain lesion size.



Session XIV: Quickshot Session I 1-13
Paper 9: 8:48 AM – 8:54 AM

TBI IN MICE AND PIGS INCREASES SUSCEPTIBILITY TO BACTERIAL PNEUMONIA BY MODULATING THE INNATE IMMUNE RESPONSE

Anupamaa Seshadri, MD; Hyoin Kim, PhD; James Harbison, MS;
William Meehan, MD; Jianhua Qiu, MD, PhD; Fernanda Guilhaume-Correa, PhD;
Kaitlyn Warren, MS; Nadia Nosek, BS; Ryan Luke Sodemann, BS;
Arthur Nedder, DVM; Rebekah Mannix, MD, MPH; Carl Hauser, MD;
Leo Otterbein, PhD
Beth Israel Deaconess Medical Center
Invited Discussant: Michael Yaffe, MD, PhD

Introduction: Traumatic brain injury (TBI) leads to immune dysregulation that is known to predispose patients to infections. We hypothesize that tissue injury increases the presence of Danger Associated Molecular Pattern (DAMP) molecules that result in this immune dysregulation, and further, that free heme is particularly deleterious. To test this, we developed both murine and porcine models of TBI with subsequent bacterial lung inoculation to study the role of tissue injury on susceptibility to lung infection.

Methods: C57Bl6 mice (n=4-6 per group) or Yucatan mini swine underwent sham or a mild TBI with standardized cranial weight drop. 24 hours later (mice), or immediately post (pigs), animals underwent intratracheal inoculation with 10^4-10^6CFU of *S. aureus*. 24 hours after bacterial inoculation, animals were euthanized, and lungs were harvested for further analyses. Plasma from mice, pigs and human TBI patients were analyzed for the presence of free heme.

Results: In mice, pigs and humans, TBI leads to elevated plasma free heme compared to uninjured controls (data not shown). In both mice and pigs, TBI decreased the ability to clear bacteria from the lungs as compared to infection (Figure 1A). In mice, this corresponded with increased neutrophil infiltration and TNF expression (Fig 1B). However, neutrophils from human TBI patients exhibited decreased phagocytosis and chemotaxis as compared to healthy controls (Fig 1C).

Conclusion: TBI leads to elevated plasma free heme in mice, pigs, and humans, which is correlated with significantly decreased lung bacterial clearance after mild TBI. Further studies are required to understand the link between brain injury, heme and a dysfunctional immune response that prevents these cells from effectively clearing bacteria.

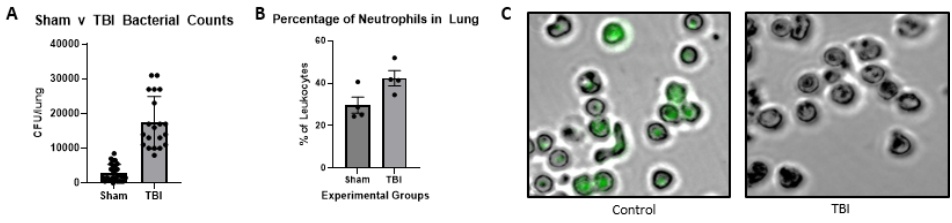


Figure 1: A. TBI mice have significantly higher bacterial counts 24h after inoculation compared to sham. B. Neutrophil percentage in lung is increased after TBI alone. C. Human TBI neutrophils exhibit less phagocytosis as compared to controls using pHrodo fluorescence assay.

Session XIV: Quickshot Session I 1-13
Paper 10: 8:54 AM – 9:00 AM

HIGH FFP: PRBC RATIOS ARE ASSOCIATED WITH LOWER RATES OF AKI AND ARDS IN TQIP: A PROPENSITY SCORE MATCHED ANALYSIS

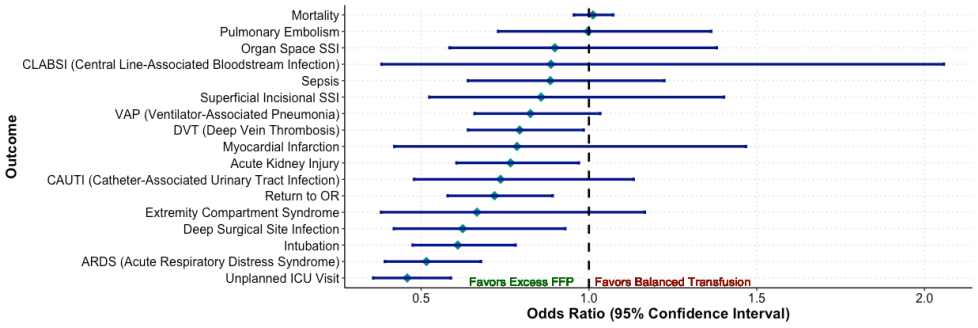
Erik L. Risa, MD; Andrew M. Loudon, MD; Omkar S. Pawar, MS; Matthew L. Moorman, MD; Amy P. Rushing, MD; James Ross, MD
Case Western Reserve University - University Hospitals
Invited Discussant: Julia Coleman, MD, MPH

Introduction: Balanced transfusion with (1:1:1) ratios of fresh frozen plasma (FFP), packed red blood cells (PRBC), and platelets is a core tenet of management in traumatic hemorrhagic shock. However, pre-clinical data suggest that PRBCs contribute to endothelial dysfunction while FFP may be protective. We compare clinical outcomes of excess FFP (>1.1:1) against balanced transfusion.

Methods: Trauma patients (>18 years) in TQIP (2017-2022) who received ≥1U FFP and 1U PRBC within 4h were included. Those with whole blood or FFP: PRBC < 0.9 were excluded. Balanced Transfusion (BT) group received FFP: PRBC 0.9-1.1 and excess FFP (xFFP) received FFP:PRBC >1.1. Comparison groups were propensity matched based on odds of mortality and compared by multivariable regression.

Results: 50,594 patients were analyzed (75% male, median age 38, ISS 25). 31,960 (63%) were BT and 18,634 (37%) xFFP. Propensity matching generated 16,939 pairs (mean standard difference < 0.05). After multi-variable adjustment, xFFP was associated with 49% decreased odds of ARDS (p< 0.001), and 24% decreased odds of acute kidney injury (p=0.027) compared to BT. There was no difference in hospital mortality (OR 1.01, 95% CI 0.95-1.07).

Conclusions: We found that early excess FFP (FFP:PRBC ratio >1.1) was associated with lower odds of ARDS and AKI compared to balanced transfusion (FFP:PRBC ratio 0.9-1.1).



Session XIV: Quickshot Session I 1-13
Paper 11: 9:00 AM – 9:06 AM

DELAYED-PHASE CT IN HIGH-GRADE RENAL TRAUMA: INCREASED INTERVENTIONS WITHOUT IMPROVED OUTCOMES AND THE PREDICTIVE VALUE OF SYMPTOMS AT FOLLOW-UP

William M. Rice, BS; Ryan Mancoll, BS; Stephanie Harper, MS; Jacob Hoffman, BA; Parker Adams, BS; Jay N. Collins, MD, FACS
E.V.M.S.

Invited Discussant: Kaushik Mukherjee, MD

I**ntroduction**: Screening for urinary extravasation (UE) after high-grade renal trauma using delayed-phase CT (DPCT) has been associated with increased urological intervention rates. We investigated the association of DPCT with major complications and urological intervention rates, while analyzing the predictive value of clinical symptoms of UE at follow-up DPCT.
Methods: This retrospective cohort study analyzed patients aged 18-89 with AAST grade III-V renal injuries at a Level 1 Trauma Center from 2013-2023. Data was obtained from the institutional trauma registry and electronic medical records. Univariable and risk-adjusted multivariable regressions assessed the association of DPCT with major complications and urological intervention rates. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of UE signs and symptoms (leukocytosis, fever, flank pain, hematuria) at follow-up DPCT were calculated, using chi-squared to determine significance ($p< 0.05$).
Results: Of 234 patients, 232 had any abdominal CT scan (99.1%), 101 (43.2%) underwent DPCT, and 2 (0.9%) were only graded intraoperatively. Baseline characteristics were similar between DPCT vs. no-DPCT, including injury grade ($p=0.13$). DPCT patients had higher rates of urological interventions compared to no-DPCT (21.8% vs 2.3%, $p< 0.001$) but similar complication rates (16.8% vs 16.5%, $p=0.95$). After multivariable regression, DPCT was not associated with reduced odds of major complications (OR 1.49, $p=0.33$) but with increased odds of undergoing urological intervention (OR 12.07, $p< 0.001$). The presence of at least one symptom at follow-up DPCT had a sensitivity and NPV of 100% for UE ($p=0.019$).
Conclusions: DPCT was strongly associated with urological intervention after risk adjustment and all asymptomatic patients had negative follow-up DPCTs. While our results suggest potential overtreatment regarding urological interventions and follow-up imaging, further prospective studies are needed to confirm these findings given our study's retrospective limitations.

Session XIV: Quickshot Session I 1-13
Paper 12: 9:06 AM – 9:12 AM

REEVALUATING C-SPINE CLEARANCE: THE ROLE OF MRI AFTER NEGATIVE CT IN BLUNT TRAUMA PATIENTS

Mason Oliver, BS; Rijul Amin, BS; Maurice Inkel, MD;
Rahul Mhaskar, PhD; Milad Behbahaninia, MD
Morsani College of Medicine
Invited Discussant: Rachel Rodriguez, MD, MS

Introduction: In blunt trauma patients reporting persistent neck pain despite a negative CT, an MRI is traditionally necessary to determine if a rigid collar can be removed. However, recent recommendations have questioned the utility of MRI, suggesting it infrequently leads to more than conservative management. This shift in practice may lead to premature clearance of the c-spine and removal of the rigid collar. This study aims to report the incidence and treatment outcomes of clinically significant injuries detected by MRI but not CT.

Methods: Retrospective analysis of adult blunt c-spine trauma patients with both a CT c-spine and an MRI c-spine during hospitalization between January 2018 and December 2022. Patients were excluded if their initial CT revealed any acute abnormality. Radiology reports, treatments, and outcomes were analyzed.

Results: 560 patients were included, with a mean age of 49 and 67% male. MRI of these patients revealed a fracture in 18 (3.2%), disc protrusion in 136 (24.3%), and spondylosis in 112 (20.0%). Of the 18 patients with a fracture on MRI, 4 (22.2%) were treated with fusion, 9 (50.0%) were treated with a rigid collar, and 5 (27.8%) received no additional treatment. Of the patients with disc protrusion on MRI, 16 (11.8%) were treated with fusion, 30 (22.1%) were treated with rigid collar, 4 (2.9%) were treated with cervical thoracic orthosis, and 86 (63.2%) received no additional treatment. Of the patients with spondylosis on MRI, 7 (6.3%) were treated with fusion, 26 (23.2%) were treated with rigid collar, 1 (0.9%) was treated with soft collar, and 78 (69.6%) received no additional treatment. Overall, 39 or 7.0% of patients with a negative CT c-spine and a positive MRI c-spine were treated with cervical fusion.

Conclusion: Utilization of MRI after negative CT can reveal previously undetected acute c-spine injuries. Detection of these injuries with MRI leads to surgical intervention in 7% of cases.

Session XIV: Quickshot Session I 1-13
Paper 13: 9:12 AM – 9:18 AM

LEFT BEHIND: ASSOCIATION OF PREHOSPITAL FIELD UNDER-TRIAGE AND OUTCOMES AFTER INJURY

Liling Lu, MS; Sebastian M. Boland, MD, MBA; Tamara Byrd, MD, MPH; David Silver, MD, MPH; Joshua Brown, MD, MSc, FACS
University of Pittsburgh
Invited Discussant: Nicholas Namias, MD, MBA

Introduction: Despite perception of the negative effects of field under-triage for injured patients, relatively little literature exists documenting worse outcomes, and trauma registry data is limited by missing patients that never arrive at a trauma center. Our objective is to evaluate the impact of under triage on outcome in a broad group of injured patients transported to trauma and non-trauma centers.
Methods: Retrospective cohort study of injured adult patients in the Pennsylvania state discharge database (PHC4). Under-triage was defined as patients not transported initially to a level I/II trauma center who met anatomic, mechanism, or age national field triage criteria using ICD-10 codes. Our primary outcome was in-hospital mortality. Secondary outcomes were hospital length of stay (LOS) and discharge disposition (home vs non-home). The association between outcomes and under-triage were determined using doubly robust targeted maximum likelihood estimation (TMLE), adjusting for age, sex, race, mechanism of injury and ISS.
Results: 60,523 trauma patients were included, with an under-triage rate of 53.4%. TMLE demonstrated increased relative risk of in-hospital mortality associated with under-triage (Table), but shorter LOS (-0.36 days [95%CI -0.49, -0.23]). For discharge disposition, a generalized additive model identified a significant change in the effect of under-triage at 60 years old. For patients under 60, under-triage is associated with higher chances of discharge home; however, for patients older than 60, under-triage is associated with a lower risk of discharge to home (Table).
Conclusion: We demonstrate among injured adults transported to both trauma and non-trauma centers in Pennsylvania that prehospital field under-triage based on the national field triage guidelines is associated with an increased risk of mortality and less likelihood of discharge home among older adults.

Outcome	Age group	Relative risk (RR)	95% CI
In-hospital mortality	>= 18 yrs old	1.15	[1.03, 1.29]
Home vs not Home	>= 60 yrs old	0.96	[0.94, 0.99]
	<60 yrs old	1.03	[1.01, 1.05]

Session XV: Quickshot Session II 14-26
Paper 14: 9:40 AM – 9:46 AM

LOW MORTALITY IN SEVERE BLUNT AND PENETRATING TRAUMA WITH AN INSTITUTIONAL REBOA PROTOCOL

Carlos A. Ordonez, MD, FACS; Michael W. Parra, MD, FACS;
José Julian Serna, MD; Maria Isabel Fernandez, MD;
Andrés Gempeler, MD; Diana Montilla, MD;
Mario Barbosa, MD; Alexander Salcedo, MD; Carlos A. Serna, MD;
Boris Sanchez, MD; Helmer Palacios, MD; Yaset Caicedo, MD;
Alberto F. García, MD; Fernando Rodriguez-Holguín, MD
Fundación Valle del Lili
Invited Discussant: Juan Duchesne, MD

Introduction: Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) has emerged as a valuable adjunct in the management of hemorrhagic shock. This study aims to evaluate the value and the potential impact that an established institutional aortic occlusion protocol has on the overall survival of critically injured trauma patients.

Methods: We conducted a retrospective descriptive study of patients admitted to a Level I trauma center between 2015 and 2024 who required REBOA for hemorrhagic shock. Indications included a systolic blood pressure (SBP) ≤70 mmHg upon arrival and/or subsequent hemodynamic deterioration. Collected variables included demographic data, admission physiology, Injury Severity Score (ISS), Abbreviated Injury Scale (AIS), estimated blood loss, total occlusion time, and hemodynamic response to REBOA. The primary outcome was mortality. Continuous variables are reported as medians with interquartile ranges (IQR).

Results: One hundred thirty patients were included, with a median age of 32 years. The majority were male 112 (86%), and penetrating trauma accounted for 65% (84) of cases. Median SBP upon admission was 70 mmHg (IQR 54-90), with a median ISS of 25 (IQR 25-34). The median AIS score was 4 (IQR 3-5) for thoracic injuries and 5 (IQR 4-5) for abdominal injuries. Non-compressible torso hemorrhage was present in 85% (110) of patients. Estimated blood loss was 3000 mL (IQR 2000-4000mL). Major vascular injuries were identified in 191 cases, with 10 aortic injuries. All patients underwent surgical and/or endovascular hemorrhage control in addition to REBOA placement. The median time of REBOA insertion was 5 minutes (IQR 5-15), and the median total occlusion time was 35 minutes (IQR 25-53). Median SBP increased from 60 mmHg (IQR 40-76) pre-REBOA to 110 mmHg (IQR 90-134) post-REBOA. The median ICU length of stay was 7 days (IQR 3-14). The overall mortality rate was 22% (95% CI: 15.1-29.2); 35.1% (13/37) in blunt trauma and 16.1% (15/93) in penetrating trauma.

Conclusion: The implementation of an institutional REBOA protocol in trauma patients with hemorrhagic shock facilitates rapid hemorrhage control without delaying definitive interventions. This approach enables timely hemodynamic stabilization and favors survival in patients with life-threatening injuries.

Session XV: Quickshot Session II 14-26
Paper 15: 9:46 AM – 9:52 AM

BREAKING PROTOCOL: SHOULD DESTRUCTIVE COLON INJURIES BE MANAGED DIFFERENTLY IN A BALANCED BLOOD PRODUCT RESUSCITATION ERA?

Kevin Lang, MD; Devanshi Patel, MD; Meredith Perkins, MD;
Andrew Fleming, MD; Saskya Byerly, MD; Dina Filiberto, MD;
John Sharpe, MD; Cory Evans, MD
University of Tennessee - Memphis
Invited Discussant: Martin Croce, MD

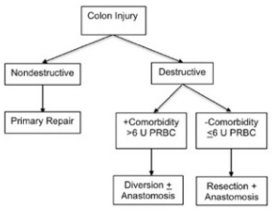
Introduction: Traumatic colon injuries are a significant source of morbidity. For several decades, institutional colon injury management protocol advises diverting ostomy for destructive injuries if patients receive >6 units packed red blood cells (pRBCs) or have medical comorbidities. With advancements in transfusion strategies, interventional radiology, and medical management, this protocol warrants re-evaluation.

Methods: We retrospectively reviewed five years of traumatic colon injuries at an urban Level 1 trauma center, analyzing destructive injuries treated with resection and anastomosis without diversion. Injury characteristics, management, and outcomes were collected. Factors associated with anastomotic leak (AL), abscess, reoperation, and mortality were assessed. Variables included 24-hour pRBC transfusion, base deficit, body mass index (BMI), comorbidities, pancreatic injury, shock index (SI), and protocol adherence.

Results: Among 559 patients with operative colon injuries, 213 underwent resection and anastomosis without diversion. AL occurred in 10 (4.7%) patients. 13 patients violated protocol, including 9 receiving >6 units pRBCs without diversion. Protocol adherence resulted in lower abscess rates (24% vs. 54%, p=0.043) and drain placement (17% vs. 46%, p=0.007), with no difference in reoperation (8.5% vs 7.7%, p=0.999) or mortality (3% vs 0%, p=0.526). Other variables associated with abscess formation included BMI >35 (p=0.039) and pancreatic leak (p=0.001). Logistic regression identified pRBCs (AOR 1.37, p=0.001) and SI (AOR 8.33, p=0.019) as abscess predictors, and pRBCs was significant for abscess even at a >2 pRBC cutoff (p=0.015). SI was the sole factor for AL requiring reoperation with ostomy (AOR 3.15, p=0.018).

Conclusions: In colon injury patients undergoing resection and anastomosis without diversion, transfusion correlates with abscess but not AL, reoperation, ostomy, or mortality. SI may better predict AL and reoperation. The colon injury protocol should be re-evaluated.

Operative Management of Colon Injuries



Indicators of a Destructive Colon Injury

Penetrating	Blunt
Wound >50% of colon circumference	Serosal tear ≥ 50% colon circumference
Complete transection	Full-thickness perforation
Devascularized segments	Mesenteric devascularization

Significant Co-morbidities

Chronic renal failure
CHF
AIDS
Cirrhosis
Uncontrolled diabetes
Chronic steroid use

Session XV: Quickshot Session II 14-26
Paper 16: 9:52 AM – 9:58 AM

HEALTHCARE COSTS AFTER OPERATIVE VS. NON-OPERATIVE APPENDICITIS MANAGEMENT

Pawan Mathew, MD; Miranda Moore, MPH; Bishwajit Bhattacharya, MD;
Robert Becher, MD, MS; Eric Schneider, PhD;
Kimberly Davis, MD, MBA; Kevin Schuster, MD, MPH
Yale
Invited Discussant: Pauline Park, MD

Introduction: Use of non-operative management for uncomplicated appendicitis is increasing. We hypothesized that healthcare costs would be lower for patients who underwent appendectomy than those with an in-situ appendix over the year after initial diagnosis.
Methods: Using MarketScan®, an all-payers claims insurance database, we extracted patients presenting to the emergency department (ED) with acute appendicitis and without perforation from 2017-2021, and either underwent appendectomy during index presentation or non-operative treatment. We examined differences in cost of initial encounter and within one-year.
Results: Of 26,469 patients presenting with uncomplicated appendicitis, 24,005 (90.6%) underwent appendectomy. The median cost of the index encounter was higher at $15,248 in the operative group compared to $5,753 in the non-operative group (p< 0.001) (Table). However, the median cost of follow-up encounters in the non-operative group was higher at $3,946 compared to $3,338 in the operative group (p=0.003). For the 78 (3.1%) patients who were initially managed non-operatively and subsequently underwent follow-up appendectomy, the median cost was an additional $16,348. Based on average costs, non-operative management must therefore succeed 68% of the time to be less costly than operative management.
Conclusion: Non-operative management of uncomplicated appendicitis was associated with higher costs for follow-up encounters and total costs of care that were 70% greater if they eventually underwent follow-up appendectomy. Non-operative management must fail less than 32% of the time to be the less costly strategy.

	Non-operative management				Operative management				p-value
	N	Median	Q1	Q3	N	Median	Q1	Q3	
Cost of index appendicitis encounter ($)	2,464	5,753	2,636	12,857	24,005	15,248	9,967	21,511	<0.001
Cost of follow-up encounters ($)	605	3,946	1,769	12,844	2,890	3,338	1,413	8,507	0.003
Cost of follow-up appendectomy ($)	78	16,348	10,739	21,887					
Cost of all care including follow-up encounters and follow-up appendectomy if applicable	77	26,336	17,090	35,672	24,005	15,778	10,340	22,434	<0.001
Cost of all care including follow-up encounters, without follow-up appendectomy	2,387	6,725	3,091	15,196	24,005	15,778	10,340	22,434	<0.001

Table: Total costs ($ - US dollars) of appendicitis care and additional follow-up visits for patients with incident appendicitis, by index operative management status

Session XV: Quickshot Session II 14-26
Paper 17: 9:58 AM – 10:04 AM

THE METABOLIC PROFILE OF PERITONEAL FLUID FROM TRAUMA PATIENTS UNDERGOING DAMAGE CONTROL LAPAROTOMY (DCL)

Dhanushka Vitharana, MD; Sophia Trinh, MD; Jacob Stover, MD;
Jenna Dennis, BS; Cara Ramos, BS; Jared M. Robinson, BS;
Abdul-Razak Masoud, PhD; Amirsalar Mansouri, PhD;
Jiri Adamec, PhD; Juan Duchesne, MD;
Alan Marr, MD; Alison Smith, MD, PhD
Louisiana State University Health Sciences Center
Invited Discussant: Jay Johannigman, MD

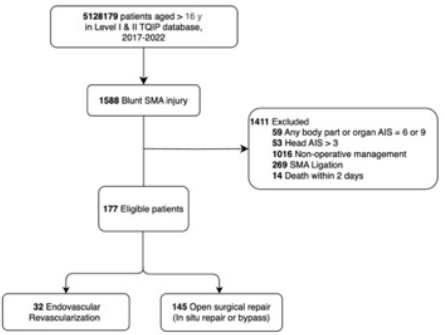
Introduction: Trauma produces unique alterations in the lipidome following injury. Elevated phosphatidylethanolamine levels have been associated with increased critical illness severity in trauma patients. Mechanism of injury (MOI) can also influence outcomes as DCL following blunt trauma is associated with increases mortality and rates of postoperative complications compared to penetrating trauma. Using untargeted lipidomics, we sought to analyze the peritoneal fluid of patients undergoing DCL to identify MOI-specific lipid alterations that may affect inflammatory pathways post-trauma and thus patient outcomes.
Methods: Peritoneal fluid was collected from adult trauma patients who underwent DCL at a Level 1 Trauma Center at the first takeback laparotomy after the index operation. Patients were separated by MOI. Untargeted LC-MS/MS Analysis was performed using a Bruker nanoElute2 System coupled to a timsTOF fleX 2 mass spectrometer. Lipidomic data were processed using mzMine 4.2.0 and it's *in silico* lipid fragment database was analyzed using an R script. Significantly expressed lipids were presented as the log2(fold change). Statistical analysis was performed with Mann-Whitney U test was used to identify significantly expressed lipids ($p < 0.1$).
Results: Overall, 46 peritoneal fluid samples were collected with 29 (63%) from blunt trauma. There were no significant differences in age, sex or mortality between the two groups ($p > 0.05$). Race was significantly different between groups ($p=0.021$). Of the 162 lipids identified, 10 had significantly altered levels. In the blunt trauma group, glycerolipids, sterol lipids and sphingolipids were significantly elevated ($p< 0.1$). In the penetrating group, glycerophospholipids and glycerolipids were significantly elevated ($p< 0.1$).
Conclusion: We applied untargeted lipidomics to peritoneal fluid from patients undergoing DCL. We observed potentially important differences in lipid profiles based on MOI that may influence both local and systemic inflammatory responses in patients with abdominal trauma. Sphingolipid dysregulation may cause profound pro-inflammatory responses and poorer outcomes following blunt trauma. Moreover, alterations in glycerophospholipids can influence outcomes after traumatic brain injuries. Further investigation is warranted into the role lipids may play in patient outcomes following DCL and their potential use as biomarkers of disease.

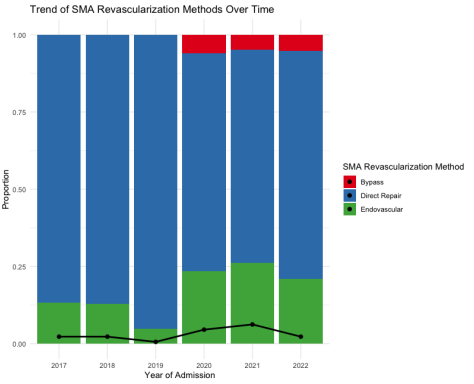
Session XV: Quickshot Session II 14-26
Paper 18: 10:04 AM – 10:10 AM

ENDOVASCULAR VERSUS OPEN REVASCULARIZATION FOR BLUNT SUPERIOR MESENTERIC ARTERY (SMA) INJURY: ANALYSIS OF THE TQIP DATABASE

Yu Cheng Chiu, MD; Anaar Siletz, MD, PhD;
Kenji Inaba, MD; Kazuhide Matsushima, MD
LAC + USC Medical Center
Invited Discussant: Milos Buhavac, MD

Introduction: Traumatic superior mesenteric artery (SMA) injury is a rare but catastrophic condition. Prompt revascularization is required to mitigate mortality and morbidity. Given the increasing success of endovascular treatment for SMA thrombosis in non-traumatic mesenteric ischemic disease, the goal of our study is to describe outcomes after endovascular repair as well as nationwide trends in endovascular treatment of blunt traumatic SMA injury.
Methods: This is a retrospective cohort study using the American College of Surgeons Trauma Quality Improvement Program (ACS-TQIP) database. Adult patients with blunt SMA injury presenting between 2017 and 2022 were included. Clinical outcomes including need for intestinal resection after the index operation and in-hospital mortality were described in patients undergoing endovascular SMA repair and compared to outcomes with open repair. A Cochran–Armitage test was used to analyze the trend of endovascular repair in revascularization for blunt SMA injuries over time.
Results: During the 6-year study period, a total of 177 patients met inclusion criteria. The median age was 35 years (interquartile range 27 to 54), and 75.7% were male. The median injury severity score (ISS) was 24 (interquartile range 17 to 29). In-hospital mortality (15.6% vs. 9.7%, p=0.32), need for intestinal resection after index operation (6.3% vs. 18.6%, p = 0.09), and major complications were similar between the endovascular and open surgical repair groups. However, in patients with SMA AIS grade IV injuries, endovascular repair was associated with a greater incidence of acute kidney injury (33.3% vs. 3.8%, P=0.049), fewer ventilator-free days (0 (0-0) vs. 14 (7-19), p=0.010), and fewer ICU-free days (0 (0-0) vs. 7 (1-14), P=0.029), with a nonsignificant trend towards higher mortality (33% vs. 7.7%, P=0.051). During the study period, there was a nonsignificant trend towards increased use of endovascular repair in the overall cohort (range 4.8% to 26.2%, p = 0.080).
Conclusion: Endovascular and open surgical repair demonstrated comparable clinical outcomes in patients with blunt superior mesenteric artery injuries overall. However, endovascular repair of grade IV injuries was associated with poor outcomes.





Session XV: Quickshot Session II 14-26
Paper 19: 10:10 AM – 10:16 AM

THORACIC BRANCH ENDOPROSTHESIS AS SAFE ALTERNATIVE THERAPY FOR BLUNT TRAUMATIC AORTIC INJURY REQUIRING ZONE 2 COVERAGE

Rebecca S. Meltzer, MD; Robert C. Keskey, MD, PhD; Ibraheem Hamzat; Adham Abou Ali, MD, MSc; David A. Hampton, MD, MEng, FACS; Mohammed H. Eslami, MD, MPH, MBA
Charleston Area Medical Center
Invited Discussant: Karen Brasel, MD, MPH

Introduction: Blunt traumatic aortic injury (BTAI) involving the left subclavian artery (zone 2) poses a challenging problem. Thoracic branch endoprosthesis (TBE) with a left subclavian artery side branch has emerged as a novel tool for thoracic endovascular aortic repair (TEVAR) for injuries requiring a zone 2 seal. We hypothesized that TBE is a non-inferior method for zone 2 BTAI repair.

Methods: The 2017-2022 American College of Surgeons Trauma Quality Programs Participant Use File data were abstracted. Inclusion criteria were adult patients (>16 years old) who had undergone a TBE or TEVAR with an open aortic arch debranching procedure (TEVAR-DB). Patient demographics, complications (stroke, deep venous thrombosis, ventilator associated pneumonia, acute respiratory distress syndrome, surgical site infection, and unplanned return to OR), intensive care unit length of stay (ICU-LOS), and mortality were compared. Wilcoxon signed-rank tests and linear regressions were performed. Significance was defined as $p< 0.05$.

Results: 94 patients met inclusion criteria (TBE: n=61 and TEVAR-DB: n=33). There was no difference in gender, age, or ISS between the groups. The TBE group had a significantly lower GCS on presentation (TBE: 10.8 ± 5.2 vs TEVAR-DB: 13.0 ± 4.1, $p=0.04$). Additionally, there was a non-significant difference in complications including stroke rate (TBE: 1.6% vs TEVAR-DB: 0%, $p=1.0$), ICU-LOS, and mortality between the groups. On multivariate analysis, a significant association was not present between procedure type and stroke rate, ICU-LOS, or mortality.

Conclusions: TBE is non-inferior to TEVAR-DB for the treatment of BTAI requiring a zone 2 seal. In the appropriate patient population, it may demonstrate a less invasive treatment alternative.

Session XV: Quickshot Session II 14-26
Paper 20: 10:16 AM – 10:22 AM

"ALL IN GOOD TIME" - THE LIBERAL UTILIZATION OF TEMPORARY INTRAVASCULAR SHUNTING BY TRAUMA SURGEONS TO IMPROVE RESOURCE UTILIZATION IS SAFE AND EFFECTIVE FOR PENETRATING PERIPHERAL VASCULAR TRAUMA

Hans Strobl, MD; Ann Polcari, MD; Oloruntoba Bolaji, DO; Lea Hoefer, MD; William I. McKinley, MD; Diane N. Haddad, MD, MPH; Andrew J. Benjamin, MD; Justin Hatchimonji, MD, MBE, MSCE; Phillip Dowzicky, MD; Jennifer Cone, MD; Tanya Zakrison, MD, MPH; Kenneth Wilson, MD; Selwyn Rogers, MD, MPH; Abid Khan, MD
University of Chicago Medicine
Invited Discussant: Manuel Lorenzo, MD, MBA

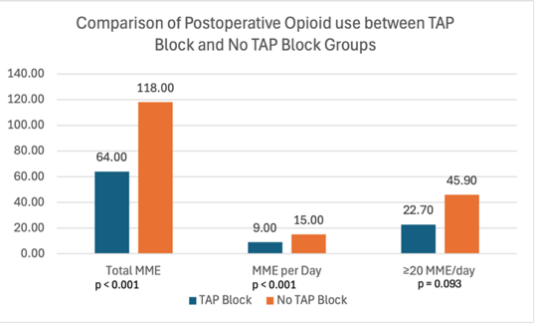
Introduction*:* Temporary Intravascular Shunting (TIVS) is well described in peripheral vascular trauma but has previously been reserved primarily for patients requiring orthopedic fixation or damage control. Our institution began utilizing TIVS liberally due to resource constraints, especially overnight. We hypothesize that utilizing TIVS to address resource constraints in busy trauma centers is not inferior to immediate repair.
Methods*:* An urban Level 1 trauma center registry was queried for peripheral arterial injuries due to penetrating mechanisms (5/2018-8/2024). Patients were categorized as undergoing immediate repair (ImR) vs TIVS placement for damage control with subsequent repair (DC). Within the DC group, those who received ≤6 units pRBC intraoperatively, had a final intraoperative lactate < 5.0 and had no other cavity explored were categorized into the resource utilization subgroup (DC-RU). ImR patients were compared to the DC group overall and to the DC-RU subgroup.
Results*:* Of 230 patients included, 123 were in the ImR group and 107 in the DC group, of which 44 were in the DC_RU subgroup. Trauma surgeons performed 91/123 of the repairs in the ImR group, 106/107 of the TIVS and 104/107 of the definitive repairs in the DC group. Mean shunt dwell time was 23.9 hrs in the DC group and 18.5 hrs in the DC-RU group. When comparing ImR to DC, there was no difference in vascular complications requiring reoperation (22.0% vs 30.1% p=0.17), post-op compartment syndrome (6.5% vs 7.5% p=0.98), amputation (2.4% vs 3.7% p=0.71) or mortality (0.8% vs 3.7% p=0.19). Similarly, when comparing ImR to DC-RU, there was no difference in vascular complications requiring reoperation (22.0% vs 13.6% p=0.33), post-op compartment syndrome (6.5% vs 2.3% p=0.44), amputation (2.4% vs 0% p=0.57) or mortality (0.8% vs 0% p=1).
Conclusion: TIVS to improve resource utilization appears to be safe for managing penetrating peripheral arterial injuries when both shunting and definitive repair are performed by trauma surgeons.

Session XV: Quickshot Session II 14-26
Paper 21: 10:22 AM – 10:28 AM

UTILITY OF TRANSVERSUS ABDOMINIS PLANE BLOCK IN TRAUMA AND EMERGENCY GENERAL SURGERY LAPAROTOMY: A QUALITY IMPROVEMENT PROJECT

Steven Forman, MD; Stephen Park, MD; Brian Hom, BS; Sydney Greenlee, BS; Negar Nekooei, n/a; Yasuko Mano, MD; Matthew Tan, MD; Matthew Martin, MD; Kenji Inaba, MD; Meghan Lewis, MD; Anaar Siletz, MD PhD; Kazuhide Matsushima, MD
University of Southern California
Invited Discussant: Anthony DeSantis, MD

Introduction: Transversus abdominis plane (TAP) blocks reduce opioid use and improve outcomes in elective surgeries, but their role in acute care surgery remains unknown. Our program recently developed a quality improvement project to implement a pain management protocol including TAP blocks for emergency laparotomy. The purpose of this study is to evaluate the impact of TAP blocks on opioid use and hospital outcomes.
Methods: This is a retrospective cohort study (2022-24) including patients (age ≥18 years) who underwent an emergency laparotomy. Patients were divided into TAP block and no TAP block cohorts. Univariate and multivariate analyses were performed to assess the association between the use of TAP blocks and study outcomes including postoperative morphine milligram equivalents (MME) and postoperative complications.
Results: Among 219 patients (110 TAP block, 109 no TAP block), those receiving TAP blocks required significantly less total MME (64 vs. 118, p= 0.009), daily MME (9 vs. 15, p< 0.001) and were less likely to require ≥20 MME/day (22.7 % vs. 45.9%, p< 0.001). No significant differences were observed in postoperative complications. Multivariate analysis showed the use of TAP block was associated with decreased odds of requiring ≥20 MME/day (aOR: 0.363, 95% CI: 0.195-0.675, p=0.001), and less MME per day (β = -14.52, 95% CI: -27.50 to -1.53, p = 0.029). (Figure)
Conclusion: TAP blocks significantly reduced opioid use in trauma and emergency general surgery patients. While further research is warranted, TAP blocks should be considered for the postoperative pain management.



Session XV: Quickshot Session II 14-26
Paper 22: 10:28 AM – 10:34 AM

PRIMARY CARE ACCESS IS ASSOCIATED WITH IMPROVED LONG-TERM SURVIVAL AFTER SEVERE TRAUMATIC INJURY

Elliott K. Yee, MD; Stephanie A. Mason, MD, PhD;
Laura C. Rosella, MHSc, PhD; Liisa Jaakkimainen, MD, MSc;
Brandon M. Zagorski, MS; Darby Little, MD;
Gemma Postill, BMScH; Avery B. Nathens, MD, PhD;
Bourke W. Tillmann, MD, PhD; Barbara Haas, MD, PhD
University of Toronto
Invited Discussant: Suresh Agarwal Jr, MD

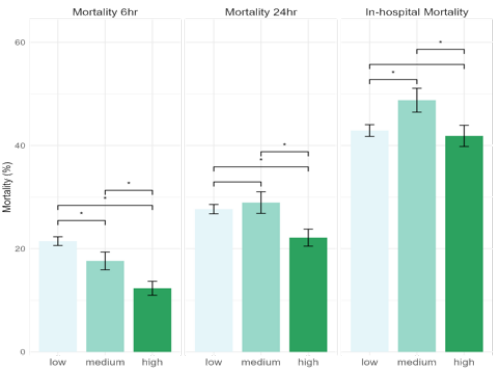
Introduction: Survivors of severe traumatic injury remain at elevated risk of death in the years after injury. Little is known about how long-term mortality among injury survivors can be reduced. Given the importance of primary care to overall health, we hypothesized that primary care access among survivors would be associated with improved long-term survival.
Methods: This population-based, retrospective cohort study (2010–2022) included adults (age ≥ 18 years) discharged alive after severe injury (ISS > 15). The exposure of interest was primary care access, defined as either visiting or being enrolled with a primary care provider in the two years prior to injury. The primary outcome was five-year all-cause mortality. Cox proportional hazards models were used to evaluate the relationship between primary care access and mortality, adjusting for sociodemographics, comorbidity, and injury severity.
Results: We identified 25,713 survivors of severe injury (mean age 54 years, 32% female), of whom 92% (n=23,720) had primary care access. Five-year mortality was 13% (n=3,265 patients). Adjusting for patient characteristics, primary care access was associated with a 20% lower hazard of death (HR 0.80, 95% CI 0.68–0.93) at five years. The relationship between primary care access and mortality was preserved across subgroups of age, sex, and comorbidity.
Conclusion: Survivors of severe traumatic injury without primary care access were more likely to die in the five years after discharge, identifying a vulnerable subset of the survivor population. Primary care physicians may represent key partners to trauma care providers in developing strategies that improve long-term outcomes in the years after injury.

Session XV: Quickshot Session II 14-26
Paper 23: 10:34 AM – 10:40 AM

DON'T FORGET THE CRYOPRECIPITATE: THE IMPACT OF THE 2019 JOINT TRAUMA SYSTEM DAMAGE CONTROL RESUSUCITATION CLINICAL PRACTICE GUIDELINE ON MORTALITY

Allyson M. Hynes, MD; Jeremy W. Cannon, MD, SM; Ruiqi Yan, MS;
Dane Scantling, DO; Andrew J. Benjamin, MD;
Patrick Murphy, MD, MPH, MSc; James P. Byrne, MD PhD;
Benjamin Abella, MD, MPhil; Nandita Mitra, PhD; M. Kit Delgado, MD, MS
Medical College of Wisconsin
Invited Discussant: Jonathan Meizoso, MD, MSPH

Introduction: Transfusion of plasma (FFP) & platelets (PLTs) to packed red blood cells (PRBCs) in a 1:1 ratio is well established; however, the ratio of cryoprecipitate (CRYO) to PRBC is not. The Joint Trauma System (JTS) updated its 2019 Damage Control Resuscitation guideline by adding 1:1 CRYO: PRBCs to their ratios. We hypothesized that those within CRYO: PRBC guideline range (high ratio) would have a reduction in mortality.
Methods: We included adult patients in Trauma Quality Improvement Program (2013-2021) who received at least 5u PRBCs/4-h & 1-u of FFP. Dying within ½-h, non-survivable injury patterns, pre-existing coagulopathy, advanced directives, transfers, & burns were excluded. Patients were partitioned into high (≥1:1), med. (≥1:2 to < 1:1), & low (< 1:2) CRYO:PRBC ratios. Treatment effects were estimated with propensity score-weighted risk adjustment models, clustering by center. Primary outcome was 6-h mortality. Secondary outcomes included 24-h & in-patient mortality. Exploratory analysis was performed on the potential mediators: FFP, PLTs & whole blood.
Results: 48,673 patients (5221 high; 3577 med; 39875 low). Mean age was 39, 79% were male, 58% blunt & mean injury severity score was 29. Unadjusted 6-h mortality was 11.8%, 18.8%, 21.3% for high, med. & low. High was protective at hours 6 [aOR 0.52,0.45-0.58] & 24 [aOR 0.74,0.67-0.82] & med. was protective at hour 6 [aOR 0.78,0.70-0.87]. High was protective compared to med. at all endpoints (Figure). Exploratory analysis demonstrated that high & med. were protective of 6-h, 24-h & in-patient mortality.
Conclusion: JTS high CRYO guideline ratios were associated with decreased mortality during the first 24-hs. Future randomized trials are warranted.



Session XV: Quickshot Session II 14-26
Paper 24: 10:40 AM – 10:46 AM

TRAUMA AND EMERGENCY SURGICAL CARE AT FACILITIES ELIGIBLE FOR RURAL EMERGENCY HOSPITAL DESIGNATION.

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Barclay Stewart, MD, PhD, MPH; John Scott, MD, MPH
University of Washington
Invited Discussant: Deborah Kuhls, MD

Introduction: Timely access to emergency surgical care is a key metric for health system development and performance. To mitigate the risks of rural hospital closures in the US, the 2021 Consolidated Appropriations Act introduced the Rural Emergency Hospital (REH) designation, which promotes closure of inpatient units in small hospitals in favor of emergency and outpatient services by providing supplemental funding and enhanced reimbursement. We investigated trauma and emergency general surgery (EGS) volumes at REH-eligible hospitals across states to evaluate the potential impact of REH designation on trauma and EGS care.
Methods: We used the 2021 Healthcare Cost and Utilization Project from five geographically diverse states (CA, FL, IA, MD, WI) to identify encounters where adult patients were treated for acute injuries or EGS conditions. We identified REH-eligible hospitals (i.e. critical access hospitals or rural hospitals with < 50 inpatient beds). We compared case volumes and patient populations at REH-eligible and -ineligible hospitals.
Results: We analyzed 2.1 million encounters. Trauma and EGS encounters at REH-eligible hospitals comprised between 2 (MD) and 37% (IA) of statewide hospitalizations and between < 1 and 14% of statewide inpatient days. Compared with ineligible facilities, REH-eligible facilities treated a higher share of patients who were white (86 vs. 55%), living in rural areas (69 vs. 6%), and had lower incomes; treated fewer patients operatively (2 vs. 10%); and transferred more patients (5 vs. 3%) (all $p < 0.001$).
Conclusion: Hospitals eligible for REH designation contribute substantially to the care of injured and EGS patients, though this is variable across states. While this policy may sustain emergency services in rural areas, but its effects on trauma and EGS care—particularly regarding surgical access, patient transfers, and system-wide capacity—remain uncertain and warrant urgent evaluation.

Session XV: Quickshot Session II 14-26
Paper 25: 10:46 AM – 10:52 AM

ASSESSMENT OF PREHOSPITAL AIRWAY MANAGEMENT IN THE SETTING OF TRAUMA: AN AMERICAN ASSOCIATION FOR THE SURGERY OF TRAUMA MULTICENTER STUDY

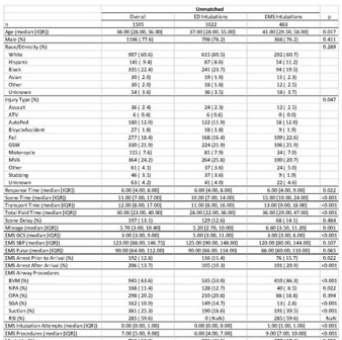
Shane Urban, BSN, RN; Shana Ballow, DO;
Thomas Schroeppel, MD; Matthew Carrick, MD; Kyle Gibson, NP;
Nancy Rivera, MD, FACS; Anna Goldenberg Sandau, DO;
Brian Thurston, MD; Jennifer M Burris, MD, FACS;
Lewis Jacobson, MD, FACS; Uma Bagga, MD; Paola Pieri, MD;
Bishwajit Bhattacharya, MD; Michael Cripps, MD
University of Colorado
Invited Discussant: Kevin Schuster, MD, MPH

Introduction: Prehospital endotracheal intubation (EMS-ETI) in the setting of trauma is highly contested. We hypothesized EMS-ETI patients would have longer scene times and increased risk of mortality.

Methods: We conducted a retrospective (2019-2022), multicenter study across 27 trauma centers comparing EMS-ETI to those intubated within 10 minutes of ED arrival (ED-ETI) without EMS-ETI attempted. Inclusion criteria included patients transported by paramedics in ground ambulances. Patients suffering cardiac arrest in the field and pronounced dead within 10 minutes of ED arrival were excluded. One-to-one nearest neighbor propensity score matching (PSM) was employed to compare EMS-ETI to ED-ETI.

Results: Of 1505 included patients: 1022 (68%) were ED-ETI and 483 (32%) EMS-ETI. Unmatched ETI patients had increased time at scene (15 vs 10 minutes), traveled farther to a trauma center (6.8 vs. 5.2 miles), had worse initial GCS (3 vs. 5), and more prehospital procedures (9 vs. 6) and cardiac arrests (15.7% vs. 11.4%) compared to ED-ETI patients (all $p < 0.05$). EMS-ETI patients also more often died during their index hospitalization (57.3% vs. 49.5%, $p < 0.05$). After matching 312 patients for mileage, prehospital GCS, cardiac arrest in the field, and number of prehospital procedures, the difference in scene time remained unchanged (15 vs 10 minutes, $p < 0.05$). There were no significant differences in prehospital vital signs. The majority of EMS-ETI attempts had first-pass success with a median of one attempt (IQR 1, 1). Notably, in contrast to unmatched observations, the EMS-ETI cohort had decreased in hospital mortality (50.3% vs. 63.8% p=0.001). However, the associated odds of mortality increased 74% with each unsuccessful EMS-ETI attempt (OR 1.74, 95% CI 1.19, 2.64, p=0.005).

Conclusion: This multicenter study demonstrated that after PSM, EMS-ETI patients had increased scene times, but decreased mortality compared to ED-ETI patients. Although, failed first pass EMS-ETI was associated with increased mortality. Overall suggesting EMS-ETI may be helpful if first pass ETI can be achieved.



Unmatched

n	Overall 1505	ED Intubations 1022	EMS Intubations 483	p
Age (median [IQR])	36.00 [26.00, 56.00]	37.00 [26.00, 55.00]	41.00 [29.00, 58.00]	0.017
Male (%)	1166 (77.6)	796 (78.2)	366 (76.1)	0.411
Race/Ethnicity (%)				0.269
White	907 (60.6)	615 (60.5)	292 (60.7)	
Hispanic	141 (9.4)	87 (8.6)	54 (11.2)	
Black	355 (23.7)	241 (23.7)	114 (23.7)	
Asian	35 (2.3)	19 (1.9)	11 (2.3)	
Other	35 (2.3)	26 (2.6)	12 (2.5)	
Unknown	34 (2.3)	34 (3.3)	0 (0.0)	
Injury Type (%)				0.047
Assault	36 (2.4)	24 (2.3)	12 (2.5)	
ATV	6 (0.4)	6 (0.6)	0 (0.0)	
Autoped	100 (6.6)	122 (11.9)	56 (11.6)	<0.001
Bicycle/accident	27 (1.8)	18 (1.8)	9 (1.9)	
Fall	277 (18.4)	168 (16.4)	109 (22.6)	
GSW	330 (21.9)	224 (21.9)	106 (21.9)	
Motorcycle	115 (7.6)	81 (7.9)	34 (7.0)	
MVA	364 (24.2)	264 (25.8)	100 (20.7)	
Other	61 (4.1)	37 (3.6)	24 (5.0)	
Stabbing	46 (3.1)	37 (3.6)	9 (1.9)	
Unknown	43 (2.9)	41 (4.0)	2 (0.4)	
Response Time (median [IQR])	6.00 [4.00, 8.00]	6.00 [4.00, 8.00]	6.00 [4.00, 9.00]	0.022
Scene Time (median [IQR])	13.00 [7.00, 17.00]	10.00 [7.00, 14.00]	15.00 [10.00, 24.00]	<0.001
Transport Time (median [IQR])	12.00 [8.00, 17.00]	11.00 [8.00, 16.00]	13.00 [9.00, 18.00]	<0.001
Total Field Time (median [IQR])	30.00 [23.00, 40.00]	28.00 [22.00, 36.00]	36.00 [29.00, 47.00]	<0.001
Scene Delay (%)	197 (13.1)	109 (10.6)	88 (18.2)	<0.001
Mileage (median [IQR])	5.70 [3.00, 10.40]	5.20 [2.70, 10.00]	6.80 [3.50, 11.20]	0.001
EMS GCS (median [IQR])	5.00 [3.00, 14.00]	5.00 [3.00, 11.00]	5.00 [3.00, 14.00]	<0.001
EMS SBP (median [IQR])	123.00 [100.00, 146.75]	125.00 [100.00, 148.00]	120.00 [100.00, 144.00]	0.107
EMS Pulse (median [IQR])	90.00 [64.00, 112.00]	90.00 [66.00, 114.00]	88.00 [63.00, 110.00]	0.065
EMS Arrest Prior to Arrival (%)	192 (12.8)	116 (11.4)	76 (15.7)	0.022
EMS Arrest After Arrival (%)	106 (7.0)	105 (10.3)	1 (0.2)	<0.001
EMS Airway Procedures				
BVM (%)	945 (63.6)	585 (58.0)	410 (86.3)	<0.001
NPA (%)	168 (11.4)	128 (12.7)	40 (8.5)	0.022
OPA (%)	298 (20.2)	210 (20.9)	88 (18.6)	0.394
SGA (%)	162 (10.9)	149 (14.7)	13 (2.8)	<0.001
Suction (%)	301 (21.3)	190 (18.6)	191 (39.5)	<0.001
RSI (%)	285 (19.6)	0 (NaN)	285 (59.6)	NaN
EMS Intubation Attempts (median [IQR])	0.00 [0.00, 1.00]	0.00 [0.00, 0.00]	1.00 [1.00, 1.00]	<0.001
EMS Procedures (median [IQR])	7.00 [5.00, 9.00]	6.00 [4.00, 7.00]	9.00 [7.00, 10.00]	<0.001
Mortality (%)	783 (52.0)	506 (49.5)	277 (57.3)	0.005

Matched

n	ED Intubations 312	EMS Intubations 312	p	SMD
Age (median [IQR])	39.00 [26.00, 57.00]	41.00 [29.00, 58.00]	0.107	0.101
Male (%)	0.77 (0.42)	0.75 (0.44)	0.514	0.052
Race/Ethnicity (%)			0.088	0.255
White	202 (65.2)	188 (60.6)		
Hispanic	17 (5.5)	39 (12.6)		
Black	69 (22.3)	61 (19.7)		
Asian	8 (2.6)	7 (2.3)		
Other	4 (1.3)	4 (1.3)		
Unknown	9 (2.9)	9 (2.9)		
Injury Type (%)			0.66	0.183
Assault	7 (2.3)	8 (2.6)		
ATV	3 (0.9)	0 (0.0)		
Autoped	40 (12.8)	39 (12.5)		
Bicycle/accident	6 (1.9)	6 (1.9)		
Fall	74 (23.7)	71 (22.8)		
GSW	71 (22.8)	69 (22.1)		
Motorcycle	24 (7.7)	25 (8.0)		
MVA	77 (24.7)	79 (25.4)		
Other	10 (3.2)	11 (3.5)		
Stabbing	6 (1.9)	3 (1.0)		
Unknown	10 (3.2)	12 (3.8)		
Response Time (median [IQR])	5.00 [4.00, 8.00]	6.00 [4.00, 9.00]	0.064	0.11
Scene Time (median [IQR])	10.00 [7.00, 14.00]	15.00 [10.00, 23.00]	<0.001	0.562
Transport Time (median [IQR])	12.00 [8.00, 17.00]	13.00 [9.00, 18.00]	0.031	0.233
Total Field Time (median [IQR])	30.00 [23.00, 37.25]	35.00 [26.75, 47.25]	<0.001	0.575
Scene Delay (%)	46 (14.7)	46 (14.7)	1	<0.001
Mileage (median [IQR])	6.70 [3.96, 11.17]	6.40 [3.60, 11.20]	0.945	0.029
EMS GCS (median [IQR])	3.00 [3.00, 7.00]	3.00 [3.00, 7.00]	0.453	0.078
EMS SBP (median [IQR])	121.50 [99.00, 150.00]	125.00 [99.00, 147.00]	0.414	0.064
EMS Pulse (median [IQR])	90.00 [70.00, 115.00]	90.00 [72.75, 113.00]	0.329	0.015
EMS Arrest Prior to Arrival (%)	0 (0.0)	0 (0.0)	NaN	<0.001
EMS Arrest After Arrival (%)	66 (21.2)	68 (21.8)	0.922	0.016
EMS Airway Procedures				
BVM (%)	235 (75.3)	252 (80.8)	0.167	0.169
NPA (%)	79 (22.4)	25 (8.2)	<0.001	0.411
OPA (%)	59 (20.2)	41 (13.6)	<0.001	0.41
SGA (%)	64 (21.6)	4 (2.0)	<0.001	0.660
Suction (%)	84 (26.9)	124 (39.7)	0.005	0.275
RSI (%)	0 (NaN)	285 (91.7)	NaN	NaN
EMS Intubation Attempts (median [IQR])	0.00 [0.00, 0.00]	1.00 [1.00, 1.00]	<0.001	1.375
EMS Procedures (median [IQR])	8.00 [5.00, 9.00]	8.00 [7.00, 9.00]	0.065	0.185
Mortality (%)	149 (47.8)	157 (50.3)	0.601	0.274

Session XV: Quickshot Session II 14-26
Paper 26: 10:52 AM – 10:58 AM

IMPACT OF YOGA INTERVENTION ON FUNCTIONAL ASSESSMENT AND QUALITY OF LIFE IN PELVIC INJURIES PATIENTS -A RANDOMIZED CONTROLLED TRIAL

Dinesh K. Bagaria, MS, FACS; Shailly Gupta, MPT; Shivam Pandey, PhD;
Sushma Sagar, MS, FACS; Narendra Choudhary, MS;
Abhinav Kumar, MS, FACS; Pratyusha Priyadarshini, MS;
Amit Gupta, MS, FACS; Subodh Kumar, MS, FACS; Biplab Mishra, MS;
Arulselvi S, MD; Samarth Mittal, MS; A.S. Moorty, PhD
AIIMS, New Delhi
Invited Discussant: Randeep Jawa, MD

Introduction: *Yoga* as an additional therapy has shown positive impact on physical capabilities and on behavioral changes in chronic diseases as well as in chest trauma patients. The evidence regarding its role in rehabilitation of non-operatively managed pelvic injury patients is lacking.
Methods: This randomized controlled trial was conducted at level-1 Trauma Centre. Non operatively managed pelvic injury patients were randomized into either standard physiotherapy or *Yogatherapy* groups. Patients in physiotherapy group received conventional physiotherapy and *Yogatherapy* group received a set of *Yogic* exercises in addition to conventional physiotherapy at various time points up to 12 weeks. Primary outcome was effect on Majeed score and various muscles functioning, and secondary outcomes were effect on pain, and quality of life (QoL) measured at 4-week, 8 week and 12 weeks using WHOQOL -BREF and PROMIS inventory.
Results: A total of 103 eligible patients were randomized to physiotherapy ($n = 52$) and *Yoga* therapy ($n = 51$) groups and included in Intension to treat analysis (ITT). Per protocol (PP) analysis was having 41 and 38 patients respectively. Demographic characteristics and injuries profiles were comparable in both the groups. PP showed change in Majeed score at 12 weeks in *Yoga* therapy group was statistically significant (0.03), while muscle function improvement was more in physiotherapy group at 4 week and 12 weeks. There was statistically significant improvement in Yoga group at week 12 in Physical domain (p=0.05), Psychological domain (p=0.04) and pain score.
Conclusion: *Yoga* was found to be effective in improving functional assessment and QoL in non-operatively managed pelvic injury patients.