Session XV: Quickshot Session I 1-13
Quickshot 1: 8:00 AM - 8:06 AM

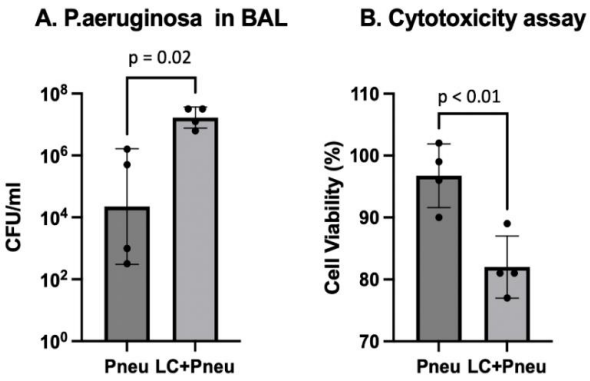
THE EFFECT OF PEDIATRIC WHOLE BLOOD USE AS A PROPORTION OF ADMINISTERED BLOOD PRODUCTS ON 24-HOUR MORTALITY: A DOSE EFFECT ANALYSIS

Introduction: Hemorrhage is a leading cause of death in pediatric patients. The use of balanced component transfusion therapy (CT) has a demonstrated benefit, and whole blood (WB) is safe in pediatric trauma patients. However, less is known about the benefit of WB compared to CT in these patients. We examined what ratio of WB to total blood product would confer a survival benefit in pediatric trauma patients receiving transfusion.
Methods: We requested and analyzed data from patients <18 years of age in the American College of Surgeons Trauma Quality Improvement Program (TQIP) database that received any blood within the first 4-hours. We created a variable of the volume of whole blood divided by the volume of total blood products. This was used as a binary variable within a multivariable logistic regression (MVLR) model starting at 0.1 and increasing by increments of 0.1 until we determined the optimal proportion with 12-hour survival as the outcome. The MVLR was adjusted for relevant confounders.
Results: From 2020-2021 there were 6340 patients that met inclusion criteria – 764 WB recipients and 5576 component-only. WB recipients represented a lower proportion of children 1-4 (7% versus 14%), but a higher proportion of older children (66% versus 51%, $p<0.001$). Collisions were the most frequent mechanism in both groups. Median composite injury severity scores were similar between the groups (25 versus 25, $p=0.059$). WB recipients had higher proportions of serious injuries to the thorax (56% versus 49%, $p<0.001$) and abdomen (42% versus 36%, $p<0.001$). Unadjusted survival was similar at 12-hours (93% versus 93%, $p=0.692$), 24-hours (91% versus 91%, $p=0.711$) and discharge (81% versus 80%, $p=0.512$). We noted that improvement in survival at a proportion of ≥ 0.2 with an associated OR 1.69 (1.03-2.78) when adjusting for confounders. On sensitivity testing, the proportions varied from ≥ 0.2 to ≥ 0.3.
Conclusions: We found that resuscitations with WB comprising at least 20-30% of the total transfusion volume within the first 4-hours was associated with improved survival at 12-hours. Our findings will help inform clinical practice patterns and guide future prospective studies.

Session XV: Quickshot Session I 1-13
Quickshot 2: 8:06 AM - 8:12 AM

EXTRACELLULAR VESICLES MEDIATE CYTOTOXICITY IN POST-BLUNT CHEST TRAUMA PNEUMONIA

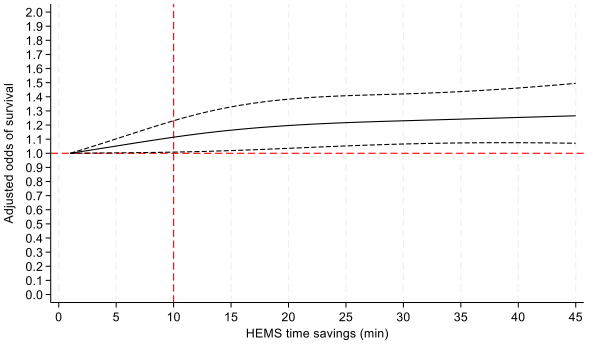
Introduction: Blunt chest trauma complicated by pneumonia is associated with a higher risk of acute lung injury (ALI) that is mediated by activation of immune cells and injury to the lung epithelium. Small extracellular vesicles (sEVs) are important mediators of cellular crosstalk; however, their role in driving ALI after trauma is unknown. We hypothesized that chest trauma worsens ALI caused by pneumonia through sEV-mediated cytokine release and injury to the lung epithelium.
Methods: Studies in C57BL/6 mice were designed with 3 cohorts: sham, lung infection (Pneu) by intratracheal injection of 105 cfu Pseudomonas aeruginosa, or unilateral lung contusion using a cortical impactor followed by infection (LC+Pneu). Bronchoalveolar lavage fluid (BAL) was harvested 24 hours post-infection, and sEVs were purified by centrifugation and size exclusion chromatography. Bacterial clearance was assessed by culture of BAL fluid on agar plates. To evaluate activity, BAL sEVs from each group were co-cultured with macrophages (RAW 264.7) to assess cytokine release and lung epithelial cells (MLE 12) to assess epithelial cytotoxicity.
Results: Bacterial clearance of P. aeruginosa was decreased in LC+Pneu compared to Pneu alone (5x105 vs. 2x107 cfu/ml, p=0.02, Panel A). There was no difference in BAL sEV concentration or size between Pneu and LC+Pneu on vesicle flow cytometry. Compared to sham, BAL sEVs harvested after both Pneu and LC+Pneu increased the release of TNFa, MIP1a, and IL1Ra from macrophages. Epithelial cytotoxicity was increased after exposure to BAL sEVs from LC+Pneu compared to Pneu alone (96% vs 82%, p<0.01, Panel B).
Conclusion: LC worsens ALI caused by pneumonia through sEV-mediated cytokine release and injury to the lung epithelium. Defining sEV activity may identify new therapeutic targets to prevent ALI.



Session XV: Quickshot Session I 1-13
Quickshot 3: 8:12 AM - 8:18 AM

FLYING FASTER: DEFINING THE TIME-SAVINGS THRESHOLD FOR AIR VERSUS GROUND TRANSPORT SURVIVAL BENEFIT AFTER INJURY

Introduction: Air medical transport (AMT) offers a survival advantage to trauma patients for several reasons, one of which may be time-savings over ground transport. Triage guidelines suggest AMT use when there are significant time-savings, but how much time needs to be saved to confer a benefit is unclear. Our objective was to define the time-savings threshold for which AMT has a survival benefit over ground transport.
Methods: Retrospective cohort of adult trauma patients transported ≤40mi by ground or air in the Pennsylvania Trauma Outcomes Study 2000-2017. GIS network analysis was used to generate counterfactual transport mode times and calculate a time-savings of AMT for each patient. We used logistic regression with splines to identify a threshold of AMT time-savings associated with survival. Subgroups meeting anatomic or physiologic criteria from the National Field Triage Guidelines (NFTG) and those with a positive Air Medical Prehospital Triage (AMPT) Score were analyzed.
Results: We included 25,303 patients. No amount of time saved by air over ground transport was associated with survival among all unselected patients. For patients with either anatomic or physiologic NFTG criteria, there was a survival benefit beginning at 10min of time-saved (OR 1.11; 95%CI 1.01-1.23, Figure). For patients positive on the AMPT Score, the survival benefit began at 20min of time-saved (OR 1.19; 95%CI 1.00-1.42).
Conclusion: Among patients meeting the physiologic or anatomic NFTG criteria, a time-savings of 10 minutes for AMT over ground transport was associated with improved survival. There is heterogeneity among this threshold of benefit among different patient groups that may be due to other benefits of AMT such as advanced capabilities. These findings can inform AMT triage guidelines.



Session XV: Quickshot Session I 1-13
Quickshot 4: 8:18 AM - 8:24 AM

HYPOXICALLY STORED BLOOD IMPROVES RESUSCITATION FROM HEMORRHAGIC SHOCK AFTER TRAUMATIC BRAIN INJURY

Introduction: This study investigates the efficacy of resuscitation with hypoxically stored red blood cells (hRBCs) in severe hemorrhagic shock (HS) after traumatic brain injury (TBI). Blood was collected, leukodepleted, and stored at 4°C with additive solution 3 (AS3). RBCs were made hypoxic using an O2 depletion system before cold storage for three weeks. Rats were divided into three groups: fresh RBCs (fRBCs), hRBCs, and conventionally stored RBCs (cRBCs) for resuscitation. HS was induced by blood withdrawal to maintain a mean arterial pressure (MAP) of 40 mmHg for 90 minutes, followed by transfusion equivalent to 70% of the shed volume.

Methods: Animals were anesthetized using isoflurane (5%), and artery and vein catheterized. They were then placed on a stereotaxic frame for craniotomy. TBI was induced by thinning the dura mater and then inducing controlled cortical injury using a 5 mm diameter tip impactor at a velocity of 5 m/s with a dwell time of 200 ms. Then, HS was induced by withdrawing blood to maintain a mean arterial pressure (MAP) of 40 mmHg for 90 minutes. Resuscitation was provided via transfusion equivalent to 70% of the shed volume, and animals were followed acutely for 2 hours. Animals were followed for 2 hours acutely and for 28 days for neurological evaluation.

Results: Animals resuscitated with cRBCs showed lower MAP compared to hRBCs and fRBCs post-resuscitation. Hepatic injury markers AST and ALT were elevated with cRBCs, whereas hRBCs showed similar AST levels to fRBCs. hRBCs improved sensorimotor and cognitive functions and reduced brain tissue damage up to 28 days compared to cRBCs. hRBCs attenuated blood-brain barrier (BBB) breach and brain edema compared to cRBCs. hRBCs also suppressed MMP-9 production from neutrophils, mitigating MMP-9-mediated BBB breakdown and exerting anti-inflammatory effects in microglia. Comparatively, cRBCs showed decreased superoxide dismutase (SOD) and catalase, with increased thiobarbituric acid reactive substances (T-bars) post-transfusion, indicating an oxidative imbalance. hRBCs restored SOD and catalase levels, similar to fRBCs, suggesting improved oxidative status.

Conclusion: Overall, hRBCs for three weeks provided comparable resuscitation efficacy to fRBCs in TBI with severe HS. Furthermore, hRBCs conferred long-term neuroprotection against TBI with HS, possibly through mitigating MMP-9-mediated BBB disruption and neuroinflammation. Hemanext did not participate in the experiment, data collection, analysis or interpretation.

Session XV: Quickshot Session I 1-13
Quickshot 5: 8:24 AM - 8:30 AM

OUTCOMES AND COMPLICATIONS OF ECMO SUPPORT IN ISOLATED BLUNT THORACIC TRAUMA

Introduction: Extracorporeal membrane oxygenation (ECMO) has emerged as a critical intervention in the management of patients with trauma-induced cardiorespiratory failure. ECMO has a pivotal role in stabilizing respiratory and hemodynamic parameters. This study aims to compare outcomes in patients with severe thoracic injuries with and without Veno-venous ECMO.
Methods: We did a retrospective review of TQIP (2017- 2021) and included all patients with isolated blunt thoracic injuries with Abbreviated Injury Scale (AIS)≥4 who required intubation. Transferred patients and those dead on arrival were excluded. Patients were divided into two groups of with and without Veno-venous ECMO support using propensity score (PS) matching.
Results: Of 14,106 patients with severe thoracic injuries, 9.5% had ECMO support. After excluding, 815 patients were in ECMO group. PS matching resulted in two groups of 812 ECMO and 812 non-ECMO support. ECMO support group had significantly lower in-hospital mortality rates (22.3% vs. 37.3%, $p<0.001$). However, ECMO group had significantly higher rates of complications including cardiac arrest (27.7% vs. 10.6%), pulmonary embolism (7.6% vs. 2.1%), ventilator associated pneumonia (16.7% vs. 4.2%), unplanned intubation (11.9% vs. 8.5%), unplanned ICU admission (8.4% vs. 4.9%) and unplanned return to operation room (10.1% vs. 2.6%), ($p<0.001$, for all). Patients in ECMO group had significantly higher hospital (29.46±26.37 vs. 13.59±13.3 days) and ICU (22.96±19.38 vs. 9.38±9.05 days) length of stay (LOS) ($p<0.001$, for both). In ECMO group, the mean time to perform ECMO was 5.54±5.91 days. As a time dependent relationship, each day earlier initiation of ECMO resulted in decreased hospital and ICU LOS by 67.1% and 59.9%, respectively ($p<0.001$ for both). Among patients without acute respiratory distress syndrome (ARDS) (n=435 in each group after repeated PS matching), we observed significantly lower mortality rates in ECMO group (26.9% vs. 40%, $p<0.001$).
Conclusion: While ECMO support in isolated blunt thoracic trauma patients is associated with higher survival rates even in non-ARDS cases, it is associated with higher incidence of complications. These findings emphasize the earlier consideration of ECMO use in severe blunt thoracic trauma.

Session XV: Quickshot Session I 1-13
Quickshot 6: 8:30 AM - 8:36 AM

HYPERTENSION AFTER BLUNT RENAL TRAUMA: MYTH OR REALITY?

Introduction: Hypertension as a late complication after renal trauma is debated. There is no generalized consensus on the duration of blood pressure monitoring following renal trauma. Our study aimed to determine the prevalence of new-onset hypertension after blunt renal injuries.

Methods: We performed a 4-year retrospective analysis of the Nationwide Readmissions Database 2017-2020. We included all adult (≥18 years) trauma patients who sustained blunt renal injuries and excluded those with penetrating injuries, a history of hypertension, and those who developed hypertensive crisis or died during the index admission. The outcome of the study was the prevalence of new-onset hypertension within 6-months of injury. Descriptive statistics and multivariable logistic regression analyses were performed to identify the independent predictors of new-onset hypertension, adjusting for patients' demographics, comorbidities, injury severity, and interventions.

Results: We identified 12,810 adult trauma patients with blunt renal injuries. The mean (SD) age was 39 (18) years, 69% were male, the median [IQR] ISS was 19 [10 – 34], and the median [IQR] abdominal AIS was 3 [2 – 4]. Nearly 91.5% of the patients were managed nonoperatively. The most common procedures performed on index admission were stenting (3.6%), followed by total nephrectomy (2.6%), nephrostomy (1.5%), and partial nephrectomy (0.8%). The rate of new-onset hypertension was 3.3% at 1 month, 4.7% at 3 months, and 5.5% at 6 months after injury. On multivariable regression analysis, increasing age, diabetes, renal artery injury, partial nephrectomy, and nephrostomy were identified as independent predictors of developing new-onset hypertension whereas total nephrectomy was not a predictor **(Table)**.

Conclusion: Our findings reveal that the risk of new-onset hypertension increases with time after blunt renal injury with a prevalence of 5.5% at 6 months from injury. Follow-up blood pressure measurements may be required following renal injuries, particularly in older diabetic patients with renal artery injuries undergoing nephrostomy or partial nephrectomy.

Table: Independent Predictors of New-Onset Hypertension

Variable	aOR	95%CI	*p*
Age (every 1-yr increase)	1.04	1.03 – 1.05	**<0.001**
Renal artery injury	1.48	1.04 – 2.14	**0.031**
Diabetes Mellitus	1.09	1.05 – 1.18	**0.044**
Interventions			
No intervention	Ref	Ref	Ref
Total nephrectomy	1.21	0.75 – 1.96	0.441
Partial nephrectomy	7.35	4.44 – 12.18	**<0.001**
Stent	1.10	0.73 – 1.66	0.652
Nephrostomy	3.04	2.05 – 4.49	**<0.001**

aOR=adjusted odds ratio; CI=confidence interval; Ref= reference

Session XV: Quickshot Session I 1-13
Quickshot 7: 8:36 AM - 8:42 AM

UTILIZATION OF CARDIOPULMONARY BYPASS IN TRAUMA PATIENTS, AAST-SPONSORED MULTICENTER STUDY

Introduction: Cardiopulmonary bypass (CPB) is required to be immediately available in Level I trauma centers. The data regarding the use of CPB after injury is scarce. The purpose of this study was to characterize the utilization and outcomes of CPB after trauma.
Method: This is a retrospective multicenter study of adult trauma patients undergoing CPB from 2011-2021. Demographics, clinical characteristics, and outcomes were reported. Univariate analysis was performed comparing those who survived to discharge versus those who did not.
Results: There were 113 patients from 32 Level I trauma centers with mean age 39.5±15.6; with most males (82%); and 27% had comorbid conditions. In total 63% sustained blunt trauma, 70% from motor vehicle crashes. The median (IQR) ISS was 29 (25); and 19% presented in shock. CPB was performed within 2 hours in 39%, and 18% after 24h. The most common injuries were cardiac 43%, thoracic aorta 42%, and 26% had pericardial tamponade. Per operative reports, repair of aorta (31%); emergency preservation & resuscitation (20%); and cardiac repair (15%) were the three most common reasons to use CPB. In-hospital mortality was 22%, with the median day of mortality 1 (IQR 3) days. 60% died in ICU, 36% in OR and one patient died in ED. Median (IQR) hospital length of stay (LOS) of survivors was 17.5 (21) days with 44% discharged home. When comparing survivors and non-survivors, there were no difference in demographics, mechanism of injury, admission vital signs and lab values. Non-survivors had higher median (IQR) ISS 47.5(27.5) vs 29.0 (19.0) $p=0.002$, more lung injuries 56% vs 25% $p=0.006$, and developed cardiac arrest more often 84% vs 13% $p< 0.001$. The rate of mortality was 44% when CPB was used for emergency preservation & resuscitation, 24% for cardiac injuries and 14% for aorta repair.
Conclusion: Utilization of CPB for traumatic injuries is extremely rare. The true impact of CPB should be studied in comparison to patients where cardiovascular injuries are repaired without CPB controlling for patients' characteristics, severity, and types of injuries.

Session XV: Quickshot Session I 1-13
Quickshot 8: 8:42 AM - 8:48 AM

PREGNANCY UNDER PRESSURE: ASSESSING VENOUS THROMBOEMBOLISM DUE TO TRAUMA-INDUCED COAGULOPATHY IN PREGNANCY

Introduction: Pregnancy induces a hypercoagulable state to protect against peripartum hemorrhage. However, trauma induced coagulopathy can lead to devastating complications. This study aims to compare venous thromboembolism in pregnant women in comparison to non-pregnant women in the setting of a traumatic injury.

Methods: A retrospective analysis using the American College of Surgeons Trauma Quality Improvement Program (ACS-TQIP) was conducted to identify traumatically injured females aged 18 to 45 years between 2020 and 2021. All patients who were transferred, dead on arrival or did not have VTE prophylaxis were excluded. Patients were then dichotomized into two groups, pregnant group (PG) and non-pregnant group (NPG). A logistic regression model was used to generate a propensity score to create inverse probability weighting (IPW) to balance baseline characteristics of cases and controls. The primary outcomes were pulmonary embolism (PE) and deep vein thrombosis (DVT). Secondary outcomes included mortality, and in-hospital complications.

Results: Out of 87,032 patients, 1428 (1.6%) were pregnant. Most common cause of injury in PG group was motor vehicle crash in PG. The mean age was 30.22 ± 7.11. PG had higher rates of PE (OR: 1.3; 95% CI, 1.124–1.504, $p<0.001$), DVT (OR: 1.237; 95% CI, 1.094–1.399, $p<0.001$), unplanned intubations (OR: 1.506; 95% CI, 1.335–1.7, $p<0.001$), return to operating room (OR: 1.366; 95% CI, 1.242–1.503, $p<0.001$), ventilator associated pneumonia (VAP) (OR: 2.35; 95% CI, 2.068–2.671, $p<0.001$), but a lower mortality rate (OR: 0.659; 95% CI, 0.568–0.766; $p<0.001$).

Conclusion: Our findings suggest that this physiological hypercoagulability in PG is compounded by trauma induced coagulopathy, increasing their risk for VTE. PG also have higher odds of unplanned intubation, unplanned admission to OR and VAP. These findings emphasize the importance of having a low threshold to implement protective measures in this population.

Session XV: Quickshot Session I 1-13
Quickshot 9: 8:48 AM - 8:54 AM

A MULTICENTER, PROSPECTIVE STUDY OF CALCIUM DERANGEMENTS ON ARRIVAL TO THE EMERGENCY DEPARTMENT AFTER MAJOR TRAUMATIC HEMORRHAGE

Introduction: Calcium derangement, more specifically hypocalcemia, occurs after trauma, and may be secondary to physiologic effects of hemorrhage or secondary to transfusion. Limited published data also suggests that hypercalcemia may be a deleterious factor. We sought to determine the incidence of abnormal calcium on arrival after major trauma.
Methods: We conducted a prospective, observational, multicenter study at three level 1 trauma centers. An initial ionized calcium (iCa) value was drawn on arrival to the trauma center prior to infusion of any blood products or crystalloid. Descriptive, inferential, and regression modeling were used to describe the outcomes.
Results: Animals resuscitated with cRBCs showed lower MAP compared to hRBCs and fRBCs post-resuscitation. Hepatic injury markers AST and ALT were elevated with cRBCs, whereas hRBCs showed similar AST levels to fRBCs. hRBCs improved sensorimotor and cognitive functions and reduced brain tissue damage up to 28 days compared to cRBCs. hRBCs attenuated blood-brain barrier (BBB) breach and brain edema compared to cRBCs. hRBCs also suppressed MMP-9 production from neutrophils, mitigating MMP-9-mediated BBB breakdown and exerting anti-inflammatory effects in microglia. Comparatively, cRBCs showed decreased superoxide dismutase (SOD) and catalase, with increased thiobarbituric acid reactive substances (T-bars) post-transfusion, indicating an oxidative imbalance. hRBCs restored SOD and catalase levels, similar to fRBCs, suggesting improved oxidative status.
Conclusion: Overall, hRBCs for three weeks provided comparable resuscitation efficacy to fRBCs in TBI with severe HS. Furthermore, hRBCs conferred long-term neuroprotection against TBI with HS, possibly through mitigating MMP-9-mediated BBB disruption and neuroinflammation. Hemanext did not participate in the experiment, data collection, analysis or interpretation.

Session XV: Quickshot Session I 1-13
Quickshot 10: 8:54 AM - 9:00 AM

EQUIVALENT OUTCOMES AFTER OPEN VS. ENDOVASCULAR REPAIR OF TRAUMATIC AXILLOSUBCLAVIAN ARTERIAL INJURY: A PROPENSITY SCORE MATCHED ANALYSIS

Introduction: Despite increased use of endovascular repair (ER) for traumatic vascular injury, large-scale study of the operative management of traumatic axillosubclavian arterial (Ax-Sub) injury has not been performed. We compare patient outcomes after open (OR) vs ER of Ax-Sub injury.
Methods: 2017-2021 TQIP database was queried for adult patients with blunt or penetrating axillary or subclavian artery injury. Patients with severe TBI, death in ED, missing necessary data, or non-operative management were excluded. Propensity score matching (PSM; 1:1) was performed, adjusting for age, sex, ISS, concomitant injuries, blunt vs. penetrating trauma, severity of Ax-Sub injury (AIS <3 vs. ≥ 3), comorbidities, hypotension, and tachycardia at presentation.
Results: There were 1,517 patients in the study: 1,032 OR and 485 ER cases. OR was more common for severe Ax-Sub injuries (54 vs. 22.1%), axillary injury (67 vs. 39.8%), penetrating injury (67.2 vs. 52%) concomitant upper extremity injury (22.7 vs. 8.7%), and patients with hypotension (21.9 vs. 11.8%) or tachycardia at presentation (51 vs. 43.9%). For both approaches, 6% had combined Ax-Sub injury. Unmatched, OR had higher mortality (8.3 vs. 4.1%, $p<0.01$) despite shorter time to procedure (2.2 [1.1-4.3] vs. 4 [2.5-8.4] hours, $p<0.02$). After PSM (485 OR vs. 485 ER), there was no difference in mortality (6.8 vs. 4.1%), length of stay (7 [5-13] vs. 7 [4-13] days), ICU admission rate (80 vs. 81.4%), delayed amputation (2.1 vs. 1.6%), fasciotomy (2.3 vs. 0.6%), or most complications. OR still occurred earlier than ER (2.8 [1.4-5.5] vs. 4 [2.5-8.4] hours, $p<0.01$). OR had more unplanned reoperations (6 vs. 3.3%, $p=0.047$), while ER had more unplanned intubations (1.6 vs. 4.5%, $p<0.01$).
Conclusion: While initial operative decision for traumatic Ax-Sub injury appears to be based on hemodynamic status, location and severity of Ax-Sub injury, and presence of concomitant injury, after adjusting for these factors through PSM, there were no significant differences in major outcomes between OR and ER. This is despite increased time to ER. This implies there is no inherent advantage to OR vs. ER that should dictate surgeon decision making. Thus, continuing to determine operative approach based on patient presentation and surgeon judgement is warranted.

Session XV: Quickshot Session I 1-13
Quickshot 11: 9:00 AM - 9:06 AM

THE IMPACT OF MOTORIST CHARACTERISTICS ON BEING UNDER TRIAGED IN MOTOR VEHICLE COLLISIONS

Introduction: Motor vehicle collisions are one of the most frequent mechanisms of traumatic injuries. Currently, field triage guidelines are utilized to direct emergency personnel on decisions about patient level of care needs and accelerate transfers to major trauma centers. However, even with these guidelines many patients are under triaged possibly leading to impropriate disposition. Given this, we sought to study associations of the motorist characteristics and the risk of being under triaged.
Methods: We conducted a retrospective study using a novel linkage of publicly available UD10 police reports linked with Michigan Trauma Quality Improvement Program (MTQIP) registry. Inclusion criteria included all MVCs, with only exclusions being motor-pedestrian collisions and patients less than 6 years old. We then compared outcomes of the patients evaluated for traumatic injuries by the details of their MVC, including vehicle age, type of collision, restraint use, and airbag deployment, controlled for patient age and sex. Multivariable logistic regressions were used to identify collision characteristics and calculated triage using both ISS criteria (Cribari Matrix Method) and Need for Trauma Intervention (NFTI) criteria to assess for characteristics that could be predictive for being under triaged.
Results: There were 15,972 cases that were linked to the MTQIP trauma registry. This group contained 42.7% males with mean age 41.7 years (SD 20.1 years). Several collision features were associated with being under triaged. Certain motorist characteristics were more predicative of being under triaged including: age, sex, and race. Being 65 or older, increased the risk of being under triaged, ISS criteria (OR 1.89, 95% CI 1.57-2.29, p=0.000) and NFTI criteria (OR 2.51, 95% CI 2.08-3.03, p=0.000). Males were also associated with being under triaged: NFTI criteria (OR 1.20, 95% CI 1.04-1.39, p=0.012). Nonwhite race was also linked to increase risk of being under triaged: ISS Criteria (OR 0.79, 95% CI 0.67, p=0.004).
Conclusions: Integrating motorist characteristics within field triage guidelines, including race, sex, and age could help to decrease risk of being under triaged following MVC, leading to better determination of potential intervention needs at a major trauma center.

Session XV: Quickshot Session I 1-13
Quickshot 12: 9:06 AM - 9:12 AM

PENETRATING MECHANISM AND HIGH SOCIAL VULNERABILITY ASSOCIATED WITH LATE SEVERE PRESSURE-RELATED INJURY IN SPINAL CORD PATIENTS

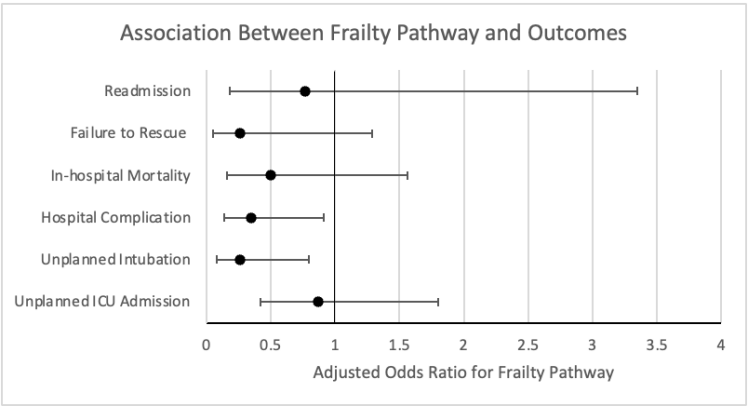
Introduction: Pressure-related injuries (PRI) are a significant source of morbidity and mortality following spinal cord injury (SCI). We sought to identify risk factors in SCI patients who require operative PRI debridement.
Methods: We performed two separate retrospective analyses. First, a trauma registry retrospective evaluation was performed of all patients sustaining an SCI at our urban Level 1 Trauma Center from 2018 to 2023 (n=1,396). Separately, we manually reviewed the charts of all soft tissue debridements within the same period (n=1,288) to identify patients with underlying SCI (n=158). Patients' home addresses were geocoded to match Social Vulnerability Index (SVI), an aggregate score that considers 16 socioeconomic factors at the census tract level. Descriptive and analytical statistics were conducted using Stata.
Results: 1,554 patients were included in data analysis. Compared to the general SCI population, SCI patients requiring operative debridement were younger (47 vs 60 y, $p<0.0001$) and more likely to be male (84% vs 58%, $p<0.0001$), black (50% vs 26%, $p<0.0001$), have a penetrating mechanism (42% vs 5.5%, $p<0.0001$), have a thoracic injury (45.6% vs 33%, $p<0.0001$), and higher SVI ($p= 0.0035$) (see Table below). The median time from index injury to operative debridement was 8 years (IQR: 2-23). Most PRIs were Stage 4 (70%) with evidence of osteomyelitis (70%).
Conclusions: Of the PRIs requiring surgical debridement, the proportion of those with underlying penetrating SCI was eightfold higher than the overall incidence of penetrating SCI in our trauma catchment. This cohort suffered severe PRI wounds as reflected in the high incidence of Stage 4 wounds and osteomyelitis. The PRI group's higher SVI indicates an unmet need to provide additional socioeconomic support after discharge that may mitigate PRI burden. Additional research is needed to identify areas for targeted intervention.

	Index Injury (1396)	Surgical Debridement (158)	*p-value*
Age mean (SD)	60.0 (±22.7)	47.3 (±15.8)	<0.0001
Male Gender	812 (58.2%)	134 (84.4%)	<0.0001
Black Race	259 (25.7%)	79 (50.0%)	<0.0001
Penetrating Mechanism	77 (5.5%)	66 (42.0%)	<0.0001

Session XV: Quickshot Session I 1-13
Quickshot 13: 9:12 AM - 9:18 AM

IMPLEMENTATION OF A FRAILTY PATHWAY FOR GERIATRIC TRAUMA PATIENTS RESULTS IN DECREASED COMPLICATIONS AND UNPLANNED INTUBATIONS

Introduction: Frailty is a well-established marker of physiologic vulnerability and is associated with morbidity and mortality. Prompt diagnosis and interdisciplinary care pathways can mitigate its effect. We hypothesized that implementation of a frailty identification and treatment pathway would result in improved outcomes for geriatric trauma patients.
Methods: This was a retrospective cohort study of patients ≥ 65 years old, admitted to the trauma service at an academic level I trauma center between April 2021 to Dec 2023. Patients with firm indications for ICU-level care (HR>120, SBP<90, and GCS≤10) and those with missing data on frailty were excluded. After August 2022 (initiation of our frailty pathway), patients were screened for frailty upon admission using a 5-point FRAIL scale. If positive, the pathway called for initial triage to the ICU and an interdisciplinary protocol focused on reducing geriatric complications. Patients were compared pre and post pathway implementation. Our outcomes were unplanned ICU admission, unplanned intubation, hospital complication, mortality, failure to rescue, and readmission.
Results: There were 611 geriatric patients included in the study, 271 of which received frailty pathway care. There were no significant differences between the groups in age, mechanism, co-morbidities, ISS, ED GCS, or ED vital signs. After controlling for confounding factors, we found that the frailty pathway predicted lower odds of unplanned intubation (OR 0.26, CI 0.08-0.80) and hospital complications (OR 0.35, CI 0.14-0.91).
Conclusion: Frailty pathway care is significantly associated with decreased risk for unplanned intubation and hospital complications. Identification and treatment of frailty in geriatric trauma patients may result in improved outcomes.



Session XVI: Quickshot Session II 14-26

Quickshot 14: 9:40 AM - 9:46 AM

LET THE RESIDENT TRY: EVALUATION OF CENTRAL VENOUS CATHETER PLACEMENT IN HYPOTENSIVE TRAUMA PATIENTS USING TRAUMA VIDEO REVIEW

Introduction: While intraosseous attempts are faster and more often successful than central venous catheter (CVC) attempts, CVC devices will continue to have a role in the resuscitation of hypotensive trauma patients. Using audiovisual recordings of trauma resuscitations, we sought to identify factors associated with successful placement of CVC devices. We hypothesized that attending surgeons would be both faster and more successful than trainees in the placement of CVC.

Methods: We analyzed data abstracted from audiovisual recordings from a multicenter study of intravascular access in injured patients with initial systolic blood pressure (SBP) <90mmHg. The primary exposure of interest was the training level of the practitioner attempting CVC access (attendings (AT) vs. trainees (TR). The primary outcomes of interest were the success rates and duration of CVC attempts. Secondary outcomes of interest were these same outcomes stratified by site of attempt (femoral vs. subclavian). We also examined the association between success rates and patient age, gender, injury mechanism, injury severity score (ISS), and initial SBP.

Results: 242 CVC attempts occurred in 176 patients at 13 centers (median age 37 (IQR 27-52), 84% male, median ISS 26 (IQR 17-40), and with initial median SBP 59 (IQR 0-78) mmHg. Trainees performed 172/242 (68%) of CVC attempts, and the overall success did not differ between groups (AT 59% vs. TR 59%, p=0.96). Patient age, sex, injury mechanism, and ISS were not associated with CVC success, but success rates were higher in patients with measurable SBP (71% vs. 45%, p<0.001). CVC attempts were faster in the AT group than the TR group (median 123 (IQR 70-240) seconds vs. 193 (IQR 120-303) seconds, p<0.001). Subclavian attempts were more successful in the AT than TR group (68% vs. 47%) even after accounting for measurable SBP (OR 2.42, 95%CI 1.04-5.63).

Conclusions: Overall, CVC attempts in hypotensive patients were ~1 minute faster but not more successful when performed by attendings vs. trainees. Attendings were also more successful than trainees at subclavian CVC attempts. Our findings support allowing resident CVC attempts even in critically ill patients.

Session XVI: Quickshot Session II 14-26
Quickshot 15: 9:46 AM - 9:52 AM

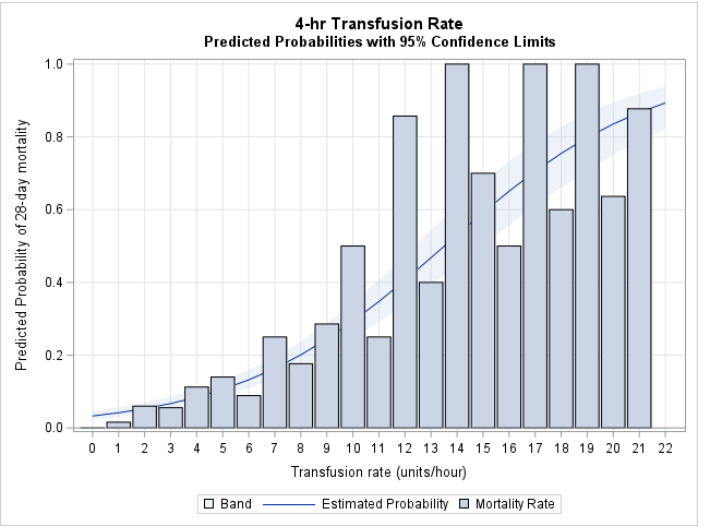
METHAMPHETAMINE USE AND HOMELESSNESS ARE RISK FACTORS FOR TRAUMA RECIDIVISM AND PREMATURE MORTALITY IN SURVIVORS OF VIOLENT INJURIES

Introduction: Methamphetamine use and homelessness have markedly increased nationally, and this trend is especially evident among trauma patients. However, no study to date has examined long-term outcomes associated specifically with methamphetamine use and homelessness in trauma survivors. The aim of this study was to measure how methamphetamine use and homelessness impact risks of recurrent injury and premature death in survivors of violent trauma.
Methods: In this retrospective single-institution study, the electronic medical records of patients who presented between 2015-2023 with violent injuries were reviewed for housing status and recurrent injury. Our County Coroner's database was queried to identify any post-discharge deaths. Cox proportional hazards regression models were used in a time-to-event analysis, with death and recurrent traumatic injury as the events of interest, to calculate hazard ratios (HR) and 95% confidence intervals (95% CI) for the risk factors of homelessness and methamphetamine use.
Results: Among the 2,468 patients who met our inclusion criteria, 1,037 (42.5%) tested negative for methamphetamine while 1,401 (57.5%) tested positive, and 1,646 (66.7%) reported having housing while 822 (33.3%) were experiencing homelessness. There were 181 (7.3%) who returned at least once to the ED with a new traumatic injury and 115 (4.7%) who died post-discharge. Meth-positive patients returned to the ED with a new traumatic injury at a rate three times higher than meth-negative patients (HR, 3.15; 95% CI 2.48-3.99), while unhoused patients returned at a rate five times that of housed patients (HR, 4.99; 95% CI 3.82-6.52). When compared to their counterparts, meth-positive patients had a two-fold higher rate of post-discharge death (HR, 1.90; 95% CI 1.44-2.51), and unhoused patients had a three-fold higher rate (HR, 3.25; 95% CI 2.40-4.41).
Conclusion: Methamphetamine use and homelessness significantly increase risk of premature death and recurrent traumatic injury in survivors of violent trauma. It is imperative that trauma care includes mandatory screening for substance use and housing insecurity. Additional study is needed to identify effective interventions to improve long-term outcomes.

Session XVI: Quickshot Session II 14-26
Quickshot 16: 9:52 AM - 9:58 AM

PREDICTING FUTILITY IN HEMORRHAGING TRAUMA PATIENTS UTILIZING 4-HOUR TRANSFUSION VOLUMES AND RATES

Introduction: Blood shortages and increased stewardship have motivated the trauma community to evaluate futility cut-points during massive transfusion (MT). Recent single center studies have confirmed meaningful survival in ultra-MT (≥20 units), while others advocate for earlier futility cut-points. We sought to evaluate whether transfusion volume and intensity cut-points could predict 100% mortality in a multicenter analysis.
Methods: A prospective, multicenter, observational cohort study was performed at 7 trauma centers, enrolling patients requiring both blood transfusion and hemorrhage control procedures. Transfusion volumes and rates (units/hour) were evaluated. Primary outcome was 28-day mortality.
Results: 1047 patients met inclusion with an overall mortality rate of 17%. Median age was 35, 80% male, 62% penetrating, with an ISS of 22. At 4-hr, volumes below 110 units and transfusion intensity averaging ≥ 21 units/hr did not demonstrate futility. Total transfusion volumes >110 units were associated with 100% mortality (n=9). At 24-hr, survival was observed >120 units and up to sustained transfusion of 10 units/hr, with 100% mortality being observed at transfusion velocities ≥ 11 units/hr. (FIGURE).
Conclusion: In this study from seven level-1 trauma centers, survival was observed at transfusion volumes up to 110 units and at transfusion velocities of 21 units/hr during the first 4 hours of resuscitation. Data are limited on transfusion volumes above 110 units in the first 4 hours.



Session XVI: Quickshot Session II 14-26
Quickshot 17: 9:58 AM - 10:04 AM

PREDICTORS OF HEALTHY DAYS AT HOME: BENCHMARKING LONG-TERM OUTCOMES IN GERIATRIC TRAUMA

Introduction: Quality benchmarking has recently evolved from a historical focus on short-term morbidity and mortality as the key metrics to assessing long-term outcomes. Long-term quality metrics have been shown to provide a more complete assessment of geriatric trauma care. Among these metrics, patients' average number of healthy days at home (HDAH) proports to be a useful administrative claims-based marker of patient functional status. Our goal was to determine the predictors of HDAH among injured older adults.
Methods: Medicare inpatient claims (2014-2015) were used to identify all geriatric trauma patients. Patients' number of HDAH was measured from the date of discharge and calculated as the total sum of patients' time during that period less any time spent in the hospital or emergency department, step-down/rehabilitation/nursing care, home health, or after death within a 365-period after index admission. Controlling for demographic, injury severity, and hospital-level characteristics, multivariable regression analyses were performed to identify the factors associated with increased HDAH.
Results: We included 772,109 geriatric trauma patients. Mean age was 82.15 (SD 8.49), 68.3% were female, and 91.6% were white. Median HDAH was 351 (IQR 351–355) days. After adjusted analysis, predictors of 365-day HDAH are shown in the table. Age, black race, CCI, care at a Level 2/3/non-trauma center were associated with fewer HDAH.
Conclusions: This study suggests that higher level trauma centers provide more healthy days at home after index admission for injured older adults. Future studies should focus on correlating healthy days at home with more granular but less readily accessible quality of life metrics.

Table. Predictors of HDAH within 365 days

Variables	Adjusted Coefficient	95% CI
Age	-1.16	-1.18 – -1.14
Female sex	3.54	3.17 – 3.90
Race (ref. White)		
Black	-2.18	-3.03 – -1.33
Other	2.91	2.08 – 3.74
Injury Severity Score	0.06	0.03 – 0.09
Charlson Comorbidity Index	-5.55	-5.66 – -5.44
Teaching hospital	1.35	0.77 – 1.93
Hospital size (>=200 beds)	0.81	0.37 – 1.26
Admitting Hospital (Ref. Level 1)		
Level 2 Trauma Center	-0.85	-1.45 – -0.25
Level 3 Trauma Center	-1.86	-2.56 – -1.16
Non-Trauma Center	-1.35	-1.96 – -0.73

Session XVI: Quickshot Session II 14-26
Quickshot 18: 10:04 AM - 10:10 AM

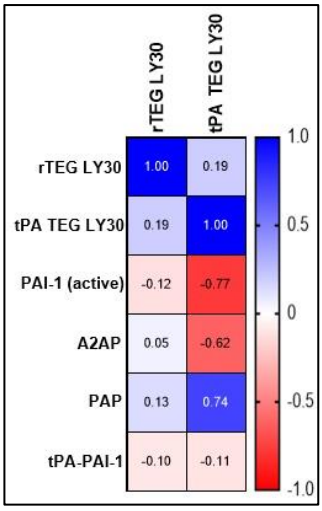
SOCIAL VULNERABILITY PROVOKES A HYPERCOAGULABLE STATE IN TRAUMA

Introduction: Previous research links the complex associations between social determinants of health to worse trauma outcomes in vulnerable populations. The Centers for Disease Control and Prevention's Social Vulnerability Index (SVI) is a composite census tract level measure of 16 variables created to examine the complex interaction of demographic, social and socioeconomic factors that impact not only the community, but individuals as well. At present, SVI has been identified as increased risk of inpatient trauma mortality; however, its influence on the fundamental biologic response to injury has not been examined. We sought to examine the effect of SVI on coagulation function and proteomics after severe injury.
Methods: Patients from our Trauma Activation Protocol Database (2014-2018) were assigned SVI based on residential address and grouped into low SVI (<75 %ile) and high SVI (>75 %ile) cohorts. Multiple regression was used to adjust omics data for injury severity and base excess before proteome-wide comparisons between high SVI and low SVI. Proteomic signatures from trauma plasma were compared between groups, stratified by injury severity, shock, sex and ethnicity. TEG data was analyzed by the Wilcoxon-Mann-Whitney test for non-normally distributed continuous variables.
Results: 74 patients with High Injury/High Shock were included (44 [59%] low SVI, 30 [41%] high SVI). High SVI was associated with a hypercoagulable phenotype with a greater rate of clot propagation (angle 70.5 in low SVI vs. 73.6 in high SVI, p=0.034) higher clot strength (MA 57.9 in low SVI vs. 62.0 in high SVI, p=0.036), and diminished clot fibrinolysis (LY30 0.75 in low SVI vs. 2.5 in high SVI, p=0.045). Proteomics signatures demonstrated enrichment in proteins associated with hemopoiesis, coagulation and apoptotic pathways among high SVI patients compared to low SVI patients.
Conclusion: High SVI patients exhibit a hypercoagulable phenotype, affecting clot propagation, strength, and fibrinolysis and a pro thrombotic proteomic milieu. Our data highlight the role of social vulnerability on the biologic response to injury and emphasize the previously unknown complex interplay between social factors and the fundamental biologic response to trauma.

Session XVI: Quickshot Session II 14-26
Quickshot 19: 10:10 AM - 10:16 AM

THE TPA CHALLENGE THROMBOELASTOGRAM (TPA-TEG) PROVIDES A COMPREHENSIVE ASSESSMENT OF FIBRINOLYSIS IN THE SEVERELY INJURED

Introduction: Tissue-plasminogen activator added to thromboelastography (tPA-TEG) predicts massive transfusion (MT) and mortality better than conventional rapid TEG (rTEG), with little concordance between their lysis values (LY30). We hypothesized that the main fibrinolytic inhibitors plasminogen activator inhibitor-1 (PAI-1) and alpha-2 antiplasmin (A2AP), and markers of fibrinolytic activation (plasmin-antiplasmin (PAP) and tPA-PAI-1 complex), would correlate more strongly with tPA-TEG versus rTEG LY30 and may explain the recent findings of four distinct fibrinolytic phenotypes in trauma based on these two TEG methodologies.
Methods: Adult trauma patients (n=56) had tPA-TEG, rTEG and plasma obtained on arrival to the emergency department with IRB approval. PAI-1 activity, A2AP, PAP, and tPA-PAI-1 complex levels were measured. Data were analyzed using Spearman's correlations and ANOVA.
Results: Median age was 34, 75% were male, and the NISS was 14. Mortality was 25%, and 23% required a MT. There was a significant negative correlation between PAI-1 activity and A2AP with tPA-TEG LY30 ($r=-0.77$, $p<0.0001$ and $r=-0.62$, $p<0.0001$). There was a significant positive correlation between PAP complex and tPA-TEG LY30 ($r=0.74$, $p<0.0001$). There was no correlation between any fibrinolytic analyte and rTEG LY30. When stratified by phenotype, patients with hypofibrinolysis and non-pathologic fibrinolysis had higher A2AP levels ($p<0.05$), lower PAP ($p<0.05$) and tPA-PAI-1 complex ($p<0.05$) than true hyperfibrinolysis and fibrinolysis shutdown.
Conclusion: tPA-TEG LY30 more accurately reflects fibrinolysis phenotypes in trauma patients than conventional TEG methods. This provides an explanation for tPA-TEG's superior performance over rTEG in predicting massive transfusion and mortality.

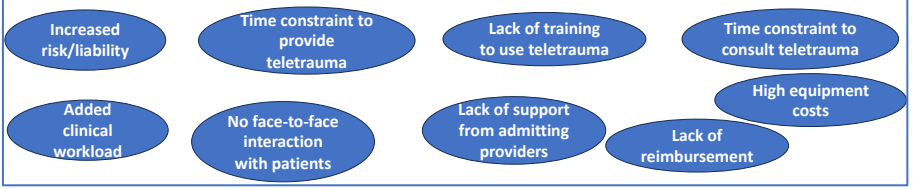


Session XVI: Quickshot Session II 14-26
Quickshot 20: 10:16 AM - 10:22 AM

BARRIERS TO USING TELEMEDICINE TO IMPROVE SECONDARY TRIAGE IN A RURAL TRAUMA SYSTEM

Introduction: Level I/II trauma centers in rural regions often face high rates of secondary overtriage which leads to inefficient resource utilization. Evidence suggests telemedicine use for trauma care (teletrauma) can help decrease the rate of secondary overtriage. However, teletrauma is not being widely used and the reasons for its low utilization remain unknown. The objective of this study was to identify physician perceived barriers to using teletrauma to improve secondary triage in a rural trauma system.
Methods: We used nominal group technique (NGT), a novel qualitative research method to identify and prioritize physician perceived barriers to using teletrauma using ranked choice voting. Four NGT panels were convened; two included trauma surgeons (n=14) at level I/II trauma centers and two included emergency physicians(n=6)at level III/non-trauma centers.
Results: Overall, 98 barriers were identified and 44 (45%) barriers were prioritized through ranked choice voting. Highest voted barriers among trauma surgeons identified concerns regarding increased risk/liability, additional clinical workload amid time constraints and lack of face-to-face interaction with patients. Highest voted barriers among emergency physicians identified concerns regarding time constraints to be on a teletrauma call while actively delivering bedside trauma care, high equipment cost, lack of reimbursement, lack of training to use teletrauma and lack of support from admitting providers to admit patients locally.
Conclusion: Trauma surgeons and emergency physicians identified unique barriers to using telemedicine. While precedents from other telehealth programs exist to resolve some of these barriers, directed effort is needed to address trauma care-specific barriers to using teletrauma.

Figure1: Perceived barriers to the use of telemedicine among trauma surgeons and emergency physicians



Session XVI: Quickshot Session II 14-26
Quickshot 21: 10:22 AM - 10:28 AM

2024 AAST PANCREAS INJURY GRADING UPDATE: BETTER GRADING FOR IMPROVED UNDERSTANDING OF MANAGEMENT OUTCOMES

Introduction: The AAST Organ Injury Scale (OIS) Committee published the original Pancreas OIS in 1990 with the authors commenting that the classification would need "continued refinement as clinical experience dictates." After 34 years, the purpose of this revision is to improve the alignment between pancreatic injury grade, severity, as well therapeutic, diagnostic, and clinical pathways.

Methods: A working group of the AAST, including trauma and pediatric surgeons, experts in radiology, and interventional GI participated. Contemporary research was reviewed, and a standardized iterative and collegial process utilized over several months to arrive at consensus.

Results: Major changes to the grading system include moving contusions of the pancreatic head (without laceration or ductal injury) down from grade IV to grade I. All lacerations without ductal injury are grade II. Injuries to the duct remain grade III, but are further subclassified to distinguish between suspected, partial, and complete ductal transection. Grade IV injuries are now ductal injuries right of the portal vein or SMV. Grade V are destructive injuries of the head with non-viable tissue.

Conclusion: We propose a revised Pancreas OIS schema based on current literature and understanding of imaging limitations. Though validation will be necessary, increasing grades should now more closely reflect increasing injury severity. Management based on grade and subgrade will allow for improved analysis of clinical outcomes.

Grade	Subgrade	Grade Criteria	Sub Grade Criteria
I		Pancreatic injury without laceration/hematoma	
	A		Peripancreatic edema without visible pancreatic injury
	B		Pancreatic contusion without hematoma or laceration
II		Parenchymal laceration/hematoma in any location, without evidence of main duct injury	
	A		Overlying or left of the portal vein/SMV
	B		Right of the portal vein/SMV
III		Main duct injury overlying or to the left of the portal vein/SMV	
	0		Suspected ductal injury based on depth of injury >50%
	A		Confirmed main duct injury with ductal alignment
	B		Confirmed main duct injury - completely transected and/or distracted
IV		Main duct injury to the right of the portal vein/SMV	
	0		Suspected ductal injury based on depth of injury
	A		Confirmed main duct injury with ductal alignment
	B		Confirmed main duct injury - completely transected and/or distracted
V		Destructive injury of pancreas with non-viable pancreatic head (blast injury or crushed pancreatic head)	
	A		with intact main pancreatic duct in head
	B		with injury of main pancreatic duct
	C		with injury to intrapancreatic common bile duct
	D		with avulsion of ducts off duodenum or sphincter disruption

Session XVI: Quickshot Session II 14-26
Quickshot 22: 10:28 AM - 10:34 AM

GERIATRIC TRAUMA PROGRAMS: WHAT IS THE BENEFIT?

Introduction: Multiple studies have validated frailty index scores - including the ISAR screening tool - at predicting elderly patients at risk of adverse outcomes in both the medical and surgical setting. Early involvement of the geriatric team has been proposed to improve outcome measures. We set out to evaluate the effect of ISAR screening and automatic consultation with the geriatrics team on our trauma patient population

Methods: The trauma ISAR screening program began at our facility on 11/1/2021. During the leading nine-month period, we retrospectively reviewed our trauma database to identify 548 patients aged 65 years and older admitted to the hospital who met ISAR criteria and did not have a consultation by the geriatric team. We compared these patients to the post intervention group, consisting of 270 patients who screened ISAR positive and were evaluated by the geriatric trauma team for the trailing nine months following program initiation. Primary endpoints included hospital and ICU length of stay (LOS), 30-day readmission, mortality, and discharge disposition.

Results: For the two intervention groups, there was no difference in mortality or discharge disposition. Average hospital LOS was 6.8 days in the pre-intervention group and 9.7 days in the post-intervention group. Of those patients admitted to the ICU, the average LOS was 4.3 days in the pre-intervention group and 5.8 days in the post-intervention group. Average age and average injury severity scores were 82.9 and 8.25 for the pre-intervention group and 81.7 and 10.06 for the post-intervention group. 30-day readmission rates were 1.1% vs. 0.4% before and after intervention, respectively.

Conclusions: Our retrospective study shows a defined ISAR screening and geriatric trauma team consult program leads to increased hospital and ICU length of stay without a difference in mortality or discharge disposition. With the increased geriatric trauma patient admission rates and geriatrician utilization, further studies are needed to better define the healthcare benefit of these initiatives.

Session XVI: Quickshot Session II 14-26
Quickshot 23: 10:34 AM - 10:40 AM

IMPLEMENTATION OF A COLON MANAGEMENT GUIDELINE: INCREASING RATE OF SAFE ANASTOMOSIS IN EMERGENCY GENERAL SURGERY PATIENTS

Introduction: Creation of a colostomy versus anastomosis remains a controversial topic in emergency general surgery (EGS) patients requiring emergent or urgent colon resection. In 2017, our institution standardized the indications for colostomy creation in EGS patients which included the presence of septic shock, poor tissue condition at the anastomotic site, and underlying medical conditions associated with poor wound healing. In the absence of these conditions, the guideline recommended anastomosis. The goal of this study is to examine rates of colostomy, anastomosis, and abdominal complications before (PRE) and after (POST) guideline implementation.

Methods: This is a single-institution, retrospective review of EGS patients over a 10-year period who underwent urgent or emergent colon resection by the EGS service. Demographics, comorbidities, operations, pre- and post-operative courses were recorded and analyzed before and after implementation of colectomy management guidelines.

Results: Between 1/1/2013 and 10/31/2022, 710 patients underwent segmental colon resection (283 PRE/427 POST). The PRE and POST groups were similar with respect to sex (F 48.1% vs. 51.8%, p=0.43), Charlson Comorbidity Index (3.7±2.8 vs. 3.8±2.8, p=0.50), and ASA score (3.5±8.6 vs. 3.4±8.8, p=0.08). Anastomosis was significantly more common in the POST group as compared to PRE (65.6% vs. 44.5%, $p<0.0001$). Intestinal leak, abscess, and wound dehiscence rates were similar in the PRE and POST groups (4.7 vs. 5.2, p=0.51, 14.1 vs. 14.7, p=0.50, 5.5 vs. 2.4, p=0.10, respectively) despite fewer colostomies.

Conclusion: Implementation of an EGS colon management guideline was associated with a significantly higher rate of anastomosis creation but no concomitant increase in leak or abdominal complication rate. This study supports the safety of anastomosis in over 60% of appropriately selected patients despite the urgent/emergent nature of their colon resections.

Session XVI: Quickshot Session II 14-26
Quickshot 24: 10:40 AM - 10:46 AM

RISK FACTORS FOR DVT IN PEDIATRIC TRAUMA PATIENTS: A 5 YEAR REVIEW OF THE NTDB

Introduction: Pediatric trauma patients receive venous thromboembolism (VTE) prophylaxis less often than adult trauma patients, but they still have a relatively low rate of deep venous thrombosis (DVT) and pulmonary embolisms (PE). Prior literature suggests that patients with lower extremity orthopedic injuries, traumatic brain injuries, more severely injured patients and older children may be at risk of these complications, but these risk factors have not been examined together for a large population group.
Method: The National Trauma Data Bank (NTDB) was queried from 2017-2022 for pediatric patients, aged ≤17 years old, and patients with DVT, PE or both were identified from this subset. Categorical variables were analyzed with x^2 test and continuous variables were analyzed with t-test. A logistic regression model was performed to determine risk factors for DVT and PE in pediatric trauma patients.
Results: From 2017-2022, there were 696,592 pediatric trauma patients. Of these, 786 had DVT (0.11%) and 194 had PE (0.03%), totaling 980 patients. The DVT group was older (13.63 vs 9.70 years, p<0.00001) and was more likely to be male (71.63% vs 64.65%, p<0.00001), have gone to the OR immediately (41.6% vs 14.63%, p<0.0001), have received packed red blood cells (PRBC) ≤4 hours of arrival (47.71% vs 9.92%, p<0.0001), have received fresh frozen plasma (FFP) ≤4 hours of arrival (58.14% vs. 49.55%, p<0.0001), have an ISS >15 (87.02% vs. 43.41%, p<0.0001), have a penetrating injury (5.85% vs. 1.01%, p<0.0001), and have a long bone fracture (1.4% vs. 0.18%, p<0.0001). A logistic regression model demonstrated that age ≥13 years had an odds ratio (OR) of 1.788 with confidence interval (CI) 1.088-2.937 (p=0.022). Other significant risk factors included PRBC ≤4 hours of arrival (OR: 3.915, CI: 2.070-7.414, p<0.0001), ISS >15 (OR: 13.299, CI: 5.166-34.236, p<0.0001), long bone fracture (OR: 3.878, CI: 1.043-14.416, p=0.043), and VTE prophylaxis administered more than 6 days after admission (OR: 23.073, CI 14.085-37.795, p <0.0001).
Conclusions: VTE prophylaxis should be considered in pediatric patients who are ≥13 years old, received PRBC ≤4 hours of arrival, severe ISS, or long bone fractures; delayed VTE prophylaxis more than 6 days after arrival increases risk of DVT in patients with these risk factors.

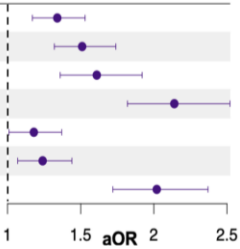
Session XVI: Quickshot Session II 14-26
Quickshot 25: 10:46 AM - 10:52 AM

SOCIAL DETERMINANTS OF HEALTH AFFECT THE PHYSICAL AND MENTAL HEALTH OF INJURED ADULTS IN AMERICA

Introduction: Although increased attention is being placed on social determinants of health (SDOH) and modifiable unmet social health needs (USNs) of injured people, there are currently no national estimates of SDOH prevalence and associated post-injury health outcomes.
Methods: We analyzed data from the nationally representative 2019-2021 Medical Expenditure Panel Survey. We identified all injured adults requiring emergency or inpatient care and compared them to age- and sex-matched uninjured controls. SDOH factors included financial strain, environmental stressors, discrimination, social isolation, adverse childhood experiences (ACEs) and 3 USNs (food insecurity, housing instability, and poor access to transportation). We then evaluated the association between USNs and physical health, mental health, and delaying care due to cost.
Results: Among a weighted sample of 21,799,813 injured adults and 114,880,510 uninjured controls, trauma was associated with higher prevalence of all SDOH factors (**Table**). Injured adults had a greater number of ACEs than their matched controls (3.5 vs 3.1, $p<0.001$). Compared to injured adults without USNs, those with USNs had increased odds of poor physical health (OR:1.46 [95%CI:1.06-2.01]), poor mental health (OR:1.94 [1.4-2.69]) health and delaying care due to cost (OR: 2.48 [1.65-3.76]).
Conclusions: Injured adults in the United States have a high burden of negative SDOH and USNs. Modifiable USNs are correlated with worse physical and mental health, and delays in care due to cost. These findings suggest that screening for, and developing affordable ways to address USNs might improve long-term mental and physical health among injured adults.

Table. Prevalence of SDOH Factors Among U.S. Trauma Patients

	Control (%)	Trauma (%)	aOR (95% CI)
Discrimination	31%	37%	1.34 (1.17–1.53)
Environmental Stress	24%	32%	1.51 (1.32–1.74)
Social Isolation	13%	20%	1.61 (1.36–1.92)
Financial Strain	43%	62%	2.14 (1.82–2.52)
Limited Transportation (USN)	39%	43%	1.18 (1.01–1.37)
Housing Instability (USN)	57%	63%	1.24 (1.07–1.44)
Food Insecurity (USN)	18%	31%	2.02 (1.72–2.37)



Session XVI: Quickshot Session II 14-26
Quickshot 26: 10:52 AM - 10:58 AM

THROMBOEMBOLIC EVENTS AFTER ADMINISTRATION OF TRANEXAMIC ACID (TXA) IN PATIENTS WITH BLUNT THORACIC TRAUMA

Introduction: Patients with blunt thoracic trauma are twice as likely to experience a pulmonary thromboembolic event compared to other trauma patients. The reported risk of thromboembolic events in trauma patients who receive TXA has been mixed. Our study analyzed the effects of tranexamic acid administered to patients with blunt thoracic trauma on thromboembolic complications.

Methods: Multicenter retrospective, observational study conducted between 2010-2022 at 2 US level 1 trauma centers. Adult patients aged 18 and older with blunt trauma and a chest abbreviated injury scale (AIS)≥3 were included. The occurrence of thromboembolic events between those who received TXA and those who had not received TXA were compared using Chi-square test. The primary outcome was thromboembolic events, which included deep venous thrombosis, pulmonary embolism, myocardial infarction, and stroke.

Results: A total of 12,453 patients were analyzed: 793 (6.4%) patients who received TXA and 11,660 (93.6%) who did not. Of the patients who received TXA, 53 (6.7%) patients had a thromboembolic event (DVT 3.8%, PE 2.3%, MI/CVA 0.6%), and 296 (2.5%) of those who did not receive TXA had a thromboembolic event (DVT 1.3%, PE 0.5%, MI/CVA 0.7%). A logistic regression on 10,240 complete cases was completed. After controlling for age, gender, race, ethnicity, systolic blood pressure (SBP), heart rate (HR), respiratory rate (RR), Revised Trauma Score (RTS), and Glasgow Coma Scale (GCS), patients who suffered blunt thoracic trauma and received Tranexamic Acid (TXA) were 2.4 times more likely to experience thromboembolic complications than those who did not receive TXA. (OR 2.4, 95% CI 1.9-4.43, $p<0.001$, Hosmer-Lemeshow goodness of fit p-value=0.99).

Conclusions: Patients with severe, blunt thoracic trauma who receive TXA are 2.4 times more likely to have a thromboembolic complication compared to those who did not. Complications associated with the use of TXA in this patient population warrant further investigation.

Session XVI: Quickshot Session II 14-26
Quickshot 24: 10:40 AM - 10:46 AM

RISK FACTORS FOR DVT IN PEDIATRIC TRAUMA PATIENTS: A 5 YEAR REVIEW OF THE NTDB

Introduction: Pediatric trauma patients receive venous thromboembolism (VTE) prophylaxis less often than adult trauma patients, but they still have a relatively low rate of deep venous thrombosis (DVT) and pulmonary embolisms (PE). Prior literature suggests that patients with lower extremity orthopedic injuries, traumatic brain injuries, more severely injured patients and older children may be at risk of these complications, but these risk factors have not been examined together for a large population group.
Method: The National Trauma Data Bank (NTDB) was queried from 2017-2022 for pediatric patients, aged ≤17 years old, and patients with DVT, PE or both were identified from this subset. Categorical variables were analyzed with x^2 test and continuous variables were analyzed with t-test. A logistic regression model was performed to determine risk factors for DVT and PE in pediatric trauma patients.
Results: From 2017-2022, there were 696,592 pediatric trauma patients. Of these, 786 had DVT (0.11%) and 194 had PE (0.03%), totaling 980 patients. The DVT group was older (13.63 vs 9.70 years, p<0.00001) and was more likely to be male (71.63% vs 64.65%, p<0.00001), have gone to the OR immediately (41.6% vs 14.63%, p<0.0001), have received packed red blood cells (PRBC) ≤4 hours of arrival (47.71% vs 9.92%, p<0.0001), have received fresh frozen plasma (FFP) ≤4 hours of arrival (58.14% vs. 49.55%, p<0.0001), have an ISS >15 (87.02% vs. 43.41%, p<0.0001), have a penetrating injury (5.85% vs. 1.01%, p<0.0001), and have a long bone fracture (1.4% vs. 0.18%, p<0.0001). A logistic regression model demonstrated that age ≥13 years had an odds ratio (OR) of 1.788 with confidence interval (CI) 1.088-2.937 (p=0.022). Other significant risk factors included PRBC ≤4 hours of arrival (OR: 3.915, CI: 2.070-7.414, p<0.0001), ISS >15 (OR: 13.299, CI: 5.166-34.236, p<0.0001), long bone fracture (OR: 3.878, CI: 1.043-14.416, p=0.043), and VTE prophylaxis administered more than 6 days after admission (OR: 23.073, CI 14.085-37.795, p <0.0001).
Conclusions: VTE prophylaxis should be considered in pediatric patients who are ≥13 years old, received PRBC ≤4 hours of arrival, severe ISS, or long bone fractures; delayed VTE prophylaxis more than 6 days after arrival increases risk of DVT in patients with these risk factors.