AN INTERNATIONAL VALIDATION STUDY OF POINT-OF-CARE NEUTROPHIL ANALYSIS FOR THE ASSESSMENT OF POST-TRAUMATIC NEUTROPHIL RECEPTOR EXPRESSION

Christian Hübner, MD; Roman Pfeifer, MD; Emma de Fraiture, MD; Paolo Cinelli, PhD; Michelle Bitzi, MD; Leo Koenderman, PhD; Falco Hietbrink, MD; Michel Teuben, PhD; Hans-Christoph Pape, MD

Introduction: Changes in neutrophil surface receptors provide critical insights into post-traumatic immune responses. Recent advances in point-of-care (POC) technology enable rapid on-site neutrophil analysis. In a pilot study, we assessed trauma-induced alterations in key neutrophil receptors and their correlation with injury severity.

Methods: A POC neutrophil analysis system was implemented in a Level 1 trauma center, adapted from a different laboratory. Polytrauma patients (ISS >25) were included, and neutrophil surface markers (CD10, CD11b, CD62L) were analyzed using an AQUIOS® Flow Cytometer. Results were compared with ISS scores, data from a second international trauma lab, and standardized animal studies.

Results: 23 patients (median ISS 27.8) were included. Mean time between accident and measurement was 181 min. Circulating neutrophil counts, as well as cellular activation status, measured by CD10, CD11b and CD62L correlated with ISS. These findings were consistent with findings from both standardized animal studies and clinical analysis at another trauma laboratory.

Conclusion: This study successfully established a POC neutrophil analysis workflow in a Level 1 trauma center. Post-traumatic receptor alterations were consistent across clinical and experimental settings, supporting POC neutrophil analysis as a valuable immunomonitoring tool with potential to improve clinical decision-making and outcomes.

DOSE-DEPENDENT DISRUPTION OF THE GUT MICROBIOME FOLLOWING ACUTE RADIATION EXPOSURE

Gilbert A Pratt III, MS; Richard W Walsh, MD;
Lois Randolph, MS; Alvaro G Moreira, MD, MS;
Xiaowu Wu, MD, MMS; Michael A Meledeo, PhD;
James A Bynum, PhD; Susannah E Nicholson, MD, MS
UT Health Science Center - San Antonio

Introduction: Susceptibility to radiation injury has increased since its weaponized use in World War II. This increase is attributable to factors such as occupational exposure in nuclear medicine, low-carbon alternative energy production, and most concerning, the threat of deliberate release by nefarious groups. Proliferatively active cells are highly susceptible to radiation insults. There remains a paucity of literature examining gut microbiota beyond seven days post-radiation exposure. We investigated the temporal flux in gut microbial diversity after acute radiation exposure.

Methods: Male Sprague Dawley rats (8-10 weeks) were exposed to whole-body radiation injury (1Gy/min). We evaluated clean caught rectal microbiota up to fourteen days post-exposure in groups exposed to 5.5Gy (n=4) or 7Gy (n=6). Rectal feces were collected daily, initiating before radiation exposure to fourteen days post-injury. The V3-V4 variable region of the 16S rRNA gene was amplified from fecal genomic DNA for sequencing. A 5.5Gy exposure was a maximum survival dose in our study, resulting in 100% survival, while 7Gy corresponded to 66.67% survival.

Results: Significant differences in Shannon Index ($p=0.015$), Chao1 ($p=0.006$), and operational taxonomic units (OTU, $p=0.006$) were observed between the 5.5Gy group (Shannon Index: 6.28±0.46, Chao1: 2126.48±549.80, OTU: 2100.50±541.21) and the 7Gy group (Shannon Index: 6.07±0.60, Chao1: 1718.64±482.50, OTU: 1693.00±477.11) by day 14. Pairwise PERMANOVA showed significant differences in β-diversity between injury groups for both Bray-Curtis ($p=0.001$) and Jaccard ($p=0.001$) analyses. The Jaccard analysis exhibited significant differences in β-diversity between survivors and non-survivors ($p=0.001$). Non-survivors had increased phyla of Proteobacteria, Verrucomicrobiota and Actinobacteria, and decreased Firmicutes compared to survivors. Death from radiation exposure was associated with a significant decrease (FDR<0.05) in *Ruminococcaceae* before radiation exposure.

Conclusion: Enriched Proteobacteria and intrinsic cellular stress from exposure may suggest their contribution as positive feedback promoters in gastrointestinal radiation syndrome pathology. A decrease in Firmicutes, a phylum recognized for producing essential short chain fatty acids, may have contributed to worse outcomes. The outcomes indicate the severity of injury may be associated with the magnitude of microbiome alterations.

MORE THAN JUST A NUMBER: THE IMPACT OF AGE ON THE POST-INJURY METABOLOME AND GLYCOCALYX SHEDDING

Tanya Anand, MD, MPH; Sumudu Rajakaruna, PhD;
Malak Tfaily, PhD; Molly Douglas, MD; Krishna Parsawar, PhD;
Taylor Edwards, PhD; Alexander Hilser, BS; Estelle Brugere, BS;
Louis J Magnotti, MD, MS; Bellal Joseph, MD
University of Arizona

Introduction: While post-injury changes in the metabolome and glycocalyx shedding are increasingly understood in younger adults (YA), they are poorly characterized in older adults (OA). We hypothesized OA exhibit a different post-injury metabolite signature and glycocalyx shedding compared to YA.

Methods: We performed a prospective observational study (2023-2024) at our Level I trauma center. Plasma samples were obtained within 90 minutes of presentation. Patients were stratified by age (OA$\geq$60 yrs and YA<60 yrs) and compared. Extracts were analyzed using liquid chromatography and mass spectrometry. Enzyme-linked Immunosorbent Assay measured glycocalyx biomarkers, syndecan-1, syndecan-4 (Sdc-4), and Tissue Inhibitor of Metalloproteinase 2 (TIMP2). To identify age-specific metabolic signatures between age groups we performed Principal Coordinate Analysis. Differential metabolites were identified using Orthogonal Projections to Latent Structures Discriminant Analysis. Identified metabolites underwent pathway enrichment analysis.

Results: 79 patients were enrolled: 60 OA and 19 YA. Median age was 71, majority were male (51%). OA had significantly different post-injury metabolite profile compared to YA ($p<0.001$). Of 4536 metabolites investigated, 934 (20.6%) differed significantly between groups, and accounted for significant enrichment in tryptophan, phenylalanine, and tyrosine pathways ($p<0.05$). 30 metabolites had age-specific correlations with glycocalyx markers. 22 metabolites had strong negative correlations with Sdc-4 in YA (Pearson $r<-0.9$, $p<0.05$). These metabolites had moderate negative correlations with TIMP-2 in OA (Pearson $r= -0.5$ to -0.9, $p<0.05$).

Conclusion: Our study shows distinct age-related differences in post-traumatic metabolic responses, particularly amino acid metabolism and metabolite impact on glycocalyx shedding. Our study is a first step to better understanding metabolic differences between injured OA and YA and improve trauma resuscitation in older adults.

PRO-INFLAMMATORY LIPID MEDIATOR SHIFTS IN SYNOVIOCYTES: UNVEILING IL-1B'S ROLE IN POST-TRAUMATIC JOINT INFLAMMATION

Jason Williams, PhD; Melissa Hausburg, PhD; Christopher Cassidy, MD; Robert Madayag, MD; Carlos Palacio Lascano, MD; Raphael Bar-Or, PhD; David Bar-Or, MD; Charles Mains, MD; Kaysie Banton, MD
Swedish Medical Center

Introduction: Joint trauma often triggers the release of interleukin-1β (IL-1β), a key cytokine driving inflammatory responses. IL-1β activates cellular pathways that lead to the production of bioactive lipid mediators (oxylipins), which can perpetuate inflammation and contribute to joint degeneration. Understanding these lipid shifts is crucial for elucidating mechanisms underlying post-traumatic joint inflammation and the development of new targets for anti-inflammatory therapeutics. Here we describe the oxylipin profile of an acutely inflamed synoviocyte model using whole-cell targeted lipidomics with goal of discovering increased oxylipin targets for new anti-inflammatory therapeutics.

Methods: To recapitulate the joint synovial membrane, we used a monolayer culture with human primary Fibroblast-Like Synoviocytes (HFLS) isolated from cadaver knees. HFLSs were cultured with media containing 1ng/ml IL-1β for 6 hours to stimulate activation of inflammatory pathways. HFLSs were then washed, harvested and processed for lipidomic analyses. Each sample was mixed with 34 deuterated oxylipin standards for quantification by ultra-high-pressure liquid chromatography coupled to mass spectrometry (UHPLC-MS). Analysis was performed using Metaboanalyst 6.0 and Prism GraphPad.

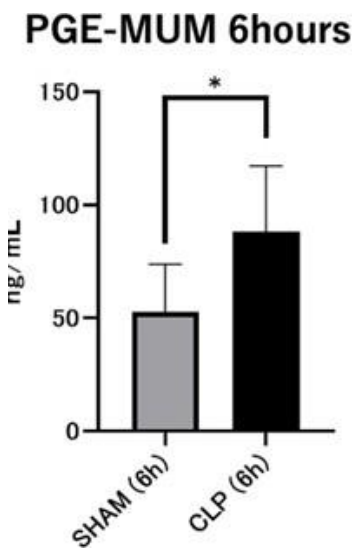
Results: IL-1β stimulation of synoviocytes significantly altered lipid profiles, markedly increasing pro-inflammatory lipid mediators. Notable elevations were observed in 15(S)-hydroxyeicosatetraenoic acid (15(S)-HETE) (12.33-fold, $p = 0.0029$), Prostaglandin F2α (16.03-fold, $p = 0.0079$), and 11(S)-hydroxyeicosatetraenoic acid/12(S)-hydroxyeicosatetraenoic acid (11(S)-HETE/12(S)-HETE) (3.94-fold, $p = 0.0012$). Additional increases included 17(S)-hydroxydocosahexaenoic acid (17(S)-HDHA) (3.89-fold, $p = 0.0089$) and Lipoxin A4 (LXA4)/13-14-dihydro-15-keto Prostaglandin E2 (2.82-fold, $p = 0.0098$).

Conclusion: The data suggest IL-1β activates the arachidonic acid (AA) cascade through enhanced phospholipase A2 (PLA2) activity, promoting AA release. This drives robust pro-inflammatory signaling via the 5-lipoxygenase (5-LOX) and cyclooxygenase (COX) pathways, leading to elevated HETEs and prostaglandins. These mediators amplify inflammatory responses characteristic of synovial inflammation, contributing to the persistence of post-traumatic joint inflammation.

THE ROLE OF PROSTAGLANDIN E-MAJOR URINARY METABOLITE IN A SEPSIS MODEL

Keisuke Suzuki, MD; Koji Morishita, PhD; Hyon woo Jeon, MS; Tomohiro Adachi, MD; Hikaru Odera, MD; Akira Suekane, PhD; Keita Nakatsutsumi, MD, PhD; Mitsuaki Kojima, PhD
Institute of Science Tokyo

Introduction: Sepsis is the leading cause of death worldwide. Although various biomarkers exist, there is still a need for rapid, non-invasive diagnostic tools. Prostaglandin E-major urinary metabolite (PGE-MUM), the metabolite of prostaglandin E2, is stable in urine and is known to be correlated with ulcerative colitis activity. We investigated the role of PGE-MUM in sepsis using a cecal ligation and puncture (CLP) model.
Methods: Male Sprague Dawley rats were divided into CLP (n=6) and sham operation (n=6) groups. The CLP group underwent CLP followed by subcutaneous administration of normal saline and buprenorphine, whereas the sham group only underwent laparotomy. Blood and urine samples were collected, and the lungs were harvested 6 h post-CLP. Urinary PGE-MUM concentrations were measured using a chemiluminescent enzyme immunoassay. Blood tests, including the WBC count and lactate levels, were also performed. Acute lung injury (ALI) was evaluated using BALF [bronchoalveolar lavage fluid] protein concentrations, lung wet/dry ratios, and lung histology.
Results: Urinary PGE-MUM levels were significantly elevated in the CLP group (sham: 52.6±20.2 vs. CLP: 88.2±27.6 ng/mL; p=0.029). The white blood cell count was significantly decreased in the CLP group (sham: 4166.7±884.9 vs. CLP: 1833.3±884.9/μL; p=0.005), and the serum lactate level was significantly increased in the CLP group (sham: 4.1±1.3 mmol/L vs. CLP: 8.2±2.9 p=0.028). No significant differences in BALF protein concentrations, lung wet/dry ratios, or histological scores were observed in ALI.
Conclusions: Our findings demonstrate that urinary PGE-MUM levels increase in the early stages of sepsis before ALI induction after CLP. PGE-MUM may be a novel non-invasive biomarker for the early detection of sepsis.



BLOOD STEWARDSHIP AND IMPROVED UTILIZATION OF BLOOD IN TRAUMA

Andrew M. Loudon, MD; Erik L. Risa, MD; Avanti Badrinathan, MD;
Alexandra D. Power, MD; Omkar S. Pawar, MS;
Amy P. Rushing, MD; Matthew L. Moorman, MD
Case Western Reserve University - University Hospitals

Introduction: We implemented a blood stewardship plan (BSP) to conserve blood in hemorrhaging trauma patients. Our plan limited resuscitation of patients with >10-minute prehospital down time, reassessed chance of survival at 15U Packed Red Blood Cells (PRBC) transfused, encouraged utilization of a second surgeon for hemorrhage control, and increased communication of blood shortages. We aim to assess the effect our protocol had on PRBC and Fresh Frozen Plasma (FFP) utilization.

Methods: Retrospective analysis of trauma patients ≥16 years old receiving transfusion on arrival or arriving without vital signs was performed from January 1, 2018 to September 30, 2024. Control patients presented before January 1, 2022; intervention patients presented after March 1, 2022. We excluded patients presenting January 1, 2022 to February 28, 2022. Outcomes were Units PRBC+FFP transfused Per Patient (UPP), proportion of product transfused to survivors, resuscitation attempts ≥30U PRBC+FFP in 4 hours, and survival.

Results: 846 patients met inclusion criteria. 291 patients were dead on arrival. 555 patients were resuscitated (254 BSP, 301 control). BSP and control groups were similar at baseline. On multivariable linear regression BSP decreased transfusion by 6.67UPP (β= -6.67, 95% CI: -9.82 to -3.52, $p<0.001$), reduced resuscitation attempts ≥30U PRBC+FFP in 4 hours (9% BSP vs 17% control, $p = 0.012$), increased proportion of product transfused to survivors (58% BSP vs 51% control, $p<0.001$), and did not change mortality (34% BSP vs 35% control, $p = 1.00$).

Conclusion: Our blood stewardship plan saved 1,695U of blood over 30 months, increased the proportion of blood transfused to survivors by 14%, with no change in mortality. Improved utilization is explained by selective resuscitation of patients ≥30U PRBC + FFP in 4 hours.

EARLY CALCIUM REPLACEMENT AFTER MINIMAL BLOOD TRANSFUSION IS ASSOCIATED WITH ADVERSE OUTCOMES

Rondi Gelbard, MD; Russell Griffin, PhD; Emily Baird, MD;
Zain Hashmi, MD; W. Preston Hewgley, MD; Jan Jansen, MBBS, PhD;
Jeffrey Kerby, MD, PhD; John B. Holcomb, MD
University of Alabama at Birmingham

Introduction: Calcium (Ca) disturbances are common in patients with traumatic injuries, exacerbated by shock and initial resuscitation. Empiric Ca supplementation (SUP) has been recommended, along with prehospital blood, despite a lack of outcome data supporting this practice. We previously reported that minimal transfusion of 1-3 RBC units compared to non-transfused patients was not associated with worse outcomes. Here we evaluated outcomes of early Ca SUP compared to no SUP in hypocalcemic patients after small volume blood transfusion.
Methods: Retrospective review of minimally transfused (1-3 RBC units) patients admitted to our Level 1 trauma center from 2018-2024. Hypocalcemic (HypoCa) patients who received Ca SUP within 6 hours of arrival were compared to HypoCa patients who did not receive supplementation (no-SUP). A Cox regression was used to estimate risk ratios (RR) for the association between supplementation and complications. Model was adjusted for age, sex, ISS and shock index.
Results: A total of 1741 HypoCa patients were included (254 SUP, 1478 no-SUP). The cohorts were similar in terms of age, sex, mechanism and ISS, although shock index was higher among the SUP group (mean 1.08 vs 0.89, $p<0.0001$). After adjustment, SUP patients were more likely to have AKI (RR 2.14, 95% CI 1.06-4.35), ARDS (RR 4.56, 95% CI 1.64-12.66), MI (RR 3.53, 95% CI 1.51-8.29), and DVT (RR 1.54, 95% CI 1.00-2.37). Mortality was similar between groups.
Conclusion: Among a minimally transfused and hypocalcemic trauma population, early Ca SUP was associated with worse outcomes. The use of empiric, pre-hospital Ca SUP in conjunction with early minimal transfusion should be reconsidered, given the possibility of adverse outcomes.

HYPERCALCAEMIA IN TRAUMA: TOO MUCH OF A GOOD THING?

Tom Hardy, BSc; Charlotte Lindsay, MSc;
Karim Brohi, MD; Ross Davenport, PhD
Queen Mary University of London

Introduction: Hypocalcaemia is well recognised during bleeding. Emerging evidence suggests hypercalcaemia may also occur and is associated with poor outcomes. This work aims to describe the incidence and factors associated with admission hypercalcaemia and associated outcomes. The effect of empiric calcium administration on incidence and mortality was also explored.

Methods: A retrospective analysis of prospectively collected data from the Activation of Coagulation and Inflammation in Trauma II study. Adult trauma patients (>15 years) requiring activation of the major haemorrhage protocol were included. Hypercalcaemia was defined as ionised calcium >1.33mmol/L. Hypocalcaemic patients were excluded from multivariate models adjusting for injury and admission physiology.

Results: 542 patients were included (median age 31;18% female; 45% penetrating injuries; median ISS 25; hospital mortality 23%). Of 495 patients who did not receive pre-admission calcium, 6% had an endogenous hypercalcaemia on admission. Hypercalcaemia was strongly associated with depth of shock, affecting 27% of those with a pH <7.0 versus 7.3% with a pH ≥7.0, and this persisted after adjustment (OR 0.82, 95%CI 0.75 – 0.89). Mortality was higher in those with hypercalcaemia than normocalcaemia (52% vs 12% p<0.001) but was not significantly different after adjustment (OR 1.15 95% CI 0.19-5.70). 47 patients received empiric calcium prior to sampling and 53% were hypercalcaemic on admission. After adjustment, empiric administration of calcium was associated with increased odds of in hospital mortality (OR 3.52 95% CI 1.06-11.4).

Conclusion: Endogenous hypercalcaemia is a marker of deep shock during haemorrhage. Use of exogenous calcium increases hypercalcaemia and may be associated with an increased risk of death. Further studies are needed to identify optimal dosing, safety and efficacy of exogenous calcium in trauma haemorrhage.

NO THAW, NO PROBLEM: PATHOGEN-REDUCED CRYOPRECIPITATED FIBRINOGEN COMPLEX IS ASSOCIATED WITH IMPROVED FIBRINOGEN SUPPLEMENTATION IN HEMORRHAGING TRAUMA PATIENTS

Michael D. Cobler-Lichter, MD; Baylee M. Brochu, BS; Jessica M. Delamater, MD, MPH; Talia R. Arcieri, MD; Ana M. Reyes, MD, MPH; Yanyun Wu, MD, PhD; Nicholas Namias, MD, MBA; Kenneth G. Proctor, PhD; Jonathan P. Meizoso, MD, MSPH; Roman Dudaryk, MD
University of Miami, Miller School of Medicine/Jackson Memorial Hospital

Introduction: Fibrinogen supplementation is commonly achieved with cryoprecipitate (CRYO). CRYO requires thawing, often resulting in delayed fibrinogen supplementation. Pathogen-reduced cryoprecipitated (PRC) fibrinogen complex, a novel product, is stored thawed for up to 5 days and can be immediately available. We hypothesized PRC implementation would be associated with fibrinogen supplementation rate.

Methods: Retrospective review from a single level 1 trauma center 1-year pre/post PRC implementation. Included adults who received >900mL RBC and/or whole blood within 1 hr to simulate critical administration threshold. Multiple regression assessed the effect of PRC implementation on likelihood of fibrinogen supplementation and 24-hour mortality.

Results: In 310 included patients, 23.9% received fibrinogen supplementation (21.9% pre-PRC, 25.6% post-PRC, p=0.50). Post-PRC patients tended to be older (44 vs 40, p=0.046), more often with blunt trauma (67.9% vs 54.1%, p=0.014), lower shock index (0.88 vs 1.03, p=0.002), higher rates of whole blood use (70.1% vs 38.4%, p<0.001), and lower 4-hour transfusion volumes (2.8L vs 3.7L, p=0.038) but similar ISS, GCS, base deficit, and hematocrit. After controlling for these differences, PRC implementation was associated with increased likelihood of fibrinogen supplementation (aOR 2.58, 95% CI 1.07-6.21), but not with 24-hr mortality (Table 1).

	Fibrinogen Supplementation		24-Hour Mortality	
Covariate	**aOR**	**95% CI**	**aOR**	**95% CI**
Age	0.98	0.95-1.00	**1.05***	1.01-1.09
Penetrating Trauma	2.31	0.99-5.38	**6.49***	1.45-29.03
ISS	1.03	0.99-1.07	1.04	0.99-1.09
Shock Index	2.22	0.84-5.89	1.81	0.37-8.84
Whole Blood use	0.47	0.18-1.12	0.44	0.08-2.46
GCS	1.06	0.97-1.16	**0.80***	0.67-0.94
Base deficit	1.02	0.95-1.09	0.98	0.86-1.11
Hematocrit	**1.09***	1.02-1.16	0.99	0.89-1.09
Post PRC	**2.58***	1.07-6.21	0.70	0.16-2.99
Volume Transfused	**1.73***	1.34-2.22	1.09	0.94-1.27

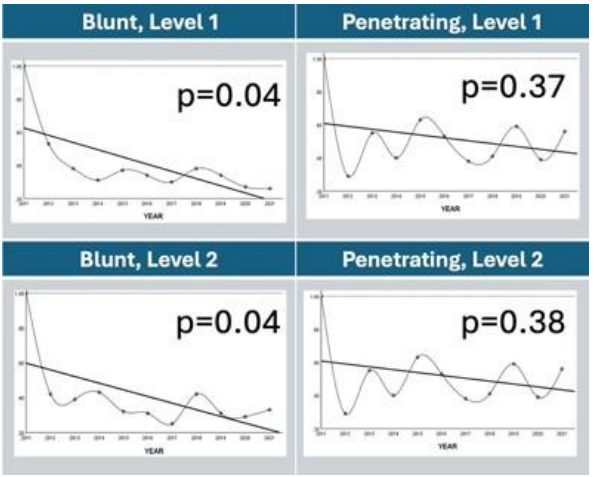
aOR: adjusted odds ratio; CI: confidence interval; * represents statistical significance at $p<0.05$

Conclusion: PRC implementation was independently associated with receiving fibrinogen supplementation during resuscitation of patients requiring transfusion. Hemorrhaging patients with hypofibrinogenemia may benefit from PRC.

PROGRESS WITH GAPS: CONTEMPORARY NATIONAL MORTALITY RATES IN OPERATIVE TRAUMA PATIENTS

Navpreet Dhillon, MD; Timothy Allison-Aipa, PhD;
Bishoy Zakhary, MPH; Raul Coimbra, MD, PhD
Riverside University Health System

Introduction: Advancements in trauma resuscitation have been described in the last 15 years, but how consistently such strategies have been used to impact clinical outcomes is unknown. We aimed to analyze mortality rates over a decade ending in 2021 and hypothesized that they have declined.
Methods: Data from TQIP was analyzed from 2011 to 2021. Hypotensive patients with an AIS chest, abdomen, or pelvis ≥ 3 requiring an operative intervention were studied, excluding those who were transferred in, had a prehospital arrest or no signs of life, and with severe injuries to other body regions. The primary outcome was 6-hour mortality. Secondary outcomes were 24-hour and in-hospital mortality. Multivariable logistic regressions and generalized additive models were used to assess mortality trends. Subset analyses were done based on mechanism and trauma center level.
Results: There were 14,221 patients analyzed with a mean SBP of 74 mmHg and ISS of 24. The 6-hour unadjusted mortality rate declined from 19.1% to 12.1% (AOR 2021: 0.46, p=0.02). Additionally, 6-hour mortality rates decreased among patients with blunt trauma (Figure). Overall 24-hour and in-hospital mortality rates also reduced. Rates remained unchanged for patients admitted to a Level 1 center after penetrating trauma and for those admitted to Level 2 centers regardless of mechanism.
Conclusion: Mortality rates have declined, but only in a subset of patients. Challenges in managing specific injuries and practice variability may account for uneven progress. Consistent care delivery to patients with penetrating injuries and those admitted to Level 2 centers is essential if improvements are to be seen.



RAPID INTERPRETATION OF ROTATIONAL THROMBOELASTOMETRY USING MULTIMODAL LARGE LANGUAGE MODELS

Brian R. Quaranto, MD; Evan Moore, MD;
Hannah Ferrari; Michael Chopko, MD
SUNY Buffalo

Introduction: Interpreting rotational thromboelastometry (ROTEM) reports during episodes of hemorrhagic shock is often challenging due to the complex parameters of the test coupled with significant time pressure and can lead to decision-making errors. The current generation of multimodal large language models (MLLMs) have a powerful toolkit of image processing capabilities and can be leveraged to extract structured text out of complex medical records. Herein we report the initial feasibility and first demonstration of a reproducible pipeline to analyze ROTEM reports using MLLMs.

Methods: De-identified ROTEM reports were obtained from our Level 1 Trauma Center's Trauma Intensive Care Unit. A prompt was developed, including a task introduction, details about how the relevant text is organized, and a literature-supported list of rules about how to interpret each section of the ROTEM report. An image of the ROTEM report acquired from a smartphone and the structured prompt was simultaneously given as input to three MLLMs (ChatGPT-4o, ChatGPT-o3-mini, and Gemini-2.0-Flash).

Results: All three MLLMs successfully extracted structured text from the ROTEM report images and provided interpretations based on the predefined prompt. ChatGPT-4o demonstrated the highest accuracy, correctly identifying all key ROTEM parameters, including clotting time (CT), clot formation time (CFT), and maximum clot firmness (MCF), across all test cases. ChatGPT-o3-mini and Gemini-2.0-Flash showed slightly lower accuracy.

Conclusions: MLLMs are readily capable of interpreting ROTEM reports when provided with a well-engineered and structured prompt. Ongoing future work will compare MLLM decision-making accuracy against human performance.

ADDRESSING CRITICAL GAPS IN RURAL TRAUMA CARE: THE IMPACT OF RISING MOTOR VEHICLE CRASH FATALITIES AND SEVERE INJURIES

Geetha Saarunya, PhD; Todd W. Costantini, MD; Patricia Jewett, PhD; Schelomo Marmor, PhD; Elizabeth R. Lusczek, PhD; Olivia Houck, MPH; Kate Kressin, BS; Lisa M. Rogers, MPH; Amanda Hayward, PhD; Temor Dourandish, MD; Julia Harrison, MD; Melissa Brunsvold, MD; Michael A. Puskarich, MD; Gregory Beilman, MD
University of Minnesota

Introduction: In the United States, which leads high-income countries in motor vehicle crash (MVC) deaths, rural residents face a 14% higher risk of dying from traumatic injuries due to limited trauma care access. We hypothesize that structural, behavioral, and temporal factors in rural areas significantly impact MVC trauma outcomes, increasing fatality and serious injury rates.

Methods: A Geographic Information System (GIS)-based crash trauma database integrated Minnesota (MN) crash incidents (2016–2024) with hospital and Emergency Medical Services (EMS) records, linking crashes to the nearest EMS provider and trauma center via nearest-neighbor analysis. Severe injury and fatality rates were analyzed using ANOVA and pairwise t-tests, while a Zero-Inflated Negative Binomial (ZINB) model assessed injury severity and fatalities across ZIP code Rural Urban Commuting Area (RUCA) classifications, evaluating interaction effects and model stability.

Results: We identified 435,480 MN crash incidents (2016–2024). Rural areas saw serious injuries rise from 31,948 (2016) to 40,029 (2024) per 100,000 and fatalities increase from 4,534 (2016) to 8,069 (2024) per 100,000, with injury rates nearly 30 times higher (40,029 vs. 1,378 per 100,000, $p \leq 0.0001$) and fatality rates almost 4 times higher (8,069 vs. 270 per 100,000, $p \leq 0.001$) than in urban areas. ZINB modeling identified drug involvement (Odds Ratio (OR) = 1.94, $p \leq 0.0001$, 95% Confidence Interval (CI): 1.5–2.5), longer ambulance response distances (OR = 1.13, $p \leq 0.01$, 95% CI: 1.03–1.24), and summer crashes (OR = 1.43, $p \leq 0.001$, 95% CI: 1.21–1.70) as key risk factors for adverse rural outcomes, with varying risk factor associations across RUCA classifications confirmed by stability analyses.

Conclusions: Rural areas experience significant disparities in MVC outcomes, and addressing the unique structural, behavioral, and temporal factors in these regions is essential to improving trauma care.

ANTECEDENT EMERGENCY DEPARTMENT UTILIZATION: AN OPPORTUNITY FOR GUN VIOLENCE INTERVENTION

Rebecca Schwartz, MD; Melike Harfouche, MD;
David T. Efron, MD; Thomas Scalea, MD
R. Adams Cowley Shock Trauma Center

Introduction: A major challenge to gun violence prevention is identification of those at risk, prior to the violent event, to allow for the opportunity for intervention. We hypothesized that adolescents experiencing gun violence (GV) were more likely to have higher antecedent emergency department (ED) utilization than non-violently injured adolescents (NV).
Methods: We retrospectively reviewed adolescents (10-19 years) treated for an injury at a Level I trauma center from 2021-23. GVs were matched to NVs using age, sex, and race. The number of and reason for ED visits in the years preceding the injury were obtained via chart review. Primary outcomes were differences in overall, mental health-related, and violence-related visits between groups. Multivariate regression controlling for age, sex, race, reason for ED visit, and social vulnerability index was performed to predict odds of future gun violence.
Results: Of 692 patients, 170 NVs were matched to 193 GVs. The median age at injury was 18 (17-19) years, 86.8% were Black, and 85.7% were male. GVs were more likely to have a higher rate of overall and median number of visits when compared to NVs (82.9% vs 67.1%, $p<0.001$ and 2 vs 1, $p<0.001$). There was no difference in the rate or median number of mental health-related visits between groups (GV 16.1% vs 15.3%, $p=0.84$ and GV 0 vs NV 0, $p=0.78$). GVs demonstrated a higher rate of antecedent violence-related visits than did NVs (20.2% vs 10.0%, $p=0.007$). Regression analysis demonstrated that only a previous violence-related ED visit was associated with a higher odds of subsequent gun violence injury (OR 2.0, CI 1.06, 3.92).
Conclusion: Adolescent victims of gun violence demonstrate a higher antecedent utilization of the ED. ED visits related to violence, but not mental health, portend a higher likelihood of future gun violence-related injury. These data suggest a possible opportunity for intervention for primary gun violence injury prevention.

EFFECT OF A HOSPITAL-BASED VIOLENCE INTERVENTION PROGRAM ON RECIDIVISM

Carma Goldstein, MD; Andrea Boyd Tressler, MD, PhD; MaryAlyce McCullough, MD; Gregory Stettler, MD; Martin Avery, MD
Wake Forest Baptist Medical Center

Introduction: Violent recidivism has been reported to be as high as 20-35% with the majority of recidivists returning in the first 1-2 years. Hospital-based violence intervention programs (HVIPs) are theorized to decrease recidivism. We sought to evaluate our HVIP to assess its effect on recidivism.
Methods: We queried our large catchment, urban, ACS-verified, level I trauma center registry for victims of violent trauma (blunt assault, firearm, or stab) for one year before (pre cohort) our HVIP initiation in June 2023. Our intervention cohort was obtained from our HVIP registry for one year after program initiation. The intervention consists of in-hospital contact and enrollment with outpatient follow-up counseling and support. We examined recidivism rates during this same period.
Results: In the pre cohort, 513 patients met inclusion criteria (72 blunt assault, 356 firearm, and 85 stab). In the intervention cohort, 496 patients met inclusion criteria (98 blunt assaults, 297 firearms, and 101 stabs). There were 8 recidivists in the pre cohort and 1 in the intervention cohort. Patients in the intervention group were significantly less likely be trauma recidivists, 0.2% vs 1.6% ($p = 0.02$). The relative risk reduction is 0.13 and the number needed to treat to prevent one trauma recidivist is 74.
Conclusion: Patients in the pre cohort were over 7 times more likely to be a trauma recidivist than the patients in the intervention group. Even in a group with a relatively low recidivism rate, our HVIP demonstrates a significant decrease in trauma recidivism. Funding and supporting these injury prevention programs is important in providing our trauma patients with the best care.

	No recidivism (1,000)	**Recidivists (9)**
Pre Cohort (513)	505 (98.4%)	8 (1.6%)
Intervention Cohort (496)	495 (99.8%)	1 (0.2%)

EVALUATION OF A HOSPITAL-BASED VIOLENCE INTERVENTION PROGRAM

Damaris Ortiz, MD; Akrem Ahmed, MPH; Samantha Padgett; Lauren Magee, PhD; Blakney Brooks, MPH; Sydney Doyle; Clark Simons, MD; Malaz Boustani, MD; Ben L. Zarzaur, MD
Eskenazi Health

Introduction: Hospital-based violence intervention programs (HVIPs) provide resources to violently injured patients at trauma centers in the US. Behavioral health interventions and robust program evaluation have been identified as weaknesses in HVIPs. This study aimed to evaluate a well-established HVIP, including social and behavioral health outcomes.
Methods: This was a retrospective analysis of prospectively collected data from HVIP participants from June 1st, 2022 to December 12, 2024. Four participants not treated at our institution for their trauma were excluded. PTSD and depression symptoms (PCL-C, ITSS, and PHQ-9), and patient-reported (PROMIS) measures of self-efficacy and satisfaction with social roles and activities were compared at baseline, 3-months, and 6-months using a mixed effects model and permutation testing. IRB approval was obtained, and this project was deemed exempt from informed consent.
Results: Fifty-six participants enrolled in the HVIP during the study period, with the last assessment follow-up on December 12, 2024. Twenty participants (35.7%) completed the assessments at all time-points. The median monthly HVIP enrollment rate (enrolled/eligible) was 9.1%. Forty-nine (87.5%) of participants screened positive for either PTSD or depression symptoms, and 26 (53%) engaged in therapy. There were no differences over time in PTSD [(β= -4.28, SE=2.55, p=0.093)], depression [(β= -6.67, SE=1.02, p=0.512)] or PROMIS measure scores [Social roles (β=1.04,SE=1.25, p=0.406)], [Self-efficacy (β=1.39,SE=1.18, p=0.240)]. There was significant score variance within and between participants.
Conclusion: HVIPs can feasibly screen for PTSD and depression symptoms and connect patients to needed therapy. HVIP interventions should remain individualized, capitalizing on program strengths and partnering with community organizations for needs outside of their scope. This study serves as a call for transparent HVIP data reporting to better study and improve program aims, outcomes, and engagement.

PREDICTIVE MODEL FOR DEEP VENOUS THROMBOSIS CAUSED BY CLOSED LOWER LIMB FRACTURE AFTER THROMBOPROPHYLACTIC TREATMENT

Jian Xing, MD; Pengfei Wang, MD; Kun Zhang, MD; Shuang Han, MD
Honghui Hospital, Xi' an JiaoTong University

Introduction: The incidence of venous thromboembolism (VTE) did not significantly change as the standardized use of thromboprophylactic drugs and clinical physical therapy counteracted the negative effect of increasing prevalence of active cancer, trauma, and surgery. However, the growing surge in trauma and surgery may suggest that the concurrent efforts of venous thromboprophylaxis are insufficient. There is currently no convincing closed lower extremity fracture-associated deep vein thrombosis (DVT) clinical prediction model. The predictive ability of biomarkers, such as D-dimer, pre-operative waiting time, and surgery still reduces the decision-making ability of clinicians to balance thromboprophylaxis and bleeding risk.

Methods: We aimed to use two retrospective cohorts to develop and externally verify a clinical prediction model for DVT in patients treated with anticoagulants after suffering closed lower extremity fractures. We evaluated the patients pre- and post- operatively, to accurately determine the predictive power of the biomarkers and clinical risk factors. We evaluated the patients pre- and post- operatively, to accurately determine the predictive power of the biomarkers and clinical risk factors. Two retrospective cohorts were used for the development and external verification of a pre-operative clinical prediction model (development: 2,253; verification: 833) and post-operative clinical prediction model (development: 1,422; verification: 449), respectively.

Results: The C-indices were used to show the predicted incidence of objective thrombosis at the pre- and post- operative stages, which were then compared with the observed incidence of thrombosis in both cohorts. Biomarkers and clinical indicators were included in pre- and post- operative nomograms, which were adequately calibrated in both cohorts. The cross-validated C-indices of the pre- and post- operative clinical prediction models in the verification cohort were 0.706 (95% Cl, 0.67-0.74) and 0.875 (95% Cl, 0.84 0.91), respectively.

Conclusions: We present our findings of novel pre- and post-operative nomograms for the prediction of deep venous thrombosis in patients who received thromboprophylaxis after suffering closed lower extremity fractures].

THE IMPACT OF LANGUAGE BARRIERS ON PRE-HOSPITAL INTUBATION AND ICU UTILIZATION

Alexandra H. Hernandez, MD MCR; Nina M. Clark, MD, MS;
John Scott, MD, MPH; Thomas Rea, MD, MPH; Micheal R. Sayre, MD;
Eileen M. Bulger, MD; Bryce Robinson, MD, MS
Harborview Medical Center

Introduction: Communication barriers caused by limited English proficiency (LEP) have been attributed to negative health outcomes, but the effect of LEP on pre-hospital care for trauma patients is unclear.
Methods: A single center retrospective study included all adult trauma patients transported from the scene by EMS between 2018-2024, excluding interfacility transfers, air transport, and AIS head ≥ 5. LEP was defined as non-English primary language. Multivariable logistic regression was used to evaluate EMS intubation, adjusted for age, sex, race, blunt v. penetrating trauma, distance, and severe head, neck, chest, and abdominal injury. Multivariable negative binomial regression was used to calculate differences in hospital length of stay (LOS), ICU LOS, and ventilator days.
Results: Of 11,524 included patients, 1,102 had LEP. LEP trauma patients were significantly more likely to be intubated by EMS (15.3%) than their English-proficient counterparts (13.2%) (aOR= 1.23, 95% CI:1.01-1.52). This finding was persistent in sensitivity analyses on subpopulations of race, negative toxicology, and low injury severity (AIS head, neck, chest, abdomen ≤ 3). LEP patients had greater ventilator days, and ICU LOS ($p<0.05$), yet there was no difference in mortality or hospital LOS (Table).
Conclusion: After adjusting for injury and demographics, patients with LEP had a higher rate of intubation in the pre-hospital setting, which may contribute to excess ventilator use and ICU length of stay.

Table. Clinical Outcomes by Language Status Among Patients Transported by EMS

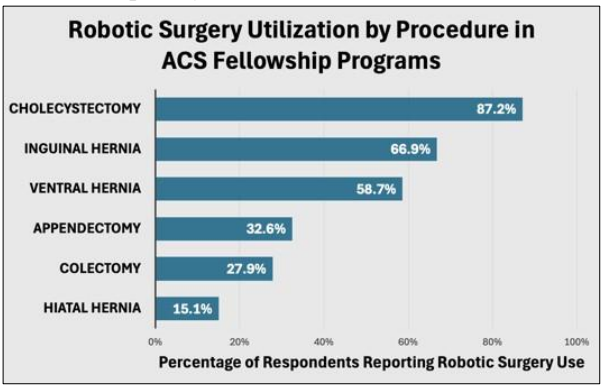
Outcome	LEP Mean (SD), %	English-Proficient Mean (SD), %	Adjusted OR / Adjusted Mean Difference	p-value**
Pre-hospital Intubation	15.3%	13.2%	1.23	0.04
Ventilator days*	1.5 Days (6.6)	0.9 Days (4.4)	0.4 Days	0.015
ICU LOS*	2.2 Days (7.2)	1.6 Days (5.4)	0.5 Days	0.004
Hospital LOS*	8.9 Days (19.2)	7.5 Days (15.5)	0.5 Days	0.16
Mortality*	4.3%	4.1%	0.81	0.26

*Ventilator Days, Hospital LOS, ICU LOS, and Mortality outcomes adjusted for insurance payer in addition to all other covariables listed. **P-value for the adjusted mean difference or aOR.

ROBOTIC SURGERY IN ACUTE CARE SURGERY FELLOWSHIP TRAINING: A NATIONAL SURVEY OF AAST FELLOWS AND PROGRAM DIRECTORS

Corey Ambrose, MD; Heewon Lee, MD; Morihiro Katsura, MD;
Chaiss Ugarte, MD; Anaar Siletz, MD PhD; Kazuhide Matsushima, MD;
Joseph V. Sakran, MD, MPH, MPA; Kenji Inaba, MD;
Stephanie Savage, MD, MS; Matthew Martin, MD
University of Southern California

Introduction: Robotic surgery (RS) is increasingly used in acute care surgery (ACS), but fellowship training remains inconsistent. This study evaluates RS utilization, case volumes, and training perceptions among fellows and program directors (PDs) in AAST-certified ACS fellowships.
Methods: An anonymous survey was administered to ACS fellows and PDs assessing demographics, case volumes, RS utilization, and training perceptions. Responses were analyzed to assess RS exposure, training opportunities, and barriers at both the fellow level and program level.
Results: A total of 174 fellows and 57 PDs responded. Sixty percent of fellows were RS certified. Among PDs, 92% reported having a teaching console, yet only 86% of fellows had regular access, and 51% stated the robot was unavailable after hours. While 73% of PDs reported regular RS use at their institution, only 44% of fellows received training, highlighting a gap between availability and utilization. The most frequently cited barriers were a lack of credentialed faculty (fellows 69%, PDs 78%) and limited OR access (fellows 60%, PDs 48%). Most programs reported RS case volumes of 0-25 cases over a three-month period, with cholecystectomy and hernia repair as the most common procedures (Fig. 1). Despite 83% of fellows planning to use RS in the future, only 14% felt prepared for independent RS practice. Support for RS use in emergency general surgery (EGS) was high (fellows 86%, PDs 85%, p=NS), whereas fewer endorsed its role in trauma (fellows 34%, PDs 47%, p<0.01). Additionally, 40% of fellows and 49% of PDs believed RS training should be a required component of ACS fellowships.
Conclusions: Hands-on RS training in ACS fellowships remains limited. Fellows are unprepared for independent practice due to a lack of credentialed faculty and OR access barriers. These findings highlight the need for structured RS training pathways to ensure competency.



THE FINANCIAL IMPACT OF FIREARM-RELATED INJURIES: A ONE YEAR, SINGLE INSTITUTION COST ANALYSIS

Carlysle J. Salter, BS; Ashley Williams, MD; Keegan Musaalo, BS
University of South Alabama Health System

Introduction: Firearm-related injuries and deaths pose serious and complex public health concerns. While the physical and psychosocial impacts are well-documented, the financial burden on patients, healthcare systems, and communities at large lags. The purpose of this study was to conduct a financial cost analysis of care provided to patients with firearm-related injuries treated at a single level one trauma center with a 20% rate of penetrating trauma.
Methods: A retrospective analysis of trauma registry data was conducted to identify all patients treated in 2023 for firearmrelated injuries at a level one trauma center with a large catchment area spanning 3 states. Once patients were identified via the trauma registry, unique financial identification numbers were then used to obtain total hospitalization charges and total reimbursed and uncompensated dollars from the electronic medical record reporting system. Post-discharge services were not included in the analysis. Secondary outcomes included the following: total adjusted amount, total uncompensated from uninsured, total charges by admission status, total charges by disposition, payor mix, and percent reimbursed by payor type.
Results: 313 patients were included in the financial cost analysis. The total hospitalization charges for the entire cohort were $13.5 million, of which $2.7 million (20.0%) was reimbursed. Thus, the total uncompensated amount was $10.8 million (80.0%). Approximately, $6.4 million was adjusted by insurance companies. The remaining uncompensated $4.4 million represents unpaid costs of accrued bills for uninsured patients. The median cost of treatment was approximately
$20,000, with 58% (n = 181) of patients discharging from the emergency department. The median cost for ED visits was $6,500 compared to the median cost for admitted patients of $41,000. Median hospitalization charges for expired patients were $19,000 compared to $20,000 for surviving patients. The payor mix included: 36.7%. (n = 115) uninsured, 32.9% (n = 102) Medicaid, 22% (n = 71) private insurance, 5.8% (n =18) Medicare, 1.9% (n = 6) Tricare, and <1% (n = 1) worker's compensation. Reimbursement rates by insurance type were 22.6% for Medicaid, 23.8% for Medicare, 26.4% for private insurance, 34.5% for Tricare, 70.0% for worker's compensation, and 0.54% for uninsured patients.
Conclusions: This financial cost analysis supports the notion that firearm-related injury contributes to a substantial and underreported financial burden. Our findings suggest that centers may operate in a deficit to provide life-saving care to those impacted by firearm-related injuries.

EMERGENCY FIELD HOSPITALS WITH VOLUNTEER SURGEONS CAN SUPPORT LOCAL TRAUMA INFRASTRUCTURE DURING INTERNATIONAL DISASTERS

Michael Cheatham, MD; Sasha Thew, MPH; Elliott Tenpenny, MD
Orlando Regional Medical Center

Introduction: Natural and man-made disasters may overwhelm or interrupt local trauma care capacity. Rapidly deployable emergency field hospitals (EFH) can augment or replace trauma resources until local infrastructure has been restored.

Methods: A non-governmental organization (NGO) EFH staffed by surgeons, nurses, anesthesiologists, therapists, and support personnel has been deployed on nine occasions (2013-2024). Staff were selected from a roster of volunteers tailored to the requirements of each disaster.

Results: A total of 4782 surgical procedures were performed by 104 surgeons during 515 days of operation.

	Disaster type	Surgical procedures	Volunteer surgeons	EFH duration (days)
Ecuador	Earthquake	309	13	60
Iraq	War	1700	40	53
Dominica	Hurricane	77	4	34
Bahamas	Hurricane	1626	7	93
Mozambique	Cyclone	17	2	47
Haiti	Earthquake	125	4	31
Ukraine	War	181	21	127
Turkey	Earthquake	270	9	48
Armenia	Explosion	477	4	22

Conclusion: An NGO EFH with volunteer multidisciplinary personnel, including trauma and acute care surgeons, can provide much needed trauma and emergency surgical services in international disaster situations where healthcare infrastructure has been disrupted.

TRAUMA BAY TEAM LEAD GENDER BIAS DURING TRAUMA RESUSCITATION - AN OBJECTIVE ASSESSMENT

Jacqueline Chen, PhD; Becky Neufeld, MS; Mattia Medina-Grespan, MSc; Hailee Davis, BS; Jefferson Dillon, BS; Brian Baucom, MA, PhD; Vivek Srikumar, PhD; Raminder Nirula, MD
University of Utah

Introduction: The Trauma Team Lead plays a critical role in the team's success. We tested whether trauma bay communication differs by Lead gender and rank.
Methods: We analyzed 818 recorded trauma bay resuscitations from a Level 1 Trauma Center. Videos were analyzed to obtain a validated measure of ambient noise, and a neural net speech recognition system transcribed videos to quantify the frequency that "quiet" was uttered and to obtain a measure of communication clarity.
Results: There were no differences in average noise levels by Lead gender or rank. While communication clarity increased from the time before quiet was said compared to after (p = .03), there was a significant interaction (p = .01) because noise in the room decreased significantly after "quiet" was said under a female Lead but not under a male Lead (see Figure).
Conclusion: This analysis found no evidence of teams' reluctance to follow female Leads. Future work could investigate other forms of compliance.

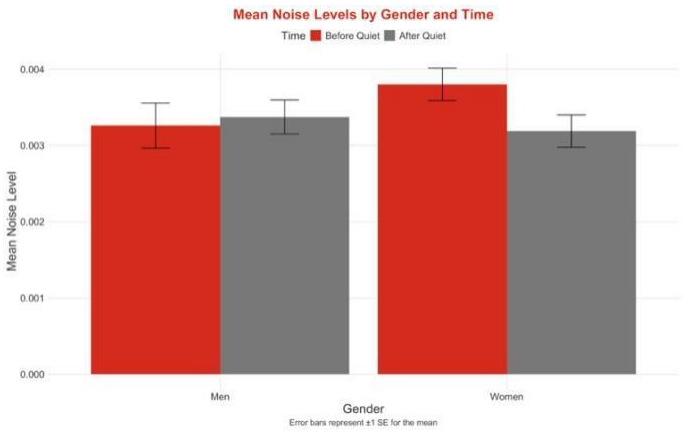


Figure. Noise levels before and after "quiet," by trauma lead gender.

Poster #22

THE IMPACT OF MISSED CHEMOPROPHYLAXIS DOSES ON VENOUS THROMBOEMBOLISM IN TRAUMA PATIENTS

Chinweotuto Uma, MD, MPH; Bert Little, PhD; Michael Egger, MD, MPH; Jingchen Chai, MS; Maiying Kong, PhD; Jason Smith, MD, PhD; Tyler Jones, MS
University of Louisville School of Medicine

Introduction: We investigated the impact of missed chemoprophylaxis doses in patients hospitalized with traumatic injuries and identified factors associated with incomplete medication compliance.
Methods: Cerner Real World Dataset was queried for patients with traumatic injuries hospitalized from 2016 to 2022. Exclusion criteria included hospital length of stay < 2 days, personal history of VTE or cancer, current pregnancy status and age ≤ 13 years. Demographics and data on chemoprophylaxis compliance were extracted. The later was defined as the proportion of missed medications doses (PMDD) from admission to discharge or VTE event. Patients were categorized into four groups based on proportion of missed doses (Complete (PMDD =0), Low, (0< PMDD ≤ 0.33), Medium (0.33 < PMDD ≤0.67, High (PMDD > 0.67)). Multivariate logistics regression was used for analysis, $p < 0.05$ was considered significant.
Results: Complete medication compliance in the cohort (of 271,272 patients) was 41.9%, and 0.9% of these patients experienced VTE (vs. 1.3% in patients with incomplete compliance, p <0.01). Chemoprophylaxis incomplete compliance is associated with VTE incidence (Figure, p <0.01). This relationship is dose dependent. The following demographics were associated with incomplete medication compliance: Males (58.7%), Hispanic/Latino individuals (62.4%), and longer length of stay (6.64 [4.0, 12.2] vs. 4.27 [3, 7]) (p <0.01 respectively). Annual facility volume was higher for patients with incomplete medication use (742 [291, 1240] vs. 640 [246, 1122], p <0.001).
Conclusion: Despite the known benefit of chemoprophylaxis, complete compliance was achieved only 41.9% of the time. Results also show that non-compliance is more common in facilities with higher patient volume. In addition, we identified modifiable and non-modifiable factors that are associated with increased frequency of medication non-compliance. This study raises opportunities for improvement in chemoprophylaxis compliance.

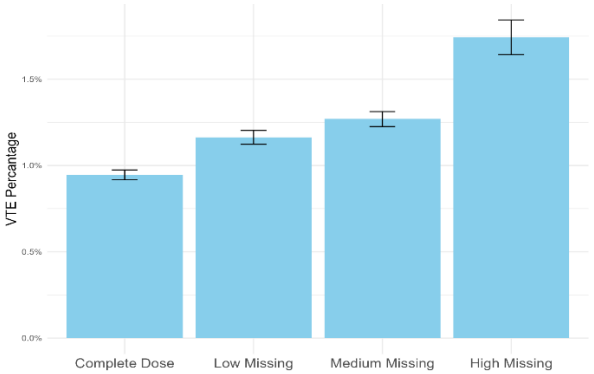


Figure: The association between proportion of missing dose days with VTE incidence rate

AGE MATTERS: UNMASKING POST-INTUBATION HYPOTENSION IN INJURED OLDER ADULTS

Tanya Anand, MD, MPH; Hannah Shin, DO; Paul Hsu, PhD;
Madolyn Conant, BS; Dylan Joule, BS; Louis J. Magnotti, MD, MS;
Christina Colosimo, DO, MS; Bellal Joseph, MD
University of Arizona

Introduction: Post-Intubation hypotension (PIH) is associated with increased mortality in trauma patients. However, the impact of age on the incidence of PIH is unknown. In this study we aimed to characterize the incidence of PIH in older adults (OA) vs younger adults (YA) and compare mortality.

Methods: This is a retrospective study at our level I trauma center (2019–2022). We included patients ≥18 years intubated in the trauma bay. OA was defined as age ≥55 years, while YA was defined as 18-54 years. Blood pressure was measured 15 minutes pre-intubation and postintubation. Primary outcome was PIH, defined as a decrease in systolic blood pressure (SBP) of ≥20% from baseline or to ≤80 mm Hg, or a decrease in MAP to ≤ 60 mm Hg. Secondary outcomes were mortality, hospital and ICU length of stay (LOS), and ventilator days. Logistic regression was performed to study the association of age on PIH incidence and mortality.

Results: Of 498 patients, 148 (30%) had PIH. Overall, 181 (36%) were OA and 317 (64%) were YA. PIH incidence in OA vs YA was (37% vs 25%, p=0.01) respectively. OA had a higher median SBP (148 vs 135 mmHg, p<0.001) and lower median pulse (99 vs 106, p=0.03). Time to intubation was greater in OA vs YA (24 vs 17 minutes, p<0.001) respectively. In the PIH group OA had greater mortality (53% vs 36%, p=0.02). Hospital and ICU LOS were not different between OA and YA. Age ≥55 years was an independent predictor of PIH (OR 1.88 [1.19-2.98], p=0.006).

Conclusion: Age is an independent predictor of PIH. Though OA were more likely to present with a higher ED SBP, they were nearly 2 times more likely to develop PIH compared to YA. Current peri-intubation resuscitation protocols may need to re-think ‘normal’ vitals in older adults and adjust for age.

Poster #24

IS IT TIME TO CHANGE THE STATUS QUO? LOW-MOLECULAR-WEIGHT HEPARIN MAY NOT BE THE BEST OPTION FOR THROMBOEMBOLIC PROPHYLAXIS AFTER TRAUMATIC HIP FRACTURES

Jerry Rubano, MD; Michael Paccione, MD; Eric Baranek, MD;
Meelan Patel, MD; Frank Paccione; Jane McCormack;
Deborah Iorio; Deanna Ripley; Nicole Stevens
New York University School of Medicine

Introduction: Thromboembolic events (VTE) have been an area of concern for trauma patients with prolonged inability to fully ambulate, especially those with lower extremity fracture. Current utilization of chemical VTE prophylaxis are high with TQIP centers reporting rates of 86.1% (all patients L1-2) and 65.7% (all patients L3). The use of low-molecular-weight heparin (LMWH) has been universally accepted with 77.5% of TQIP cases receiving LMWH. Chemical VTE prophylaxis is not without risks which may include bleeding, potential need for transfusions and return to the OR resulting in prolonged hospitalization. The use of low-dose aspirin (ASA) as a form of postoperative thromboprophylaxis has been described and successfully used in patients undergoing joint replacement. The safety of using ASA in patients undergoing operative repair of isolated hip fracture is unknown. If ASA use is effective for hip replacement, is it also effective in insolated hip fractures (IHF)?

Methods: Data was collected across a suburban Trauma Network consisting of both Level I and Level III trauma centers over a 3-year period. Patients meeting the TQIP IHF inclusion cohort (age >=65 years, ground level fall, no additional injuries) were identified at each campus. Both campuses collected registry data in accordance with the National Trauma Data Standard. Differing practices relating to VTE prophylaxis between the two campuses allowed a unique comparative study of either LMWH (30mg twice daily) or ASA (81mg twice daily). Compared outcomes included unplanned return to the OR and transfusion requirements.

Results: A total of 1022 patients met IHF inclusion of which 966 patients underwent operative fixation. Patients received either LMWH (544 patients) or ASA (246 patients). The remaining 176 patients received another form of VTE prophylaxis (157 patients) or no VTE prophylaxis (157 patients). The rate of Deep Venous Thrombosis (DVT) or Pulmonary Embolism (PE) were similar between the two groups (1.1% vs 1.6%; P=0.543). Patients in the LMWH group had a 1.8% unplanned return to the OR as compared to the ASA group which had 0.0% (P=0.032). The LMWH group also had a higher degree of transfusion requirements as compared to the ASA group (9.7% vs 5.7%; P=0.058).

Conclusion: In patients with isolated operative hip fractures, both LMWH and ASA were equally effective in preventing thromboembolic events. The use of LMWH was associated with a statistically significant increase in both unplanned return to the OR and need for transfusions as compared to the ASA group. ASA also has the added benefits of being a less invasive, more user friendly, readily available and more cost-effective alternative to LMWH.

MACHINE LEARNING CAN SUPPORT PROGNOSTICATION OF LONG-TERM OUTCOMES IN INJURED OLDER ADULTS

Gemma Postill, BMScH; Ingrid Giesinger, MSc; Elliott K. Yee, MD; Darby Little, MD; Brandon M. Zagorski, MS; Bourke W. Tillmann, MD, PhD; Matthew P. Guttman, MD, PhD; Nathan Stall, MD, PhD; Jonathan Zipursky, MD, PhD; Avery B. Nathens, MD, PhD; Laura C. Rosella, MHSc, PhD; Barbara Haas, MD, PhD
University of Toronto

Introduction: Older adults represent over 40% of patients admitted to hospital with severe injury. Due to often complex health histories, however, predicting long-term outcomes in this population remains challenging. We hypothesized that machine learning (ML) methods could be applied to pre-injury health data to identify older adults with different likelihoods of survival and functional outcomes after injury.
Methods: We conducted a population-based, retrospective cohort study of community-dwelling older adults (age $\geq$ 65 years) with moderate or severe injuries (ISS>9, excluding isolated hip fractures) admitted to hospital in a large regional trauma system (2015–2023) We used unsupervised ML methods to analyze health data from two years prior to injury (including comorbidities, medications, admissions, and frailty) to identify data-driven pre-injury clusters. We then compared one- and five-year survival and functional recovery (ability to continue to live at home) across clusters.
Results: Among 46,669 injured older adults (mean age 80, 53% female), ML methods identified three unique clusters (A, B, and C). Patient characteristics, comorbidities, and medications varied significantly across clusters. While clusters were created agnostic of outcomes, there were significant differences ($p<0.01$) across clusters in 1-year survival (A: 89%, B: 80%, C: 69%), proportion alive and at home at 1-year (A: 81%, B: 66%, C: 56%), 5-year survival (A: 47%, B: 31%, C: 24%), and proportion alive and at home at 5-years (A: 40%, B: 22%, C: 17%).
Conclusion: Distinct clusters of injury patients with various survival and functional recovery outcomes were identified using complex pre-injury health data to identify older adults. These distinct clusters may be used improve prognostication and care outcomes among injured older adults.

NECROTIZING SOFT TISSUE INFECTION MANAGEMENT WITH LYOPHILIZED ACELLULAR PISCES DERMIS

Alfredo Cordova, MD; Kristy Miller, APRN; Sammy Shihadeh, BA; Talia Selembo, BS; Victoria Young, BS
Sarasota Memorial Hospital

Introduction: Necrotizing soft tissue infection (NSTI) are common life-threatening conditions which may lead to significant tissue loss and disfiguring wounds. Its management is challenging and carry significant morbidity. Skin substitutes may enhance the development of an optimal wound bed for grafting and provide temporary wound coverage reducing these risks. Decellularized and lyophilized north Atlantic cod dermis have properties in the 4-stages of wound healing. Subsequent resurfacing with autologous split-thickness skin graft (STSG) and suspended skin cell transplantation (SSCT) may lead to faster and complete healing of the skin grafts with reduced donor sites.

Method: Eighteen critically ill and comorbid patients presented in septic shock and multiorgan failure secondary to NSTI including Fournier's gangrene. Different body parts were involved including extremities, abdomen, chest, buttocks, and the perineum. The patient's comorbidities included diabetes, alcoholism, cirrhosis, renal insufficiency, coronary disease, morbid obesity, substance abuse, COPD, etc. Excisional debridement was performed. Subsequently, they were grafted with fish dermis graft and later STSG and SSCT.

Results: Xenograft integration and optimal granulation tissue was evidenced in >95% of the surface area as early as 5-days after product application. This was considered ideal for resurfacing. Skin coverage with meshed STSG and SSCT revealed nearly 100% skin graft take and epithelization in all cases within 2-weeks.

Conclusions: Decellularized and lyophilized fish dermis provide excellent wound coverage and enhances the formation of the optimal wound bed for grafting for NSTI patients. Subsequent, autologous suspended cell transplantation reduces time of healing with smaller donor sites and donor site morbidity.

OUTCOMES IN OLDER ADULTS REQUIRING OPERATIVE MANAGEMENT OF TRAUMATIC DUODENAL INJURIES: A POST HOC ANALYSIS

Rachel L. Choron, MD; Mira Ghneim, MD; Michael Rallo, PhD;
Amanda Teichman, MD; Christopher Bargoud, MD;
Jason D. Sciarretta, MD; Randi Smith, MD, MPH; Dustin Hanos, MD;
Iman Afif, MD, MPH; Jessica Beard, MD, MPH; Navpreet Dhillon, MD;
Ashling Zhang, MD; Rebekah Devasahayam, MD;
Mayur Narayan, MD, MPH, MBA, MHPE; Mark Seamon, MD
Rutgers Robert Wood Johnson Medical School

Introduction: Traumatic duodenal injuries(TDI) are infrequent but associated with significant morbidity and mortality. As limited data exist in older adults(OA), we aimed to elucidate characteristics, management strategies, and outcomes of TDIs in OA compared to younger adults(YA). We hypothesized TDI are particularly catastrophic for OA versus YA.

Methods: This was a post-hoc analysis of a retrospective multicenter (2010-2020) study from 35 level-1 trauma centers, including patients >14 years of age with operative TDI. OA(≥55 years) and YA(<55) were compared. The primary outcome was mortality. Inverse proportional weighting was performed based on comorbidities and injury profile to control for baseline differences in risk. Regression analyses assessed effect of age on outcomes.

Results: Of 774 patients, 71(9%) were OA with a mean age 65 vs 29 years in YA ($p<0.001$). OA were more often female (35% vs 15%,$p<0.001$), had multiple comorbidities, more blunt injuries (66% vs 21%,$p<0.001$), more AAST grade I TDI (35% vs 17%,$p=0.002$), less solid organ injuries (47% vs 64%,$p=0.004$), less hollow viscus injuries (42% vs 72%,$p<0.001$), lower AIS abdomen (3 vs 4,$p<0.001$), less massive transfusion protocol (24% vs 40%, $p=0.01$), less damage control laparotomy (47% vs 60%, $p=0.047$), and more TBI (13% vs 6%,$p=0.04$) than YA. There was no difference in pancreatic injuries or AIS chest ($p>0.05$). After adjusting for confounders, OAs were more likely to experience anastomotic leak, ileus, sepsis, pneumonia, bacteremia, AKI, more ventilator days, and longer ICU length of stay (all $p<0.05$). OA with TDI were less likely discharged home (OR 0.15, 95%CI 0.1-0.2, $p<0.001$) and more likely to die (OR 3.9, 95%CI 2.9-5.2, $p<0.001$) than YA.

Conclusion: OA with TDI were more often bluntly injured, required less MTP, and had less abdominal injuries than YA, however OA still had higher mortality and worse outcomes. Despite having less severe abdominal injuries, OA suffered more abdominal complications than YA.

RISK FACTORS AND OUTCOMES OF LEAK FOLLOWING PERFORATED PEPTIC ULCER REPAIR: A RETROSPECTIVE COHORT STUDY

Shuchi Sharma, BS; Molly Armstrong, BS;
Aishwarya Balaji, BA; Adara McCarty, BS; Holly Baselice, MPH;
Jennifer Knight Davis, MD; Julia R. Coleman, MD, MPH
The Ohio State University

Introduction: Predictors of leak after perforated peptic ulcer disease (PPUD) repair are not well characterized, leading to heterogeneity of intra- and post-operative management of PPUD repairs. This study aims to identify risk factors for leak after repair of PPUD.
Methods: This is a retrospective cohort study of operative repair for PPUD from 2014-2024 at a tertiary care center. Demographics, comorbidities, operative details, and postoperative outcomes were compared to identify predictors of leak.
Results: 90 patients were included (average age 59 yrs, 91% white, 54% male, average BMI 27.8). Most patients underwent Graham patch repair with intraoperative leak test. The postoperative leak rate was 15.6% (14/90), all of which were detected by upper GI or CT with sensitivity of 100%/100%, specificity 90%/92%, PPV 43%/50%, and NPV 100%/100%. There was no correlation with intraoperative leak test and development of post operative leak. Risk factors for leak included older age (63.5 vs. 58.4 yrs, p=0.04), former tobacco use (64.3% vs. 32%, p=0.02), duodenal perforation location (85.7% vs. 50.0%, p=0.01), and primary repair (28.6% vs. 2.6%, p=0.0003). Leaks were associated with surgical site infections (28.6% vs. 6.7%, p=0.01), longer hospital (median 37 vs. 11 days, $p < 0.001$) and ICU stays (median 14 vs. 1.5 days, p=0.0005), and discharge to a facility (64.3% vs. 25.3%, p=0.0043). The mortality rate with a leak was 21.4%, compared to no leak, 14.7% (p=0.004).
Conclusion: Leak after PPUD is associated with significant morbidity and mortality. The high NPV of upper GI and/or CTAP imaging highlight their role as a potential postoperative standard, deferring intraoperative leak tests.

Poster #29

FEASIBILITY OF INSTITUTING VTE PROPHYLAXIS GUIDELINES AT AN URBAN LEVEL ONE TRAUMA CENTER

Grace Chang, MD; Jeremy Miller, MD;
Michelle Mendiola, MD, MPH; Andrew Desio, PharmD
University of Illinois at Chicago - Mount Sinai Hospital Chicago

Introduction: Venous thromboembolism (VTE) prophylaxis guidelines were updated in 2020 by multiple surgical societies to base initial enoxaparin dosing on weight, then adjusted based on anti-Xa levels. Although trauma patients are at higher risk of developing VTE, these protocols are challenging to integrate into clinical practice. At an urban level one trauma center, a modified protocol was instituted on a cohort of trauma patients. We present the results of this intervention to assess if this protocol leads to reduced VTE rates and is feasible in a community level one trauma center with limited resources. In this specific urban area, the majority of level one trauma centers follow AAST guidelines, but the adjustment of enoxaparin varies - some centers only check above a weight greater than 100 kg, others do not check levels, and some are only checked peripherally by the pharmacy service.

Methods: This is a prospective cohort study from 2022-2024. Patients admitted for blunt or penetrating trauma were assessed for inclusion and those with known VTE or on therapeutic anticoagulation were excluded. For a total of 424 patients, enoxaparin was dosed according to current guidelines and titrated based on resultant anti-Xa levels (figure 1). VTE was screened by surgeon discretion using either duplex ultrasonography or computerized tomography. VTE and bleeding rates were compared against 5-year historical rates.

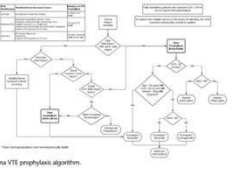


Figure 1. Inpatient trauma VTE prophylaxis algorithm.

Figure 1. Inpatient trauma VTE prophylaxis algorithm
See injury Scoring Scale (aast.org) for grading of solid organ injuries[4]

Anti-Xa Level	Hold Next Dose?	Dose Change	Next Anti-Xa level*
< 0.2 units/mL	No	increase by 10 mg	4 hours after 3rd/4th dose
0.2 – 0.5 units/mL	No	No change	Weekly
0.51 – 1.5 units/mL	No	Decrease by 10 mg	4 hours after 3rd/4th dose
1.51 – 2 units/mL	3 hours	Decrease by 10 mg	4 hours after 3rd/4th dose
>2.01 units/mL	Until anti-Xa < 0.5	Decrease by 20 mg	Every 24 hours until anti-Xa < 0.5

Enoxaparin dose adjustments based on peak anti-Xa levels
*Draw anti-Xa levels between 0700-1400, 4 hours after dose administered

Results: VTE rate was 2.6% (n=11), compared to the historical rate of 6.6% (RRR 59%, NNT=25.6). All but 2 patients achieved prophylactic anti-Xa levels during their hospitalization. 0.5% (n=2) patients had adverse bleeding compared to the historical rate of 2.05%. Receiving 4+ blood transfusion products (p=0.015) or having a lower extremity or pelvic fracture were significantly associated with developing VTE on this protocol (p=0.033). BMI over 30 (p=0.162), nicotine use (p=0.348), and surgery (p=0.119) were not associated with VTE. Of those who initially received enoxaparin 30 mg twice a day, 17% had an initial sub prophylactic anti-Xa level, but no significant difference in VTE rate compared to those who were prophylactic.

Comparison of characteristics for those who developed VTE			
Characteristic	No VTE N = 404 (97%)	VTE N = 11 (2.7%)	p-value
Age (years)	40 (17)	34 (20)	0.2
Sex	325 (81%)	8 (80%)	>0.9
Race			0.6
Black	189 (51%)	4 (44%)	
Hispanic	72 (19%)	1 (11%)	
Other	81 (22%)	4 (44%)	
White	25 (6.8%)	0 (0%)	
Asian	2 (0.5%)	0 (0%)	
American Indian	1 (0.3%)	0 (0%)	
Weight	81 (19)	77 (15)	0.6
BMI	27.1 (6.1)	22.7 (4.6)	0.2
Mechanism of injury			0.2
Blunt	232 (58%)	3 (33%)	
Penetrating	170 (42%)	6 (67%)	
Both	1 (0.2%)	0 (0%)	
Lower extremity or pelvic fracture	125 (31%)	6 (67%)	0.033
Length of stay	12 (14)	15 (10)	0.082
ICU admission >1 day	110 (27%)	1 (11%)	0.5
Received 4+ blood product transfusions	94 (23%)	5 (50%)	0.015
Alcohol	137 (37%)	2 (25%)	0.7
Smoking	30 (8.2%)	0 (0%)	>0.9
Drugs	66 (18%)	1 (13%)	>0.9
ISS	16 (13)	16 (13)	0.3
Death	3 (0.8%)	0 (0%)	>0.9
Prophylactic on first anti Xa level			0.3
Subprophylactic	57 (14%)	2 (25%)	
Prophylactic	343 (86%)	6 (75%)	
First anti Xa level	0.27 (0.12)	0.26 (0.17)	0.6
Prophylactic level achieved during hospitalization	384 (96%)	8 (100%)	>0.9

*Mean (SD); n (%)
†Wilcoxon rank sum test; Fisher's exact test

Outcomes	
Characteristic	Overall N = 424*
Deep vein thrombosis	5 (1.2%)
Pulmonary embolism	6 (1.4%)
All DVT and PE	11 (2.7%)
Bleeding	2 (0.5%)
Death	3 (0.7%)

*n (%)

Conclusion: A lower VTE rate using the new prophylaxis guidelines was noted without a change in bleeding risk compared to historic controls. Nearly all patients achieved prophylactic anti-Xa levels following AAST guidelines with an unchanged rate in VTE compared to historic controls. Future studies focusing on specific trauma patient subsets are needed to further define which benefit most from anti-Xa level dosing.

FINDINGS OF THE PREVENT CLOT MULTICENTER RANDOMIZED CLINICAL TRIAL ARE GENERALIZABLE TO A NATIONAL TRAUMA DATASET

Anthony J DeSantis, MD; Deborah Stein, MD; Sandip Tarpada, MD; Renan Castillo, PhD; Katherine Frey, PhD; Gerard Slobogean, MD; Robert O'Toole, MD; Nathan O'Hara, PhD
R. Adams Cowley Shock Trauma Center

Introduction: PREVENT CLOT, a randomized clinical trial of 12,211 participants, found thromboprophylaxis with aspirin was not significantly different from low-molecular-weight heparin (LMWH) in preventing death, pulmonary embolism (PE), or proximal deep vein thrombosis (DVT). However, the generalizability of these findings to all traumatic fracture patients has been questioned, prompting this investigation using a national-level trauma dataset.

Methods: Using the American College of Surgeons' Trauma Quality Improvement Program (TQIP), we created a target population of 197,326 patients aged 18-89 with extremity, pelvic, or acetabular fracture, and thromboprophylaxis use. We used logistic regression to model the probability of trial participation based on the linear combination of key baseline covariates. We used these probabilities to reweight the trial population to mirror the covariate distribution of the TQIP population and estimated the between-group risk differences with 95% confidence intervals (CI). Outcomes included death, PE, proximal DVT, and distal DVT within 90 days of randomization.

Results: Compared to the TQIP population, trial patients were younger, more uninsured, had higher rates of tibia fractures and smoking, and lower rates of diabetes. The rates of death (difference, -0.1%; p=0.85), PE (difference, 0.0%; p=0.90), proximal DVT (0.6%; p=0.06), and distal DVT (-0.1%; p=0.85) were not statistically different between groups after reweighting.

Conclusion: Our findings suggest that although differences between these populations exist, we would expect to observe similar efficacy of thromboprophylaxis with aspirin or LMWH in preventing death, PE, and proximal DVT in the broader population of traumatic fracture patients. The results question whether the relatively small benefit of LMWH in preventing distal DVT would be observed in the target population.

REAL WORLD TRANEXAMIC ACID ADMINISTRATION DIVERGES FROM CRASH-2 GUIDELINES IN A BLOOD-CONSTRAINED SETTING: A MISSED IMPLEMENTATION OPPORTUNITY

S. Ariane Christie, MD; Matthew Driban, MD;
Fanny Dissak-Delon, MD, MPH, PhD; Arole Darwin Touko, MPH;
Mbiarikai Mbianyor, MS; Rasheedat Oke, MD, MPH;
Isaac Obeng-Gyasi, MD, MPH; Alain Mefire Chichom, MD;
Catherine Juillard, MD, MPH
University of California, Los Angeles

Introduction: Low-cost tranexamic Acid (TxA) reduces mortality for patients at risk of hemorrhagic shock and has particular potential to be impactful in blood-constrained settings. However, in contexts without standardized trauma training, failure to adhere to validated administration guidelines may decrease TxA efficacy and increase risk. As part of an ongoing trauma QI initiative, we evaluated adherence of TxA administration to CRASH-2 guidelines in a prospective multisite Cameroonian trauma cohort.

Methods: Between 2022 and 2024, injured patients at 10 hospitals with TxA were categorized by whether they met CRASH-2 guidelines for TxA administration (C2+ or C2-) and whether they received TxA (TxA+ or TxA-). Multivariate logistic regression was used to test associations between TxA and death in C2+ and C2- cohorts.

Results: Of 8,645 patients, 1,218 (14%) were C2+. C2+ and C2- patients had no difference in TxA administration rates (3.6 vs. 3.7%, p=0.83). In C2+ patients, TxA+ had lower hemoglobin than TxA- patients (9.2 v. 11.3, p=0.05) and there was no survival difference between TxA+ and TxA- (p=0.76). In C2- patients, mortality was 5.3% for TxA +, compared to 2.7% for TxA-(p<0.01). Receiving TxA was found to be independently associated with inpatient death in C2- patients (aOR 2.0, p=0.02).

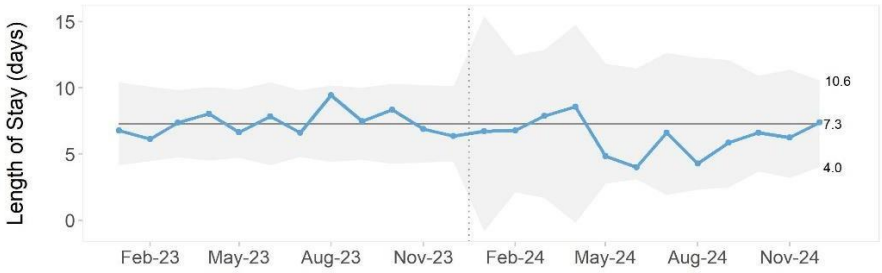
Conclusions: Current TxA administration in Cameroon deviates from CRASH-2 guidelines. In C2+ patients, TxA effectiveness may be attenuated by delays waiting for Hgb results prior to administration and TxA administration in C2- patients is associated with higher mortality. Coupling TxA availability with implementation support strategies, such as trauma training and ongoing quality improvement data review, is essential to ensure adherence and may decrease preventable deaths in a blood-scarce setting.

STANDARDIZING ADHESIVE SMALL BOWEL OBSTRUCTION MANAGEMENT: A FOUR-HOSPITAL QUALITY IMPROVEMENT INITIATIVE

Abby R. Gross, MD; Sofya H. Asfaw, MD, MBA;
Benjamin T. Miller, MD; Sayf Al-deen Said, MD, MPH;
Ajita Prabhu, MD; Jeffrey A. Claridge, MD, MS
Cleveland Clinic

Introduction: Adhesive small bowel obstructions (aSBOs) frequently lead to emergency surgery, prolonged hospital stays, and high costs. This quality improvement (QI) project aimed to reduce length of stay (LOS).
Methods: A standardized protocol for aSBO was developed and introduced at four hospitals. The primary outcome was LOS, compared against a baseline cohort from the previous year.
Results: Protocol utilization rose from 10.1% (January 2024) to 52.3% (December 2024). LOS and technical direct costs declined significantly post-implementation (Table). Statistical process control (x-bar) charts indicated a significant shift in LOS (Figure).
Conclusion: Standardizing care for aSBO across multiple hospitals can effectively reduce LOS and cost.

Variable	Pathway (n=206)	Pre-Pathway (n=555)	P-Value
Age	66.46±15.71	66.65 ± 16.49	0.610
Charlson Comorbidity Index	1.2±1.6	1.4±1.7	0.208
Operative Intervention	43(20.87%)	93(16.76%)	0.202
Time to Operation	1.64±3.17	1.95 ± 3.13	0.330
Length of Stay, days	6.21±5.97	7.29 ± 6.31	**0.001**
Technical Direct Cost, 30-days	$7,988±$11,733	$9,788 ± $12,934	**0.003**
Inpatient Mortality	2(0.97%)	14(2.52%)	0.259



THE ASSOCIATION OF LOSS OF INDEPENDENCE WITH WORSE LONG-TERM OUTCOMES AFTER EMERGENCY GENERAL SURGERY IN OLDER ADULTS

Manuel Castillo-Angeles, MD, MPH; Cheryl Zogg, MD, PhD, MSPH, MHS; Rachel Adler, PhD; Lingwei Xiang, MPH; Stephanie Nitzschke, MD; Reza Askari, MD; Ali Salim, MD; Joel Weissman, PhD; Joaquim Havens, MD
Brigham & Women's Hospital

Introduction: Loss of independence (LOI) has recently emerged as a high-priority patient-centered quality metric. However, prior LOI research has focused on short-term outcomes, which do not provide an adequate assessment of the continuum of care in this population. Our goal was to determine the impact of LOI on long-term outcomes after Emergency General Surgery (EGS) among older adults.

Methods: Community-dwelling older adults, ≥65 years, who underwent EGS procedures were identified using 2017 Medicare fee-for-service claims. LOI was defined as either nursing home admission or assistance required for Activities of Daily Living (ADLs) after discharge. Main outcomes were mortality, readmission, and major morbidity within a 365-period after index admission. Multivariable regression analyses were performed to determine the association between LOI and the main outcomes.

Results: 280,209 community-dwelling older adults underwent EGS with 26% experiencing LOI. After adjusted analysis, LOI was significantly associated with 365-day mortality, morbidity, and readmission.

Table. Factors associated with main outcomes within 365 days.

	OR (95% CI)		
Variables	**Mortality**	**Morbidity**	**Readmission**
Loss of Independence	**1.58 (1.53-1.63)**	**2.58 (2.52-2.65)**	**2.59 (2.53-2.64)**
Age	1.05 (1.05-1.06)	1.01 (1.01-1.01)	0.99 (0.99-0.99)
Female sex	1.36 (1.32-1.40)	1.15 (1.12-1.18)	1.07 (1.06-1.09)
Race (ref. White)			
Black	1.12 (1.06-1.18)	1.11 (1.06-1.16)	1.01 (0.97-1.04)
Other	0.80 (0.75-0.86)	1.07 (1.02-1.12)	0.96 (0.92-0.99)
Elixhauser Comorbidity Index	1.23 (1.22-1.23)	1.15 (1.15-1.16)	1.14 (1.14-1.15)
Dementia	1.54 (1.48-1.59)	0.92 (0.89-0.95)	0.87 (0.84-0.90)
Hospital Frailty Risk Score (Ref. Low risk)			
Moderate risk 5-15	1.65 (1.59-1.70)	1.11 (1.08-1.14)	0.90 (0.88-0.92)
High risk >15	2.09 (1.94-2.25)	1.08 (1.01-1.16)	0.63 (0.59-0.67)

Conclusion: One in four older adults undergoing EGS experience LOI, which is significantly associated with worse outcomes up to a year after surgery. Future studies should focus on new strategies to improve physical function before and after procedures and to preemptively coordinate care transitions in this population.

ANTIPLATELET (BUT NOT ANTICOAGULATION) THERAPY REDUCES AMPUTATION RISK AFTER LOWER EXTREMITY VASCULAR TRAUMA

Ana M. Reyes, MD, MPH; Michael D. Cobler-Lichter, MD;
Kenneth G. Proctor, PhD; Nicholas Namias, MD, MBA;
Enrique Ginzburg, MD; Joseph DuBose, MD;
Jonathan P. Meizoso, MD, MSPH; AAST PROOVIT Study Group
University of Miami

Introduction: There is no consensus on the role of anticoagulation (AC) or antiplatelet (AP) therapy after lower extremity vascular trauma. We hypothesized that amputation risk would be decreased with either post-operative AC or AP.

Methods: The AAST PROOVIT prospective registry of vascular trauma was queried from 2012-2022 for adults with popliteal, anterior tibial (AT), posterior tibial (PT), or peroneal artery injuries who underwent definitive open repair. Multiple logistic regression determined the association of AC or AP with amputation during index admission. Model controlled for age, ISS, admission blood pressure, units of blood given in the first 24hrs, blunt mechanism, & presence of concomitant vein, nerve, or bone injuries.

Results: In 210 patients (popliteal-180, AT-8, PT-20, peroneal-2), the median age was 34.0 years, 85.2% were male, & 47.6% had blunt injuries. The amputation rate was 12.4%. Primary repair was performed in 21.4%, patch repair in 1.9%, autologous vein interposition graft/bypass in 74.8%, synthetic graft interposition/bypass in 1.4%, and cryo-vein bypass in 0.5%. Post-operative AC was received by 52.9% of patients and AP by 49.5%. Post-operative AP decreased the likelihood of amputation (aOR 0.22, 95% CI 0.08-0.65, p=0.006), but AC was not associated.

Conclusion: AP after vascular repair for trauma reduced amputation rate in the PROOVIT study population. Duration of AP therapy to achieve maximal benefit requires further study.

Regression Model for Amputation

Covariate	aOR (95% CI)
Age	0.98 (0.94-1.02)
ISS	1.05 (0.98-1.12)
Admission SBP	1.01 (0.99-1.03)
Total units prbc in 24hr	0.99 (0.87-1.13)
Blunt mechanism	0.35 (0.12-1.06)
Vein injury	0.80 (0.22-2.88)
Nerve injury	3.14 (0.95-10.43)
Bone injury	4.10 (1.28-13.07)*
Post-operative AC	2.11 (0.69-6.40)
Post-operative AP	0.22 (0.08-0.65)*

aOR: adjusted odds ratio; CI: confidence interval; ISS: injury severity score; SBP: systolic blood pressure; prbc: packed red blood cells; AC: anticoagulation; AP: antiplatelet; * statistical significance at $p < 0.05$

DYSPHAGIA IN BLUNT CERVICAL SPINE TRAUMA: TRUE INCIDENCE MAY BE TOUGH TO SWALLOW

Connor Maloney, BS; Thomas Gazella, MD; Matilyn Kopcsik; Erin Luke; William Leukhardt, MD; Christopher Wolff, MD
Cleveland Clinic Akron General

Introduction: The incidence of dysphagia may be under recognized in cervical spine injury (CSI) patients. Complications such as aspiration and pneumonia can lead to significant morbidity or mortality. We aim to measure the level of dysphagia in CSI patients in our institution using a Speech Therapy driven evaluation protocol. We hypothesized that said protocol would detect a higher (and true) incidence of dysphagia.

Methods: This was a single center study from our Level 1 Trauma Center. Our study involved trauma patients with radiographic findings of blunt CSI from January 2020 to October 2023. Our intervention was a mandated evaluation from a Speech-Language Pathologist. Dysphagia was measured using the Functional Oral Intake Scale (FOIS). We were able to retrospectively identify patients using our internal trauma registry to compare a historical arm to the interventional arm. Our primary outcome was diagnosis of dysphagia. Secondary outcomes were complications from dysphagia: aspiration, pneumonia, ICU readmission, unplanned intubation.

Results: 418 patients were included; 239 were in the historical arm and 179 were in the intervention arm. 138 of the 179 patients underwent our intervention. The historical cohort was 87% male with a mean age of 65.2 and an average ISS of 12.6. The intervention group had 60% males with a mean age of 68.4 and average ISS of 12.7. Of the 138 patients evaluated, 44 (31.8%) were diagnosed with dysphagia requiring intake modifications. Dysphagia diagnosis was poorly measured or documented in the historical group. Aspiration and pneumonia rates were documented as low and comparable between groups. ICU readmission was at 9 in the historical group down to 7 in the intervention group while unplanned intubation went from 4 to 5.

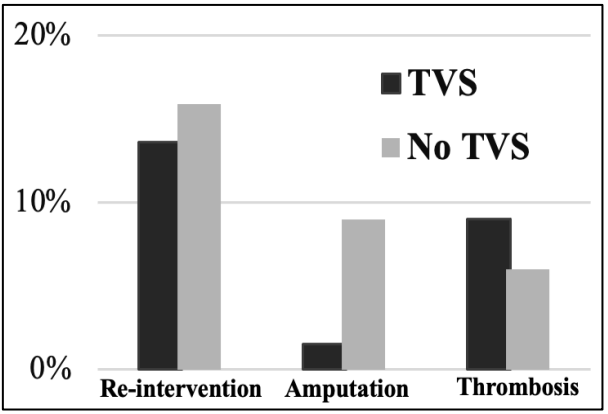
Conclusion: A large portion of our patients with CSI were diagnosed with dysphagia. This detection rate is at the higher end of the published incidence and, based on our methods, must be recognized as accurate. Due to the high incidence of dysphagia detected, we recommend mandated speech therapy evaluations on all patients with blunt cervical spine injuries.

FOIS	Deficit	N=138 (%)
2	Profound	5 (3.6)
3	Severe	1 (0.7)
4	Moderate	11(7.9)
5	Mild	4 (2.9)
6	Minimal	23 (16.6)
7	None	94 (68.1)

IMPACT OF TEMPORARY VASCULAR SHUNTING ON OUTCOMES FOLLOWING PERIPHERAL ARTERIAL REPAIR: A PROPENSITY-MATCHED ANALYSIS FROM THE PROOVIT REGISTRY

Negar Nekooei, MD; Danielle Brabender, MD; Justin Wang, MS; Ajay Prasad, BS; Anaar Siletz, MD PhD; Kazuhide Matsushima, MD; Kenji Inaba, MD; Joseph Dubose, MD; Matthew Martin, MD
LAC + USC Medical Center

Introduction: Temporary vascular shunts (TVS) are used for initial stabilization and delayed arterial repair, but their overuse may worsen outcomes. This study evaluates the impact of TVS on re-intervention and amputation rates following peripheral arterial repair (PAR).
Methods: Retrospective analysis (2012–2023) of the PROspective Observational Vascular Injury Treatment (PROOVIT) registry. Patients who underwent PAR were categorized into two groups: TVS before PAR versus immediate repair (IR). Propensity score matching (1:3) balanced patient characteristics and injury severity. The primary outcome was re-intervention, with secondary outcomes including amputation, thrombosis, and length of stay.
Results: Among 1,182 PAR patients, 67 (5.7%) received TVS. TVS was most commonly placed in the femoral (42%), brachial (30%), and popliteal arteries (15%). After matching, 67 TVS patients were compared to 201 IR patients. Re-intervention rates were comparable (13.6% vs. 15.9%, p=0.655), as were amputation (1.5% vs. 9%, p=0.051) and thrombosis (9% vs. 6%, p=0.40, Figure). Additionally, median length of stay was similar (12 vs. 9 days, p=0.243) within cohorts.
Conclusion:
TVS did not significantly impact re-intervention, amputation, thrombosis, or length of stay following PAR. TVS and delayed repair achieved comparable outcomes compared to immediate repair of peripheral arterial injuries



INTERNAL JUGULAR INJURIES: OUTCOMES FROM THE PROSPECTIVE OBSERVATIONAL VASCULAR INJURY TREATMENT (PROOVIT) MULTICENTER REGISTRY

April I. Miller, DO; Pranay Aurora, DO; John Bini, MD
Medical City of Plano

Introduction: Since March 2013, the PROOVIT database has been a prospective, multi-center observational trial established for the study of vascular trauma. Here we present the data for the management of internal jugular vein injuries due to blunt and penetrating trauma.
Methods: Inclusion criteria for the PROOVIT study included patients age >2 years with radiologic or clinical/operative diagnosis of injury to named vessels in trauma patients at participating facilities. The database was reviewed to examine injury presentation, surgical management, postprocedural medical management with antiplatelet or anticoagulant therapy, and mortality. SPSS software was used to perform the descriptive and exploratory analysis for the study sample dataset.
Results: 94 injuries were reported over a 10 year period beginning in 2013 from 21 Level 1 and one Level 2 trauma centers. 10 were blunt, 83 penetrating, and 1 mixed blunt/penetrating with 45 transected, 8 occluded, 3 pseudoaneurysm, and 26 injuries with partial transection or flow limiting defect. 75 patients underwent operative exploration - 49 being ligated, 1 endovascular repair, and 39 primary repair. Anticoagulation (AC) included 4 patients on IV heparin, 19 on LMWH, and 1 on apixaban. 6 were discharged on AC and 19 on anti-platelet medications. In-hospital mortality was 18% of the 94 total patients, excluding 2 with unreported outcomes. Based on the binomial regression analysis, higher ISS score, lactate, and PRBC transfusion requirements were associated with increased risk of in-hospital mortality (8.3%, 12.5%, and 20.4% respectively). Normal hemoglobin was associated with decreased risk of in-hospital mortality. P-values for independent variables of type of injury, repair vs ligation, ISS score, blood lactate, number of PRBC transfusions, hemoglobin level, and type of primary repair did not exceed the 0.05 significant threshold.
Conclusion: In review of IJV necessitating intervention, the majority were ligated. Nearly half were managed with primary repair, including thirteen with end-to-end anastomosis.

PATIENT-CENTERED OUTCOMES AFTER SURGICAL STABILIZATION OF RIB FRACTURES: A PROSPECTIVE OBSERVATIONAL TRIAL

Jonathan Laredo, BS; Morgan Walker, MD; Faith Wilson, BA;
Gillian Hertslet, BS; Kyle Lange, DO, MBA;
Alexander Cavalea, MD; John Griepentrog, MD
University of Tennessee Medical Center at Knoxville

Introduction: Rib fractures are common after blunt trauma and lead to chronic pain and morbidity. Surgical stabilization of rib fractures (SSRF) has been shown to improve clinical outcomes in patients with flail chest and ventilator dependence, but its effects on quality of life and physical functioning are understudied. We hypothesize that SSRF improves pain and quality of life at 3 months.

Methods: A prospective observational trial comparing SSRF to nonoperative management of trauma ICU patients with ≥3 continuous rib fractures was carried out at a Level 1 trauma center from June 2023–August 2024. Patient quality of life (via SF-36) and pain (via SF-MPQ-2) were assessed at discharge, 2 weeks, 3 months, and 6 months. Propensity score matching controlled for age, sex, and ISS. Mann-Whitney-U and Chi-Squared tests ($p<.05$) were chosen for statistical analysis.

Results: Among 122 patients, 39 underwent SSRF. The surgical group had higher rates of pneumothorax, hemothorax, and chest tube placement but similar ICU stay, ventilator days, and total length of stay. SSRF patients reported significantly lower pain at discharge and 2 weeks, along with improved long-term physical functioning, energy, and emotional well-being scores across all time points.

Conclusion: SSRF is associated with improved long-term physical functioning and reduced short-term pain compared to nonoperative management. These findings suggest SSRF may have significant benefits to patient quality of life during recovery from major chest trauma.

STOP THE RADIATION: RETHINKING THE NEED FOR FOLLOW-UP X-RAYS IN UNCOMPLICATED RIB FRACTURES

Eric Klein, MD; Maria Sfakianos, MD;
Matthew Bank, MD; Daniel Jafari, MD; Amna Aslam;
Elysa Margiotta, MD; Manuel Beltran, PhD
North Shore University, LIJ

Introduction: Rib fractures can be associated with delayed hemothorax (HTX) or pneumothorax (PTX) which could significantly enlarge over time and might not be present on admission. Failure to treat these problems can result in increased morbidity. Follow-up radiographs of patients with rib fractures have been recommended to identify delayed HTX or PTX, so that timely drainage can be performed. We hypothesize that specific risk factors can guide more selective use of follow-up radiographic imaging.
Methods: Initial chest CT images in adult blunt trauma patients with isolated thoracic injuries were retrospectively reviewed over a 2-year period. Using our trauma registry, we identified delayed HTX, delayed PTX, pleural drainage procedures, and 30-day readmissions.
Results: 678 patients with isolated thoracic trauma who had 1 or more rib fractures were identified. At least trace HTX was present on initial CT scan in 181 (27%) of patients. Of these 181 patients, 42 (23%) required drainage (17 within 24 hours, 20 beyond 24 hours, 5 on readmission). No patient developed a HTX which was not present on admission CT scan. At least trace PTX was present on initial CT in 161 (24%) of patients. Of these 161 patients, 41 (25%) required drainage (31 within 24 hours, 10 beyond 24 hours). While 3 patients developed a PTX which was not present on admission CT scan, a HTX had been present on 2, and only 1 required drainage. The third PTX was trace in a patient with blebs and did not require drainage. 6 patients required VATS for retained HTX. 93 patients (14%) had both HTX and PTX present on initial CT scan. 429 patients (63%) had no HTX or PTX (not even trace) present on initial CT scan, and none went on to develop a HTX. Only 1 developed a PTX which did not require drainage.
Conclusions: There appeared to be minimal risk of developing a delayed HTX or PTX if there was no evidence of any HTX or PTX present on admission. We recommend against routine follow-up radiographs in patients without initial signs of pleural complications, including trace HTX or PTX.

SURGICAL STABILIZATION OF RIB FRACTURES MAY NOT BENEFIT CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS

Amir Ebadinejad, MD; Ya-Huei Li, PhD;
Stephen Thompson, BS; Jane Keating, MD; Daniel Ricaurte, MD;
Juan Cobar, MD; Nishant Merchant, MD
Hartford Hospital

Introduction: Patients with Chronic Obstructive Pulmonary Disease (COPD) sustaining rib fractures experience increased morbidity due to compromised respiratory function. Surgical Stabilization of Rib Fractures (SSRF) may offer benefits, but its impact in COPD patients remains uncertain. This study compared outcomes between COPD patients undergoing SSRF and those managed non-surgically.

Methods: We retrospectively analyzed COPD patients (≥35 years) with rib fractures from 2017 to 2022 in the National Trauma Data Bank, stratifying them into SSRF and non-SSRF groups. To mitigate confounding, we performed 1:1 propensity score matching on demographics, comorbidities, and injury characteristics. Outcomes included ventilator use, intensive care unit (ICU) length of stay (LOS), hospital LOS, ventilator days, mortality, and perioperative complications.

Results: Among 21,757 patients meeting inclusion criteria, 626 underwent SSRF while 21,131 did not. After matching, each group comprised 505 patients with comparable demographics and injury profiles. The SSRF group showed higher ventilator use (45.5% vs. 28.9%, $p<0.001$), longer ICU LOS (median 7 vs. 3 days) and hospital stays (median 14 vs. 10 days, $p<0.001$), and more unplanned intubations (13.9% vs. 8.9%, $p=0.013$). Mortality rates were similar (5.3% vs. 7.1%, $p=0.242$), with no significant difference in discharge disposition ($p=0.431$).

Conclusion: In COPD patients with rib fractures, SSRF is associated with increased ventilator dependency, longer ICU and hospital stays, and higher rates of unplanned intubations, without a significant reduction in mortality. These findings suggest that SSRF may not offer a survival advantage and may involve increased resource utilization in COPD patients.

TO EVALUATE THE IMPACT OF N-ACETYLCYSTEINE USE IN THE MANAGEMENT OF TRAUMATIC LOWER EXTREMITY VASCULAR INJURY - A PILOT RANDOMISED CONTROLLED TRIAL

Dinesh K. Bagaria, MS; Shankarnath S, MS; Shivam Pandey, PhD; Narendra Choudhary, MS; Pratyusha Priyadarshini, MS; Abhinav Kumar, MS; Junaid Alam, MS; Amit Gupta, MS; Biplab Mishra, MS; Subodh Kumar, MS; Sushma Sagar, MS
All India Institute of Medical Sciences, New Delhi

Introduction: N-acetyl cysteine (NAC) known as a potent antioxidant and having cellular healing properties, showed improve amputation stump perfusion and healing in patients with persistent limb-threatening ischaemia. This randomised controlled trial was conducted to compare the rate of limb salvageability and other morbidities at 30 days post injury between 5 day NAC treatment and the placebo group.

Methods: This study was a Pilot Prospective, Randomized controlled Trial conducted from January 2022 to December 2024. Patients who were scheduled for post trauma lower extremity vascular intervention but not for upfront amputation were included in the study based on inclusion and exclusion criteria. The study subjects were randomized to two groups. Group A were treated with N-acetylcysteine 1200 mg iv bd in 100ml DNS over 30 – 60 mins for 5days and patients in Group B were given Dextrose normal saline. In post operative clinical assessment patients were evaluated for limb salvageability, surgical site infection (SSI), need for surgical debridement, and the day of fasciotomy wound closure post-surgery 30 days.

Results: Total 37 patients were enrolled, 19 in group A and 18 in group B. The mean of age (years) of our study population was 29.83 (SD 11.47). 26(70.27%) patients out of 37 sustained blunt trauma with RTI and 8 (21.62%) patients had penetrating trauma. 9 (47.36%) patients from Group A and 9 (50%) patients from Group B presented to our ED within 6 hours of injury respectively (P = 0.65). Limb salvageability was not significantly different (78.95 % v/s 55.56%, p=0.170). SSSI (P=0.45), need of surgical debridement (p =0.53) and mean days of fasciotomy closure (p=0.05) were also not statistically significant. There was no reported adverse event with NAC.

Conclusion: This study showed NAC safety as an adjunct in acute traumatic limb vascular injuries management. There was improvement in limb salvageability though statistically not significant. Further large-scale studies are warranted to establish role of NAC in vascular injuries management.

"NOT SO FAST" - FAST EXAM ALONE IS NOT ADEQUATELY SENSITIVE TO DETECT CARDIAC INJURY IN PENETRATING TRAUMA

Ellen Cohn, MD, MPH; Oloruntoba Bolaji, DO;
Justin Hatchimonji, MD, MBE, MSCE; Diane N. Haddad, MD, MPH;
Phillip Dowzicky, MD; Andrew J. Benjamin, MD; Jennifer Cone, MD;
Priya Prakash, MD; Tanya Zakrison, MD, MPH;
Susan Rowell, MD, MBA; Kenneth Wilson, MD;
Selwyn Rogers, MD, MPH; Abid Khan, MD
University of Chicago Medicine

Introduction: Timely diagnosis and treatment of cardiac injuries following trauma is critical for survival. The FAST (Focused Assessment with Sonography in Trauma) is used to triage thoracoabdominal injuries, however, its diagnostic accuracy for cardiac injury in penetrating trauma remains incompletely characterized. This study evaluates the sensitivity of the FAST and the relationship between missed cardiac injury and mortality.
Methods: The trauma registry at an urban Level 1 trauma center was retrospectively queried for adults with operatively proven penetrating cardiac injuries that had a FAST (5/2018-12/2024). Our primary outcome was sensitivity of FAST. Secondary outcomes were mortality, time to surgical intervention, and relationship of hemothorax to FAST result.
Results: Of 70 patients with confirmed cardiac injuries, 54.3% of those had a positive FAST, 31.4% had a negative exam, and 14.3% had an inconclusive FAST. FAST sensitivity for cardiac injuries was 63.3% and was lower for patients with concomitant left-sided hemothorax (52.9%). Time to thoracic cavity exploration was longer for FAST-negative (144 minutes, p=0.03) and indeterminant (371 minutes, p=0.17) patients compared to the FAST-positive group (38 minutes). In patients with multi-cavity trauma, 67% of FAST-positive patients underwent thoracic exploration before exploratory laparotomy, vs 30% in the FAST-negative group and 50% of the indeterminant group. Mortality was not significantly higher in the FAST-negative or indeterminant patients compared to FAST-positive patients (65.0% and 60.0% vs 52.6%, p=0.77) (OR 1.46, 95% CI 0.49-4.37 and OR 1.35, 95% CI 0.34-5.38 respectively).
Conclusion: Cardiac FAST exam cannot be relied upon alone to determine the need for cardiac exploration in penetrating trauma, as almost half of patients with a penetrating cardiac injury had a negative or equivocal FAST. These results underscore the importance of maintaining a high clinical suspicion for cardiac injury regardless of initial FAST results.

A CONTEMPORARY STUDY OF OUTCOMES AND SURVIVAL PREDICTORS AFTER EMERGENCY DEPARMENT THORACOTOMY

Lucy Hart, MD; Zachary Grady, MD; Courtney Meyer, MD;
Luis Alejandro De Leon Castro, MD; Jason D. Sciarretta, MD;
Randi Smith, MD, MPH; Jonathan Nguyen, DO
Grady Memorial Hospital

Introduction: Low-cost tranexamic Acid (TxA) reduces mortality for patients at risk of hemorrhagic shock and has particular potential to be impactful in blood-constrained settings. However, in contexts without standardized trauma training, failure to adhere to validated administration guidelines may decrease TxA efficacy and increase risk. As part of an ongoing trauma QI initiative, we evaluated adherence of TxA administration to CRASH-2 guidelines in a prospective multisite Cameroonian trauma cohort.

Methods: Between 2022 and 2024, injured patients at 10 hospitals with TxA were categorized by whether they met CRASH-2 guidelines for TxA administration (C2+ or C2-) and whether they received TxA (TxA+ or TxA-). Multivariate logistic regression was used to test associations between TxA and death in C2+ and C2- cohorts.

Results: Of 8,645 patients, 1,218 (14%) were C2+. C2+ and C2- patients had no difference in TxA administration rates (3.6 vs. 3.7%, p=0.83). In C2+ patients, TxA+ had lower hemoglobin than TxA- patients (9.2 v. 11.3, p=0.05) and there was no survival difference between TxA+ and TxA- (p=0.76). In C2- patients, mortality was 5.3% for TxA +, compared to 2.7% for TxA-(p<0.01). Receiving TxA was found to be independently associated with inpatient death in C2- patients (aOR 2.0, p=0.02).

Conclusions: Current TxA administration in Cameroon deviates from CRASH-2 guidelines. In C2+ patients, TxA effectiveness may be attenuated by delays waiting for Hgb results prior to administration and TxA administration in C2- patients is associated with higher mortality. Coupling TxA availability with implementation support strategies, such as trauma training and ongoing quality improvement data review, is essential to ensure adherence and may decrease preventable deaths in a blood-scarce setting.

CRACKED AND BLEEDING: IDENTIFYING PATIENTS AT RISK FOR BILE LEAK AFTER BLUNT HEPATIC TRAUMA

Khalid Mahmoud, MD; Brian Kim, MD; John Zietlow, MD;
Stephanie Heller, MD; Daniel Stephens, MD;
Mohamad Abou Chaar; Michael Thorn; Veljko Strajina, MD
Mayo Clinic Rochester

Introduction: Our study aims to assess factors associated with the development of a bile leak in patients with moderate to high-grade blunt liver trauma.

Methods: Retrospective, single institution, chart review study including patients with blunt liver trauma. Liver-directed hemostatic interventions included either angioembolization or laparotomy involving a hemostatic intervention for the liver injury. The “cracked liver” was defined as a laceration extending from the liver capsule to the inferior vena cava (IVC) or the caudate lobe.

Results: A total of 168 patients injured between October 2001 and December 2023 met the inclusion criteria, and bile leaks developed in 15 patients (9%). The average age of the patients was 38 years (±18), and 76 patients were female (45%). The AAST liver injury severity grades were as follows: grade 3 (n=113, 68%), grade 4 (n=49, 29%), and grade 5 (n=5, 3%). The median time until bile leak diagnosis was 4 days post-injury (IQR 2-13 days). Most bile leaks (n=13, 87%) originated from the third-order or more distal biliary branches. Factors associated with a bile leak included the presence of a "cracked liver" pattern of injury (Odds Ratio (OR) 15.6, 95% Confidence Interval (CI) 4.3-57.5), involvement of at least two central segments (OR 8.6, 95% CI 1.9-39.6), liver-directed hemostatic interventions (OR 6, 95% CI 1.9-18.8), and higher liver injury severity grade ($p<0.01$). If a patient had either a hemostatic intervention or a "cracked liver" pattern of injury, the diagnostic sensitivity, specificity, positive predictive value, and negative predictive value for predicting a bile leak were 93%, 73%, 25%, and 99%, respectively.

Conclusion: Our study identified two criteria, one anatomic and one clinical, that, when used together, are highly sensitive and specific for identifying patients at high risk for a bile leak after blunt liver injury. Future external validation of these findings is required.

DRAWN OUT DECISIONS: EVALUATING THE UTILITY OF SERIAL HEMOGLOBIN IN NONOPERATIVE MANAGEMENT OF BLUNT SOLID ORGAN INJURY

Emily H. Johnson, MD; Janet Lee, MD; Michael Cripps, MD; Robert McIntyre, MD; Warren Dorlac, MD; Julie Dunn, MD; Chris Cribari, MD; Nathan Schmoekel, DO; Thomas Schroeppel, MD
University of Colorado Health

Introduction: Nonoperative management (NOM) has replaced operative management (OM) as standard of care for hemodynamically stable blunt solid organ injury (BSOI). NOM involves observation with serial hemoglobin (sHgb) & adjuncts like angioembolization (AE) if needed. This study assessed sHgb utility to predict delayed intervention in NOM.
Methods: A multicenter retrospective study evaluated NOM of BSOI at 3 level 1 trauma centers 2019-2024. Any Organ Injury Scale (OIS) grade spleen, liver, or kidney injury were eligible. Any initial OM was excluded. Cohorts were classified by sHgb testing (sHgb+) defined as ≥6 Hgb values drawn in 48hrs. Primary outcome was delayed intervention [OM/AE]. Secondary outcomes were Hgb nadir, change in Hgb (ΔHgb), ΔHgb first 48hrs (ΔHgb_{48}), hospital & ICU length of stay (LOS). Multivariable logistic regression was performed for the primary outcome. Optimal ΔHgb & ΔHgb_{48} cutoff was determined by Youden's J index.
Results: 996 BSOI patients were managed with NOM. 557 (56%) had sHgb+. The sHgb+ cohort had higher ISS (26 vs 17, $p<0.001$) and higher grade of spleen, liver, & kidney injuries. sHgb+ had larger ΔHgb (4.5 vs 2.2g/dL, $p<0.001$), lower nadir Hgb (8.6 vs 11.6g/dL, $p<0.001$), longer hospital (8 vs 3 days, $p<0.001$) & ICU LOS (3 vs 1 day, $p<0.001$). Delayed intervention was more common for sHgb+ (18.3 vs 7.5%, $p<0.001$). Adjusted analysis found sHgb+ was a predictor for delayed intervention (OR 1.86, CI 1.20–2.89). For predicting intervention, the ΔHgb cutoff was 6.5g/dL (sensitivity 77.1%, specificity 49.4%) while optimal ΔHgb_{48} cutoff was 3.1g/dL (sensitivity 62.1%, specificity 62.5%).
Conclusion: While sHgb decline is associated with delayed intervention in NOM for BSOI, its predictive value is limited. Poor sensitivity & specificity for
ΔHgb cutoffs suggest sHgb trends alone are insufficient, challenging their routine use in NOM of BSOI.

ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY FOLLOWING PENETRATING HEPATOBILIARY TRAUMA: WHO, WHAT, WHEN, WHERE, AND WHY

Tyler J. Murphy, MD; Marissa C. Kuo, MD; Rohan Nigam, BA;
Jill R. Streams, MD; Michael Derickson, MD
Vanderbilt University Medical Center

Introduction: Acute management of penetrating hepatobiliary trauma focuses on hemostasis, with subsequent management of infectious and biliary complications if needed. Post-traumatic biliary complications can be treated with Endoscopic Retrograde Cholangiopancreatography (ERCP), however, ERCP in penetrating liver injury is often performed reactively. In this study we aim to identify characteristics of penetrating liver injuries with elevated risks of bile leaks and create a model to predict the need for early ERCP.

Methods: This retrospective cohort study identified patients with penetrating liver injury at a level 1 trauma center from 2015-2024. Patient demographics and outcomes were adjusted for Injury Severity Score (ISS) and American Association for the Surgery of Trauma (AAST) liver injury grade. Multivariable logistic regression compared indications for ERCP and secondary outcomes of readmission and mortality. Linear regression was used for hospital length of stay (LOS). Nonparametric testing was performed to predict bile leak occurrence using co-variates of central location of injury, admission total bilirubin, initial operative management, and AAST injury grade 4-5.

Results: Of the 402 patients identified with penetrating liver injury, 41 patients underwent ERCP. These patients more frequently suffered from higher grade of global (ISS 29 v. 22; $p < 0.001$) and liver specific injury (AAST grade 4-5 65.9% v. 26.1%; $p < 0.001$), have initial operative management (82.9% v. 67.6%; $p < 0.001$), and be associated with hepatobiliary complications (Odds Ratio [OR] 68.1; $p < 0.001$). Patients most frequently underwent ERCP for bile leak (OR 227.3; $p < 0.001$). The patients who underwent ERCP were more likely to have longer LOS (28.9 v. 10.5; $p < 0.001$) and greater rate of readmission (26.8% v. 8.6%; $p < 0.001$). There was no difference in mortality. When utilizing central location of liver injury, elevated admission bilirubin, initial operative management, and AAST grade 4-5 as a model to predict bile leak, the AUC was 0.78.

Conclusion: Post-traumatic bile leaks are a source of significant morbidity in penetrating liver injury often requiring ERCP. Our novel multimodal predictive model of bile leak may be used to identify patients who would benefit from prophylactic early ERCP.

Poster #47

FREQUENCY OF MONITORING WITH HEMOGLOBIN AND HEMATOCRIT IN PATIENTS WITH BLUNT ABDOMINAL TRAUMA UNDERGOING NON-OPERATIVE MANAGEMENT: A RANDOMIZED CONTROLLED TRIAL

Vikram V. S., MS; Junaid Alam, MBBS, MS; Abhinav Kumar, MS;
Pratyusha Priyadarshini, MS; Dinesh Bagaria, MS;
Narendra Choudhary, MS; Sushma Sagar, MS; Amit Gupta, MS;
Biplab Mishra, MS; Shivam Pandey, PhD; Subodh Kumar, MS
JPN Apex Trauma Center, All India Institute of Medical Sciences, New Delhi

Introduction: Non-operative management (NOM) is the standard of care in patients with blunt abdominal trauma who are hemodynamically stable. Due to the paucity of enough prospective data, there are no set guidelines for the frequency of monitoring for the Hemoglobin (Hb) or Hematocrit (Hct) level during the period of NOM. Recommendations vary from 6-hourly to 24-hour monitoring in the first 48-72 hours of admission. Any significant drop in Hb due to ongoing blood loss will be reflected in the patient's vitals during NOM, questioning the rationale for the scheduled lab monitoring in patients with stable vitals.

Methods: We conducted a randomized controlled trial among patients admitted for NOM of Blunt solid organ injuries in a level 1 trauma center between March 2023 and November 2024. Patients with active contrast extravasation from solid organs, those on anticoagulation therapy, associated pancreatic injury, low Glassgow Coma Score (GCS), Hb at admission < 7g/dL, and/or Hct < 20 or those requiring intervention for associated injuries in the first 72 hours were excluded from the study. Post admission 12 hourly scheduled Hb and Hct assessment was done in the control group till 72 hours of admission (6 blood samples for each patient), whereas in the study group samples were sent within 6 hours of admission and at 72 hours post-admission (2 samples for each patient). Serial clinical monitoring was done in both the groups. With any derangement in vital parameters, an additional sample was sent as necessitated. Failure of NOM, need for blood transfusions, length of hospital stay, and readmission rates were assessed across groups.

Results: A total of 90 patients were recruited and 45 each were randomized to two groups. The majority patients were young adults (18 - 39 years) making up 72% of the participants with road traffic injury as the most common mode of trauma. Demographics, trauma scores, solid organ injuries, and associated injuries were comparable across the groups. Statistical significance was seen with the total number of blood samplings (p value: <0.001) and blood transfusion rates (p value: 0.008). There were no significant differences between mean Hb and Hct levels at admission and their levels at 72 hours post admission. Also, rates of failure of NOM, readmission, and length of hospital stay were not statistically significant. No mortality was observed in either group. Hb and Hct levels reached nadir at 24 hours post-admission followed by recovery even in the non-transfused group. About 47% of the patients who received transfusion in the control group didn't have any deranged clinical parameters. These additional transfusions were attributed to the falling trend of Hb seen during scheduled monitoring in the control group.

Conclusion: Additional sampling during NOM for a period of 72 hours needs to be considered concerning alteration in clinical parameters. With Hb and Hct values reaching nadir at 24 hours post admission a single sampling can be considered. NOM can be safely practiced without scheduled multiple blood sampling if facilities for continuous close monitoring are available, it also avoids unnecessary blood transfusions.

IMPLEMENTATION OF AN INSTITUTIONAL GUIDELINE FOR LAPAROSCOPY IN TRAUMA IS ASSOCIATED WITH INCREASED UTILIZATION AND DECREASED NEGATIVE LAPAROTOMY RATES

Rebecca Zhu, MD; Alyssa Kalustian, MD; Gwendolyn Henry, BS; Eduardo Ortiz, BS; Anirudha Karla, BS; Bradford Scott, MD; James Suliburk, MD; Roberto Vera, MD; Catherine Seger, MD; Marcus Hoffman, MD; Chad Wilson, MD; Ryan Dumas, MD; Martin Zielinski, MD; Jeremy Ward, MD
Baylor College of Medicine

Introduction: Laparoscopy is an important diagnostic modality in select patients presenting with abdominal trauma. Appropriate patient selection is critical, and it is unclear whether clinical practice guidelines increase utilization. We sought to develop and implement an institutional guideline for patient selection for diagnostic laparoscopy (DL). We hypothesized that a guideline would increase its utilization and decrease the rate of negative or non-therapeutic (N/NT) laparotomies.
Methods: This is an institution study of a Level 1 trauma center. The trauma registry was queried for all abdominal explorations in hemodynamically stable (HDS) patients from May 2015 to December 2023. In October 2018, after literature review and divisional expert consensus, an institutional guideline for the use of DL in trauma was implemented outlining candidates and indications based on injury mechanism, physical exam, clinical stability, imaging, and concomitant injuries. Chart review was performed to assess DL utilization, conversion to laparotomy (LAP), N/NT rates, and outcomes before and after guideline implementation.
Results: 962 HDS trauma patients underwent abdominal exploration, n=408 before and n=554 after guideline implementation. 20.5% of patients presented with blunt trauma, 79.6% with penetrating trauma. 22.2% (n=214) started with DL; of these, 34.6% (n=74) required conversion to LAP with 90.5% (n=67) receiving therapeutic intervention. Use of DL increased after guideline implementation (11.0% before to 30.5% after). N/NT LAP rate decreased after guideline implementation (18.1% before to 5.7% after). In the purely DL group (n=140), there were no missed injuries or need for unplanned abdominal exploration; 30% (n=42) had therapeutic intervention. N/NT DL patients had shorter length of stays compared to N/NT LAP patients (4.4 vs. 7.0 days).
Conclusions: DL is safe in select trauma patients and reduces rates of N/NT LAP. The implementation of institutional guidelines can improve the utilization of this modality.

INITIAL CT IMAGING CAN SAFELY GUIDE DECISION FOR SELECTIVE NON-OPERATIVE MANAGEMENT IN PENETRATING LIVER TRAUMA

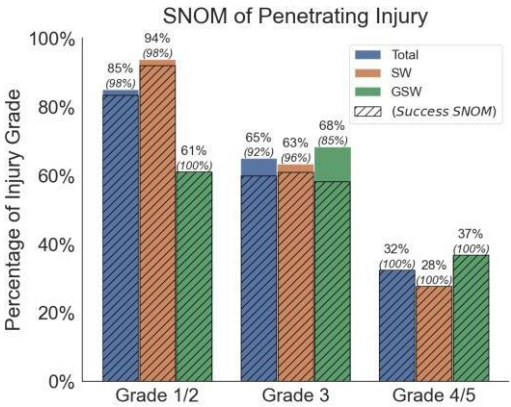
Catherine Beni, MD, PhD; Catherine Campbell, BS; Imam Sanousi, BS; Max Raynor, DO; Samantha Chau, MD; Daniel Stern, MD; Kazuhide Matsushima, MD; Kenji Inaba, MD; Stuart Schroff, MD; Sue Hanks, MD; Matthew Martin, MD; Anaar Siletz, MD, PhD
University of Southern California

Introduction: Initially developed for blunt liver injuries, selective nonoperative management (SNOM) and the AAST-OIS grade system are increasingly applied to penetrating trauma. However, it is unclear if injury grade is predictive of outcomes including SNOM success. We aimed to characterize management and outcomes by grade and mechanism in penetrating liver trauma.

Methods: We examined adults (2015-2023) with liver injuries identified on initial CT scan. SNOM was defined as admission without operative management (OM) or angioembolization (AE); failure was defined as needing OM or AE after admission. We compared patient, injury, and imaging characteristics, management, and outcomes.

Results: Of the 693 patients identified, 165 (24%) had penetrating trauma: 109 (66%) stab wounds (SW) and 56 (34%) gunshot wounds (GSW). 108 (65%) patients underwent SNOM (vs 83% blunt, p≤0.001), 24 (15%) required immediate OM, 26 (16%) required immediate AE, and 7 (4%) required both. SNOM success rate was similar to blunt trauma (96% vs 98%, p=1) and did not differ by injury grade or mechanism (SW vs GSW) (Figure). Only 4 (4%) patients with penetrating injuries failed SNOM; 3 had AE for pseudoaneurysm on routine interval CT and 1 had OM for bleeding. CT findings prior to immediate OM were isolated hemorrhage in 6 (19% all, 50% SW vs 5% GSW, p=0.01), isolated hollow viscus injury in 6 (19% all, 20% SW vs 19% GSW, p=1), and both in 18 (58% all, 30% SW vs 71% GSW, p=0.07).

Conclusion: By identifying penetrating injuries warranting OM, CT imaging may safely guide decision for SNOM. AAST-OIS injury grade was not associated with SNOM failure in penetrating trauma.



ROBOTIC ASSISTED SURGERY (RAS) IS SAFE AND EFFECTIVE IN SELECT TRAUMA PATIENTS IN A SAFETY NET HOSPITAL

Sherry Melton, MD, MSHA; Neonika Fernandes, MD; Jigesh Patel, MD; Parsa Lotfi, MD; Ayoub Hilmi, MD; Paul Fine, MD; Abdelrahman Habiba, MD; Han Oo, MPH; Jacqueline Frankstone, M Ed
NYC Health + Hospitals - Lincoln Hospital

Introduction: Robotic assisted surgery (RAS) offers a new option in minimally invasive surgery (MIS) for select trauma patients in a Level I trauma center with 25% penetrating injury. Laparoscopic exploration is used in patients with stab wounds to determine if injuries require operative management. Isolated injuries are often addressed laparoscopically; however, many cases require conversion to open. The primary goal of this study is to determine if RAS in stable patients with select penetrating injuries is safe. We anticipate improved outcomes compared to laparoscopic MIS including decreased LOS, conversion rates and readmissions.

Methods: Patients with stab wounds who were hemodynamically stable with concern for internal injuries were included in the study. Patients were offered MIS or open exploration. A comparison of Open to MIS groups was performed. A case-control study compared RAS vs LAP groups. The LAP group included all consecutive cases during a three-year period (1/1/22-12/31/24). Characteristics of the groups were delineated, and outcomes compared: number of interventions possible with each modality, conversion rates, LOS, and 30-day readmission rates. Statistical significance analysis was performed using Fisher's exact test.

Results: Fifty-one patients were studied (Open 27, LAP 15, RAS 9). The RAS group had similar ISS compared to Open while LAP had a lower ISS (Open 9.3, LAP 7.6, RAS 9.9). In the RAS group, 67% of patients underwent multiple interventions with no conversions. The LAP group had a high conversion rate (LAP 67%, RAS 0%, p=0.036). The majority of LAP patients requiring conversion underwent a single intervention (70%). The mean LOS was similar for Open and LAP (7.6 vs 7.4); those undergoing RAS had a 1.6-day lower LOS (5.8). Rates of readmissions within 30-days were low for all groups with no readmissions in RAS (Open 7.4%, LAP 6.7%, RAS 0%).

Conclusions: RAS is a safe approach in select trauma patients. RAS allows for management of patients with comparable injuries as seen in those managed open. Larger sample sizes and populations with higher acuity patients need to be studied as surgeons, and trauma centers gain experience. RAS has the potential to decrease post-operative pain, with decreased LOS and return to pre-injury function.

RUN OR RUSH: A DIAGNOSTIC AND THERAPEUTIC APPROACH FOR UNSTABLE TRAUMA PATIENTS

Carlos Alberto Ordoñez; Andrés Gempeler, MD; José Julian Serna, MD; Yaset Caicedo; Mario Barbosa, MD; Maria Isabel Fernandez, MD; Diana Montilla, MD; Alexander Salcedo, MD; Fernando Rodriguez-Holguín, MD; Alberto F. García, MD
Fundación Valle del Lili

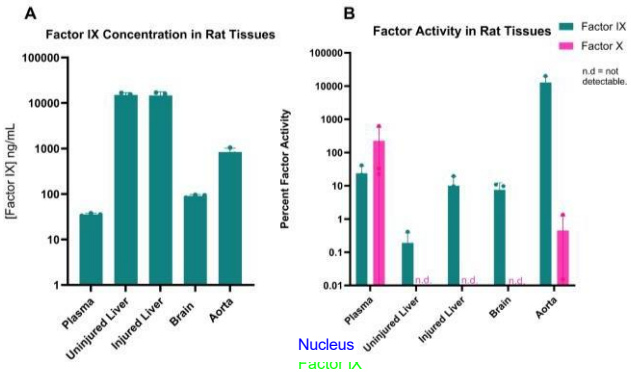
Introduction: We aimed to assess the progressive use of a "Run or Rush" approach in unstable trauma patients based on systolic blood pressure(SBP); where patients with SBP 90 to 70mmHg upon admission or after resuscitation may undergo initial imaging for injury characterization to guide surgical and endovascular interventions ("run"), and patients with SBP<70mmHg undergo immediate surgery after initial assessment if indicated ("rush").
Methods: Cohort study of patients with trauma and hemorrhagic shock (SBP<90mmHg) treated at a level-I trauma center. Severe brain injuries and burns were excluded. We describe trends of imaging, emergent endovascular and surgical interventions, and vital outcomes over 10 a year-period (2012-2021). We used multivariable analyses to assess the effect of recent years on diagnostic and therapeutic decisions. Incidences and association measures are accompanied by 95% confidence intervals (95%CI).
Results: We included 800 patients for analysis: 531 in "run" and 269 "rush" categories upon admission. We observed an increase in CT and angiographies with advancing years, which correlated with a decrease in major surgery and mortality (see figure 1) which were not explained by differences in injury severity nor overall status upon admission. Overall mortality was 14.1% (95%CI: 11.8%-16.8%). Multivariable analysis adjusted by age, type of trauma, and severity by ISS found that admission in more recent years was strongly associated with a higher frequency of imaging, a lower frequency of open surgery, and a lower risk of death (OR= 0.55, 95%CI: 0.34-0.88, p=0.013 for death).
Conclusion: The "run or rush" approach allows injury characterization and improved therapy selection and planning in many unstable trauma patients. Given the availability of current diagnostic and therapeutic tools, this approach can guide practical decision-making in primary trauma assessment with a potential to improve patient outcomes and optimize resources use in trauma settings.

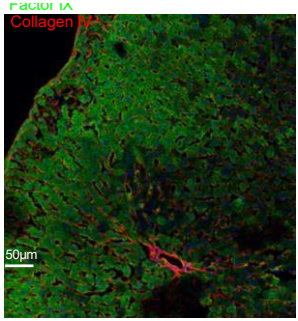
PENETRATING LIVER TRAUMA INCREASES EXTRAVASCULAR FACTOR IX ACTIVITY

Tvisha Subhasish, BS; Morgan Mollen; Patricia Loughran, PhD; Mark Ross; Lauren Jackson, BS; Susan M. Shea, PhD; Matthew D. Neal, MD; Christopher Reed, MD
University of Pittsburgh

Introduction: Factor IX uniquely binds to collagen IV in the vascular basement membrane to create an extravascular hemostatic reservoir throughout tissue. Although extravascular Factor IX is crucial for normal hemostasis, no studies have investigated extravascular Factor IX activity in response to injury.

Methods: Male Sprague-Dawley rats (n=3) were anesthetized and underwent laparotomy. Three hepatic lacerations were made and allowed to hemorrhage for 30 minutes. Animals were sacrificed and perfused with saline. Tissues were homogenized and assayed for Factor IX concentration by ELISA; and for Factor IX and Factor X (control) activities using a PTT-based assay. Confocal microscopy with staining of both Factor IX and collagen IV was performed on tissues from a fourth perfused animal.





Results: Factor IX activity was greater in injured liver lobes than uninjured (A). Interestingly, the amount of Factor in both lobes was nearly identical (B). Activity was very high in aorta commensurate with its robust basement membrane. Factor X activity was expectedly undetectable (liver, brain) or negligible (aorta) in all tissues assayed. Confocal microscopy demonstrated hepatocyte and perivascular Factor IX staining.

Conclusion: Penetrating liver injury potentiates local extravascular Factor IX activity. Other coagulation factors lack this unique tissue reservoir. Further studies should focus on exploiting this reservoir for improved hemostasis and identifying the mechanism of its greater activity.

THE CURRENT SURGICAL MANAGEMENT OF SUBSEQUENT COLON TRAUMA FAILURES: ARE COLOSTOMIES NECESSARY?

Carlos A. Ordonez, MD; Michael W. Parra, MD;
José Julian Serna, MD; Alexander Salcedo, MD; Diana Montilla, MD;
Maria Isabel Fernandez, MD; Andrés Gempeler, MD;
Mario Barbosa, MD; Yaset Caicedo, MD; Carlos A. Serna, MD;
Fernando Rodriguez-Holguín, MD; Alberto F. García, MD
Fundación Valle del Lili

Introduction: The management of colon trauma remains controversial, particularly regarding its complications. Recent studies have reported high mortality rates associated with these complications and have recommended colostomy as the preferred treatment. This study aims to describe the management of colon trauma complications without colostomy and to evaluate the associated clinical outcomes.

Methods: This descriptive study includes patients with colon trauma admitted between January 2022 and December 2024 at a Level I trauma center. We analyzed demographic data, physiological status upon admission, Injury Severity Score (ISS), and surgical management approaches (primary repair, resection with primary anastomosis, and delayed anastomosis). We specifically assessed for anastomotic leak rates and subsequent management strategies. The primary outcomes measured were mortality, hospital length of stay, and colostomy rate at
discharge. Incidences are reported with95% confidence intervals (95% CI).

Results: A total of 88 patients were included, with a median age of 27 years (IQR 20–34); 93% were male. Penetrating injuries accounted for 96.5% of cases. The median ISS was 16 (IQR 10–25), and the median abdominal AIS was 3 (IQR 3–4). Destructive colon injuries were present in 49% (n=43) of cases. Surgical management included primary repair in 38 patients (43%), resection with primary anastomosis in 20 (23%), and delayed anastomosis in 23 (26%). No patient underwent colostomy as the initial management. The anastomotic leak rate was 17% (n=15). Leaks were managed with primary repair and vacuum-assisted closure in 13 patients, and with resection and re-anastomosis in 2 patients, achieving definitive closure in 14 cases. Only one patient required colostomy due to failure of initial management. The median hospital stay was 14 days (IQR 7–27), and the median number of laparotomies was 6 (IQR 5–9). No mortality was reported.

Conclusion: In patients with destructive colon trauma initially managed with primary repair, anastomosis, or delayed anastomosis, the management of anastomotic leaks without colostomy is feasible, safe, and not associated with increased mortality.

Poster #54

EARLY AND LATE FAILURES OF GASTROGRAFIN CHALLENGE TESTING FOR MEDICAL MANAGEMENT OF ADHESIVE SMALL BOWEL OBSTRUCTION

Jamila K. Picart, MD; Patrick L. Johnson, MD;
Raymond A. Jean, MD, MHA MA; Laura Gerhardinger, MA;
Roy J. Golden, MD; Lena M. Napolitano, MD; Mark R. Hemmila, MD
University of Michigan

Introduction: Adhesive small bowel obstruction (SBO) is a leading cause of acute care surgery admissions. Gastrografin challenge (GG) is a combined diagnostic and therapeutic procedure that can help differentiate a partial- from complete-SBO. However, data comparing outcomes of medical management of adhesive SBO with and without GG is limited.

Methods: We performed a cohort study using data from a 12 hospital EGS collaborative from 2021-2024. Index admissions and all subsequent admissions are captured. Inclusion criteria were patients ≥18 yo admitted for adhesive SBO. Patients with an SBO due to metastatic disease or inflammatory bowel disease were excluded. Patients were candidates for GG if they did not undergo operative intervention within 24 hrs of arrival. A positive GG was x-ray confirmation of contrast reaching the colon. Short and long-term outcomes were compared using Chi2 test for patients with a positive GG vs. patients that did not receive a GG (no GG).

Results: Of 5,426 patients presenting on index admission for adhesive SBO 946 (17.4%) underwent immediate operation. 4,480 patients were candidates for GG and 2,550 (56.9%) received a GG test. Of the patients who received GG, 2,043 (80%) had a positive GG. 507 patients failed GG and 293 (57.8%) underwent operation. 165 (8.1%) patients with a positive GG had early failure during index admit resulting in an operation (Table). The no GG group had significantly more operations on index admission and total operations. There were no differences between the positive GG vs. no GG groups for readmission or operation following readmission.

Conclusion: Our multi-institutional study informs short- and long-term results for GG testing and medical management of SBO. A positive GG is associated with less operative intervention on index admission and overall. Readmission rates are similar in positive GG and no GG patients. Interestingly, despite a positive GG indicating partial SBO on index admission, 7% of those patients required operation on readmission.

Table: Outcomes comparing medical management with GG and without GG.

	Positive GG	no GG	*p*-value
N	2,043	1,925	
Operation, admission	165 (8.1%)	395 (20.5%)	<.001
Readmission	351 (8.7%)	316 (20.7%)	0.2
Operation, readmission	134 (7.1%)	120 (7.8%)	0.2
Operation, total	299 (14.6%)	515 (26.8%)	<0.001

Poster #55

EFFECT OF RIB FRACTURE LOCATION ON CLINICAL OUTCOME IN GERIATRIC PATIENTS

Taylor Gong; Adrian Ong, MD; Michael Romeo, DO; Adam Sigal, MD; Traci Deaner, MSN; Alison Muller, MSPH, MLS; Ashley Deng; Zach Mattiola; Liron Fedida; Sharon Shania; Ping-Shou Zhong, PhD; Linxin Liu; David Fang
READING Trauma Center, Tower Health

Introduction: Rib fractures in geriatric patients contribute to a higher mortality and are often complicated by comorbidities, leading to higher ICU admission, pneumothorax, and pneumonia rates. Multiple scoring systems have been created to assist in risk stratifying patients, however, none of these systems utilize rib fracture location as an independent variable. The purpose of this study is to explore whether rib fracture location will provide a more accurate prediction of patient outcome when compared to a standard scoring system, the RibScore.
Methods: Patients ≥65 years-old who presented with rib fractures after blunt trauma on imaging between January 1st, 2016 and May 31st, 2024 at a level 1 trauma center were included. Based on chest Computed Tomography (CT), fracture location was categorized as either anterior, lateral, or posterior. Data concerning demographics, comorbidities, complications (pneumothorax, hemothorax, chest tubes, pneumonia, respiratory failure, intubation, and surgical rib stabilization), and ICU admission were collected. Calculated RibScore, fracture locations, and other clinical and demographic variables (race, age, and Charlson Comorbidity Index) were applied to logistic regression, random forest, and bagging methods to assess importance of RibScore and fracture location on predicting 30-day mortality.
Results: A total of 2,366 patients were identified for the study, with 1,669 meeting the inclusion criteria. In the logistic regression analysis with all the features, both fracture locations and RibScores were selected using the stepwise AIC criterion and the p-values for RibScore, anterior, and lateral fracture are, respectively, 0.007, 0.013, and 0.020. The random forest model ranked the importance of features, revealing that fracture location was more important than RibScore in predicting 30-day mortality across 20 random data splits. When other features were included, the prediction accuracies for adding RibScore only, fracture location only, and both RibScore and location together were 95.20% (94.31%–95.50%), 94.91% (94.15%–95.50%), and 94.76% (93.54%–95.50%), respectively, using random forest. Prediction accuracies using the bagging method were similar to those obtained from random forests.
Conclusion: Rib fracture location alone has similar accuracy compared to RibScore in predicting 30-day mortality in geriatric trauma patients.

Poster #56

EVALUATING THE IMPORTANCE OF LEVEL I/II TRAUMA CENTER CARE FOR LOW-INJURY GERIATRIC TRAUMA PATIENTS: A TQIP ANALYSIS

Arnav Mahajan, MD; Pooja Podugu, MD; Penelope Halkiadakis, BS; Ruchika Kamojjala, BA; Caleb Curry, MPH; Priyash Hafiz, BS; Justin Dvorak, MD; Vanessa Ho, MD, PhD, MPH
MetroHealth Medical Center

Introduction: While it is known that Level I/II (L1/2) trauma centers provide demonstrably better outcomes for severely injured geriatric trauma patients, it is not known if the same is true for those with minor injuries. We hypothesized that older patients with an injury severity score (ISS) < 9 can be safely treated at Level III (L3) centers.
Methods: We conducted an analysis of the Trauma Quality Improvement Program database (2020–2023), identifying trauma patients aged ≥65 years with an ISS < 9. Patients were grouped by treatment at L1/2 versus L3 centers. A "low-acuity admission" was defined as no surgery, no ICU admission, and discharge to home or a skilled nursing facility (SNF) within 4 days. An "unnecessary transfer" was defined as a patient transferred to a L1/2 center who later met low-acuity criteria. Outcomes included in-hospital mortality, length of stay, low-acuity admission proportion, and unnecessary transfer prevalence. Regression was adjusted for age, comorbidities, mechanism, and injured body region.
Results: Of 116,385 included patients, 60.7% were treated at L1/2 centers. Low-acuity admissions were 6.0% at Level I/II centers versus 6.3% at L3 centers (aOR 1.43 [95% CI: 1.28–1.60], p< 0.001). Unnecessary transfers occurred in 2.6% of cases. In-hospital mortality was 1.3% at L1/2 centers versus 1.1% at L3 centers (aOR 0.99 [95% CI: 0.86–1.11], p=0.778), and length of stay was longer at L1/2 centers (4.0 vs. 3.0 days, p< 0.001).
Conclusions: For older trauma patients with minor injuries, management at L1/2 centers is linked to longer stays without clear mortality benefits. In this analysis, over 3,000 patients were unnecessarily transferred to L1/2 centers. These findings support developing protocols to identify patients who can safely be treated at lower-level trauma centers and maximizing resource utilization safely.

Poster #57

GERIATRIC RIB FRACTURE OUTCOMES IN THE MODERN ERA

David Velez, MD; Allison McNickle, MD; Abigail Dickinson, MD; Brenna Chen, MD; Natalia Adamska, MD; Jordan Nichols, MD; Thomas Irons, MD; Christopher Demme, MD; Kevin Petersen, DO
UNLV

Introduction: Rib fractures in the elderly are associated with significant morbidity and each additional rib fracture has shown an increased risk of pneumonia and death. However, the most recent data fully evaluating this effect is outdated using x-ray imaging from the 1980-1990s. CT imaging is now the gold standard in diagnosis and management has evolved. We hypothesized that the mortality would be decreased from those historical reports and evaluated the effect that each additional rib fracture on geriatric outcomes.
Methods: A five-year retrospective review of the trauma registry was performed for all geriatric patients, ≥ 65 years old, admitted to our level one trauma center with rib fracture. Rib fracture descriptions were taken from initial CT imaging. Data was evaluated using both simple and multivariable regression analysis.
Results: Of 709 eligible patients, there was an average of 4.2 rib fractures, 16% were bilateral, and 6% had flail segment. Overall, 67 patients (9%) died. With six or fewer rib fractures, mortality was 7.0% and no significant difference was seen per each additional fracture (OR 0.889, p=0.243). When there were greater than six rib fractures, however, mortality was 20.6% and there was a significant difference per each additional fracture (OR 1.160, p=0.048). Age in years was also significantly associated with increased mortality (OR 1.056, p< 0.001). Flail segment had no significant association with mortality (OR 1.314, p=0.536) although both bilateral fractures (OR 2.088, p=0.004) and pulmonary contusions (OR 2.242, p< 0.001) did. When compared by multivariable logistic regression age, number of fractures, and pulmonary contusion all remained statistically significant.
Conclusions: Outcomes after rib fractures have markedly improved over the last 2-3 decades although it remains a significant challenge. Mortality after rib fracture in the elderly was increased by 5.6% for every additional year of age, 16.0% for every additional rib fracture greater than six, and 124% (over doubled) if pulmonary contusions were present.

Poster #58

ACCESS TO TRAUMA CARE: AN ANALYSIS OF A STATE TRAUMA SYSTEM

Nicolas Medrano, MS; Elizabeth Atkins, MSN, RN, TCRN;
Eileen M. Bulger, MD, FACS; James Dunne, MD, FACS;
Dennis Ashley, MD, FACS; Courtney Terwilliger, BA, EMT-P;
Michelle Price, PhD
Coalition for National Trauma Research

Introduction: Access to timely trauma care is critical for trauma patients, as it directly impacts survival rates, recovery outcomes and long-term quality of life. We built a system-based geographic information system (GIS) model in a state to analyze accessibility to trauma care within 60 minutes, identify gaps in coverage, and identify locations where new facilities would maximize accessibility. This model estimates the total prehospital interval, from the time the 9-1-1 call was received to the time the patient arrived at the nearest trauma center.

Methods: A system-based GIS model was built for a state and includes ground EMS, air EMS, and designated level 1-4 trauma center locations. We used US Census block group population-weighted centroids to determine the population access within 60 minutes. We utilized median dispatch and on-scene times from a previous National Emergency Medical Services Information System (NEMSIS) analysis. Response and transport times were calculated using ArcGIS Pro.

Results: Population access to level 1-2 trauma centers using the existing ground EMS infrastructure was 64.9%. When air EMS was added, population access increased to 94.1%. When the optimal trauma center upgrade was identified, accessibility increased to 66.3% and 96.0% using ground and air resources, respectively. Access to level-1-4 trauma centers using the existing ground EMS infrastructure was 80.8%. When air EMS was added, access increased to 98.6%

Conclusion: Using GIS models to identify gaps within the state trauma system is essential for effective planning, enabling policymakers and healthcare providers to allocate resources strategically and improve access to timely, lifesaving care.

Population accessibility to trauma care within 60 minutes utilizing EMS and trauma infrastructure (total time from 911 call to patient arrival at trauma center) after the optimal trauma center is upgraded one level.

Trauma Center Level	Population (Percent)	
	Ground EMS	Air EMS
Level 1-2	6,947,081 (64.9)	10,008,103 (94.1)
Level 1-2 w/ Upgrade	7,100,889 (66.3)	10,280,157 (96.0)
Δ	+153,808 (1.4)	+272,054 (1.9)
Level 1-3	8,088,017 (75.5)	10,443,562 (97.5)
Level 1-3 w/ Upgrade	8,132,849 (75.9)	10,505,918 (98.1)
Δ	+44,832 (0.4)	+62,356 (0.6)
Level 1-4	8,658,543 (80.8)	10,561,132 (98.6)
Level 1-4 w/ Upgrade	8,747,993 (81.7)	10,679,256 (99.7)
Δ	+89,450 (0.9)	+118,124 (1.1)

Poster #59

THE GOLDEN HOUR IS ELUSIVE IN RURAL TRAUMA: A 10-YEAR ANALYSIS FROM A LEVEL 1 TRAUMA CENTER IN THE RURAL NORTHWEST

Jung Gi Min, MD; Michael Englehart, MD; Gordon Riha, MD;
Craig Palm, MSN; Simon Thompson, PhD
Billings Clinic

Introduction: The majority of trauma care guidelines are derived from data based in urban settings, where trauma patient transfers to a tertiary center average 60 minutes or less. However, this "golden hour" is an elusive goal in the rural Northwest, in part due to complex injury mechanisms, long transportation times, harsh weather, and varying levels of pre-hospital care. Thus, further studies are required to identify and describe the barriers to trauma care in this underserved region.

Methods: A 10-year retrospective analysis (2012-2022) of the trauma registry at a rural Northwest tertiary trauma center was performed. All trauma activations were categorized based on transfer status and Rural and Urban Commuting Area (RUCA) codes. Basic patient demographics, time and distance to definitive care, available providers and mortality were compared.

Results: Of the 4545 trauma activations included, transfer patients accounted for 47.3%. 81.5% of transfer patients were from areas with RUCA designation 7-10 (small and isolated small rural towns). For transfer patients, the EMS arrival time from injury was 57.5 (43.5, 71.2) minutes, time to arrival at the initial facility was 2.0 (1.9, 2.3) hours, time to arrival at the tertiary facility was 7.2 (6.8, 7.3) hours, and transportation distance to the tertiary facility was 188.4 (174, 192.7) miles. Overall transfer all-cause mortality was significantly higher than direct presentations on univariate regression (5.0% vs. 3.0%; $p < 0.0001$), explained by transfer patients presenting with higher injury severity scores (14.5 vs. 8.3; $p < 0.0001$). Of the transferring facilities, urban centers were more likely than isolated rural centers to have on-call trauma surgeons (93.2% vs 12.6%), general surgeons (93.5% vs 29.8%) and APPs (99.7% vs 89.3%).

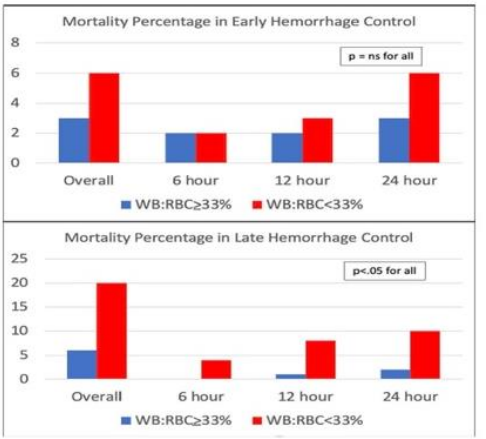
Conclusion: This single-center 10-year retrospective analysis represents the largest real-world data examining trauma transfer and mortality outcomes in the rural Northwest. Transfers from this region traverse significantly greater distances and take longer than what is described elsewhere in the United States, thus making the first "Golden hour" an elusive goal. Furthermore, the initial point of contact in the most isolated rural facilities comprise more often of APPs than surgeons. Future studies will utilize state-wide data to focus on elucidating the contributing variables to delayed transfers and poorer health outcomes.

Poster #60

WHEN SECONDS COUNT: THE IMPACT OF TIME TO HEMOSTASIS ON USE OF WHOLE BLOOD IN PATIENTS WITH TRAUMATIC HEMORRHAGE

Joshua Dilday, DO; Shea Gallagher, MD; Kazuhide Matsushima, MD; Kenji Inaba, MD; Joshua Hazelton, DO; John Oh, MD; Jennifer Gurney, MD, FACS; Matthew Martin, MD
MCW

Introduction: Whole blood (WB) transfusion and early time to hemostasis (TTH) have both been associated with improved outcomes for trauma patients in hemorrhagic shock. Increased WB:RBC ratios have been shown to improve mortality but its benefit in the context of TTH has not been evaluated.
Methods: Secondary analysis of a prospective multicenter study was performed. Patients receiving an intervention were grouped by the TTH (early ≤60 min; ERY vs. Late LTE; >60 min; LTE) and grouped according to WB:RBC resuscitation strategies. Multivariable regression models assessed the relationships between WB:RBC, TTH, and mortality.
Results: 579 patients (ERY 40% vs LTE 60%) were identified. The ERY group had fewer deaths (5% vs. 12%; p< 0.05) and received less WB (2u vs.1u; p< 0.05). WB:RBC≥33% within ERY showed no mortality benefit compared to a WB:RBC< 33% strategy (Figure). In contrast, WB:RBC≥33% demonstrated increased overall and interval survival in the LTE group (Figure). Among all patients, early TTH and WB:RBC≥33% were independently associated with decreased odds of death. (.3 [CI .2-.7] and .3 [CI .2-.6], respectively; p< .05 for both). However, when separated by time to hemostasis WB:RBC≥33% was only a factor of decreased mortality in the LTE group (.3 [.2-.6], p< .05).
Conclusion: Increased WB:RBC transfusion ratio was independently associated with survival in late, but not early, hemorrhage control. Both TTH and WB ratios should be included in future analyses of WB use and resuscitation outcomes.



Poster #61

TRAUMA PATIENTS WHO DEVELOP VTE DEMONSTRATE INCREASED VWF ANTIGEN LEVELS COMPARED TO NON-VTE PATIENTS EARLY AFTER INJURY

Sergio M. Navarro, MD; Riley Thompson, BS; Alex Tischer, PhD; Laurie Moon-Tasson; Taleen MacArthur, MD; Grant Spears, BS; Kent Bailey, PhD; Jing-Fei Dong, MD, PhD; Rosemary Kozar, MD, PhD; Matthew Auton, PhD; Myung S. Park, MD
Mayo Clinic Rochester

Introduction: After trauma, Von Willebrand factor (VWF) is released into circulation and cleaved by ADAMTS-13, preventing the accumulation of prothrombotic unusually large multimers of VWF. We aimed to quantify VWF antigen, Rapid Enzyme Assays for Autoimmune Diseases (REAADS) activity of VWF, and ADAMTS-13 antigen in trauma patients and correlate their levels to the development of VTE.
Methods: Trauma patients presenting to a Level I Trauma Center had samples collected within 12 hours of time of injury, with symptomatic VTE determined based on imaging or autopsy. Plasma concentrations of VWF antigen, REAADS activity of VWF, and ADAMTS-13 antigen were assessed. Data are presented as median [IQR] or n (%), with Wilcoxon Rank-Sum or Fisher's exact tests conducted.
Results: A total of 396 trauma patient samples were analyzed (49.7 years [33.7, 64.1], 74.2% male, 94.2% blunt, ISS 17 [10, 27]): 103 pts with VTE to 293 with non-VTE. VWF Ag levels (5.06 ng/mL [3.68, 7.10], 4.22 ng/mL [3.06, 5.69], $p< 0.001$) were significantly greater in trauma patients who developed VTE as compared to those who did not, as was REAADS activity (203.3% [148.6, 302.4], 148.3% [104.2, 203.8], $p< 0.001$). ADAMTS13 levels were not significantly different (6.87 ng/mL [5.32, 8.35], 6.92 ng/mL, [5.81, 8.46], $p=0.58$). The ADAMTS13/VWF ratio was lower in VTE vs non-VTE (1.29 [0.90, 1.79] vs. 1.68 [1.10, 2.27], $p< 0.001$).
Conclusion: We demonstrate that VWF levels are greater and ADAMTS13/VWF ratios are lower in patients who developed VTE. Though prior studies have shown trauma patients have greater VWF levels and lower ADAMTS13:VWF ratios, this is the first study to demonstrate such correlation with VTE.

Poster #62

THE BIG CRITERIA: ADDITIONAL MEDICAL RESOURCES NEEDED FOR THE COMORBID PATIENT

Neesha Patel, MD; Chris Alving-Trinh, MD; Charles Wilkins, MD; Kayla Torrez Chang, MD; Marlene Hernandez, MD; Nick Faunce, MD; Vue Yeng; Jessica Gallegos; James Davis, MD; David Jeffcoach, MD
University of California, San Francisco-Fresno

Introduction: Recent literature suggests that using the Brain Injury Guidelines (BIG) can allow low-grade traumatic brain injuries (TBI) to be managed safely without neurosurgical consultation or offered early discharge without transfer to a trauma center. However, TBIs can be indicators of baseline frailty in the comorbid patient. We hypothesize patients with increased comorbidity burden who are categorized into BIG 1 and 2 require further evaluation by in-patient ancillary services for possible need of additional care after discharge.
Methods: This is a retrospective review of head injury patients at a Level 1 Trauma Center from 2018 to 2022. Patients < 18 years of age, GCS < 13 at presentation, or those with negative imaging were excluded, and remaining patients were stratified by BIG 1, 2, or 3. For BIG 1-2, we calculated their Charlson Comorbidity Index (CCI), assessed utilization of ancillary services ((Physical Therapy (PT), Occupational Therapy (OT), and Speech Language Pathology (SLP)), and examined patient outcomes including length of stay (LOS), readmission, and disposition.
Results: 5949 head injury patients were identified in the trauma registry. 3438 patients were excluded based on the above criteria. 792 BIG1 and 2 patients and 1719 BIG3 patients were identified. BIG3 patients had higher rates of SNF (18% vs 10%), rehab (14% vs 8%), and death (8% vs 1%) compared to BIG1 and 2 ($p < .001$). One-year readmission rates were 24% for BIG1 and 2, and those identified with increased comorbidity burden had an increased one-year readmission rate ($p < .001$). Eighteen percent of BIG1 and 2 patients were discharged to SNF or rehab.
Conclusion: While BIG has refined the management of TBI patients, this study found BIG1 and 2 patients with increased comorbidity burden may require additional care at time of discharge. This would suggest comorbid BIG1 and 2 patients should not remain at hospitals without appropriate ancillary services.

Poster #63

VARIABILITY IN CT UTILIZATION AND AT-RISK SUBGROUPS FOR SUBOPTIMAL IMAGING IN OLDER BLUNT TRAUMA PATIENTS: A LATENT CLASS ANALYSIS

Penelope Halkiadakis, BS; Ruchika Kamojjala, BA;
Caleb Curry, MPH; Arnav Mahajan, MB, BCh, BAO;
Priyash Hafiz, BS; Vanessa Ho, MD, PhD, MPH
MetroHealth Medical Center

Introduction: A lack of evidence-based imaging protocols for the older blunt trauma patient may perpetuate variation in trauma care. We hypothesized that distinct subgroups exist with varying risks of suboptimal imaging secondary to variation in CT imaging practices.
Methods: From a prospective study (11/2020 - 12/2021) of blunt trauma patients ≥65 years at 18 Level I/II trauma centers, subgroups were created via latent class analysis (Fig 1). CT region scanned (Head, C-Spine, Chest, Abd/Pelvis, T/L-Spine) and suboptimal imaging rates were compared using chi-square tests. Suboptimal imaging was defined as CT scans not obtained during the initial work-up needed to identify the full scope of injuries listed in the patient's Abbreviated Injury Scale codes at discharge.
Results: Among 1,075 patients, three latent classes were identified: Low-Risk Trauma (LRT), High-Risk Trauma (HRT), Transferred Trauma (TT) (Fig 1). CT regions scanned varied by subgroup (all $p< 0.001$). HRT had the lowest rate of suboptimal imaging (LRT: 14.3%, HRT: 6.1%, TT: 15.2%, $p < 0.001$) despite fewer CT Chest and Abd/Pelvis. Across all subgroups, T/L-spine had the most suboptimal imaging (LRT: 12.4%, HRT: 3.6%, TT: 9.5%, $p< 0.001$).
Conclusion: Among older blunt trauma patients, LRT and TT patients face the highest risk of suboptimal imaging. Evidence-based imaging strategies tailored to these at-risk subgroups are desperately needed.

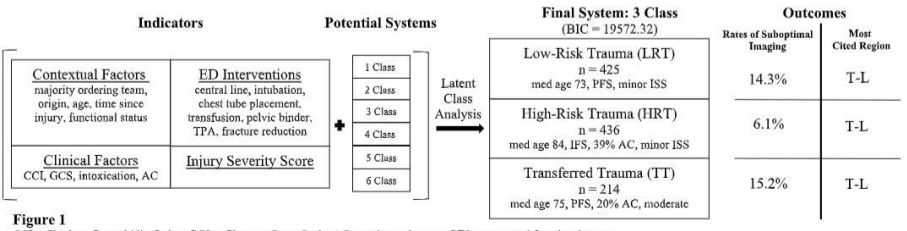


Figure 1
CCI = Charlson Comorbidity Index, GCS = Glasgow Coma Scale, AC = anticoagulant use, PFS = preserved functional status, IFS = impaired functional status, ISS = injury severity score (1-8 = minor, 9-15 = moderate)

Poster #64

INTEGRATING TRAUMA TRANSFERS: HOW THE 4C FRAMEWORK BROUGHT TOGETHER TWO LEVEL I TRAUMA CENTERS

Michael DeWane, MD; Ikemsinachi Nzenwa, MBChB, MSc; Yasmin Arda, MD; Vahe Panossian, MD; Casey Luckhurst, MD; Jonathan Parks, MD; Joshua Ng, MD; Haytham Kaafarani, MD, MPH; George Velmahos, MD, PhD; Kyan Safavi, MD, MBA
Massachusetts General Hospital

Introduction: The merger of two major academic medical centers (AMCs) & level I trauma centers in Massachusetts created an opportunity to enhance how patient transfers are managed. This also provided a challenge to what previously had been two separate transfer and triage pathways. This study explores the first year of a system-wide center dedicated to streamlining transfers for trauma and acute care surgery (TACS) patients needing advanced care.
Methods: The Patient Transfer Access Center (PTAC) was developed in 2023 to optimize TACS transfers within our hospital system (Figure 1). Transfers are triaged by clinical urgency and directed based on the 4C framework: patient/provider choice, continuity of care, AMC capacity, and AMC capability. If all four factors align, transfers rotate between AMCs.
Results: From 2023 to 2024, PTAC managed 2,514 TACS transfer referrals, of which 78% were single-system trauma. Most referrals were out-of-system (74%) and of critical priority (63%). PTAC completed 69% of transfers, while 17% were canceled and 14% declined. Among completed transfers, 23% required ICU care. The top selection factors for AMCs were choice (42%), rotation (33%), and capability (14%). AMC 1 received 54% and AMC 2 received 45% of total transfers respectively. Ninety-five transfers were pivoted to a different AMC than initially selected by PTAC, with 70% to AMC 1. On average, transfer requests were completed in 41 ± 15 minutes.
Conclusion: The PTAC ensures a non-competitive, transparent, and patient-centered transfer process. This system has the potential to reduce declined transfers and transfer delays, ease provider burden, and ultimately enhance the patient experience.

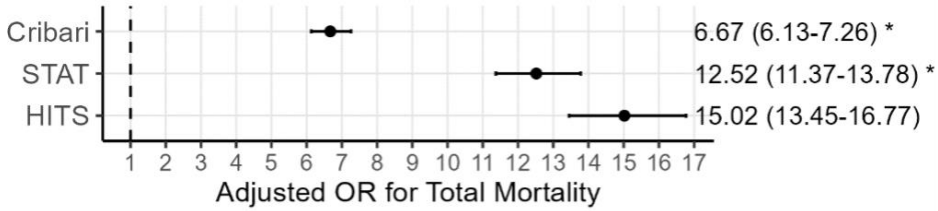
Poster #65

MEASURING WHAT MATTERS: REDEFINING UNDERTRIAGE USING TRAUMA TEAM ACTIONS

Samir M. Fakhry, MD; Yan Shen, PhD;
Alessandro Orlando, PhD, MPH; GAC Research Study Group
Center for Trauma and Acute Care Surgery Research, HCA Healthcare

Introduction: Evaluating triage efficiency, particularly undertriage (UT), is an important quality activity for trauma centers (TCs) and supports selection of optimal trauma activation (TA) criteria. This study aimed to compare two existing methods to a novel method using 8 High Intensity Time Sensitive (HITS) interventions adapted from TQIP process-of-care measures.
Methods: This multicenter, retrospective study identified trauma patients admitted 2017–19 using NTDB files with TA status: full TA (fTA+) or non-full TA (fTA–). UT rate was assessed using Cribari (ISS >15 & fTA–), STAT (Cribari UT & NFTI+), and HITS (HITS+ & fTA–); UT denominator was all fTA– patients. Among fTA– patients, UT patients were compared to appropriately triaged (AT) patients on total mortality (in-hospital death+hospice) using multivariable generalized linear mixed models.
Results: 37 Level I/II TCs enrolled 158,696 patients (88.0% blunt, 21.7% fTA+, median age=55, median ISS=9, 4.4% total mortality). UT rate was lowest using the HITS method (3.8%) vs. STAT (5.1%) and Cribari (11.1%). Compared to Cribari or STAT, HITS method showed significantly higher adjusted odds ratio for total mortality in UT vs AT (Fig).
Conclusions: Compared to Cribari and STAT, HITS not only reduced the number of patients categorized as UT but also isolated those at the highest risk of mortality. Thus, HITS provides a streamlined, data-driven means to calculate UT rates using registry data and guides PI reviews to patients who were not fTA but might have benefited from full trauma team intervention.

Fig. Odds of Total Mortality: Under vs. Appropriate Triage



Note: Models adjusted for linear and quadratic age, sex, injury mechanism, hospital; asterisk (*) shows HITS's association was significantly stronger than Cribari's and STAT's.

Poster #66

OPTIMIZING TRAUMA SYSTEMS FOR BOTH QUALITY AND EQUITY: A NOVEL FRAMEWORK USING POPULATION-BASED REGISTRY DATA

Xiaonan Sun, PhD; Rebecca Maine, MD, MPH;
Joshua Brown, MD, MSc, FACS; Shan Liu, PhD
University of Washington

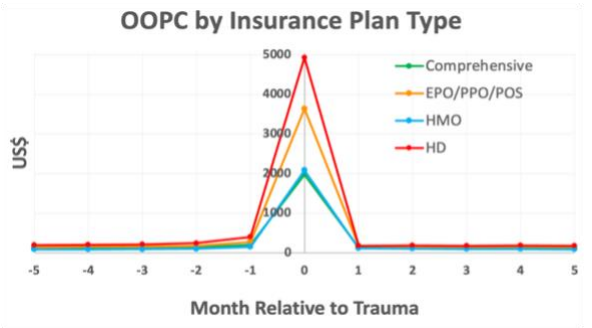
Introduction: Optimizing trauma systems requires balancing competing priorities. While geospatial access is well-studied, less attention has been paid to how different optimization approaches impact care quality and equity across diverse patient populations. This study developed a systematic framework to optimize statewide trauma systems based on cared delivery quality and population equity.
Methods: Using 2017-2020 data from Pennsylvania Trauma Outcome Study registry, we evaluated the performance of 30 Level I/II trauma centers with 103,362 patients. Our assessment included standard quality metrics and equity measures. Principal component analysis built a quality index from 0 to 1. We built optimization models to set performance targets for quality indices across hospitals, exploring how prioritizing larger populations versus vulnerable groups impacts system-wide performance. We reformulated the models as mixed-integer linear programs.
Results: When optimization prioritized larger population groups, the overall system care quality performance, weighted by population size, improved by 4.4% (quality index 0.716 vs 0.686) but maintained existing disparities. In contrast, prioritizing vulnerable populations improved care quality for the worst-performing group by 15.5% (quality index 0.580 vs 0.502) but resulted in a lower peak performance across the system.
Conclusion: This analysis demonstrates that trauma system optimization strategies that improve overall performance may not address - and could potentially exacerbate - disparities in care delivery. Different optimization approaches reveal an inherent tension between maximizing overall system performance and ensuring equitable access to high-quality care with implications for resource allocation. System leaders need to explicitly consider equity alongside traditional quality metrics when making decisions about resource allocation and system design.

Poster #67

OUT OF POCKET COSTS AMONG WORKING-AGE ADULTS FOLLOWING INPATIENT ADMISSION FOR TRAUMATIC INJURY: A NATIONWIDE ANALYSIS

Simeng Wang, MD; Joshua Grab, MS; Katherine Arnow, MS;
Kathryn Taylor, MD; Hannah Hae, PhD;
John Scott, MD, MPH; Lisa Marie Knowlton, MD, MPH
Stanford University

Introduction: Limited research available on the financial hardship of working-age privately insured trauma patients requiring inpatient admission.
Methods: We analyzed private payer claims from the Merative™ Marketscan® Commercial and Health and Productivity Management Databases for working-age patients aged 18-64 admitted for traumatic injuries (2013-2022) with 24 months continuous enrollment peri-trauma. Out-of-pocket costs (OOPC) included all deductibles, coinsurance, and copayments. Month-to-month OOPC changes were evaluated 12 months pre- and post-admission. Patients were stratified by Injury Severity Score (ISS), age group, or insurance plan type. Unadjusted differences in OOPC during admission were compared using Wilcoxon rank-sum test.
Results: Among 226,596 patients, most OOPC occurred during admission, dropping to slightly above pre-trauma levels by one-month post-trauma and returned to baseline by five months. OOPC were highest among patients with profound injury (ISS >24: $3,993) vs. ISS< 9 ($3,604), 9-15 ($3,426), and 16-24 ($3,495) (P< .001). Older patients (age 55-64: $3,418) had lower OOPC than younger groups (age 18-34: $3,705; 35-44: $3,714; 45-54: $3,724) ($P$< .001). Significant differences were observed across insurance plan types (P< .001) with high-deductible plans having the highest OOPC ($4,930) and comprehensive plans having the lowest ($1,979) (Figure).
Conclusion: Among privately insured trauma patients, high injury severity, younger working-age individuals on high-deductible insurance plans are at risk for greater OOPC, potentially contributing to longer-term financial toxicity.



Poster #68

EVALUATING AI SUPPORT IN TRAUMA CARE: INSIGHTS FROM THE TRAUMA CHATBOT SYSTEM AT A LEVEL II TRAUMA CENTER

Laura Roberson, DO; Karim Jreije, DO; Ari Solomon, DO;
Javier Romero, MD; Graal Diaz, PhD
Ventura County Medical Center

Introduction: The integration of artificial intelligence in clinical settings has the potential to revolutionize trauma care by providing rapid access to established guidelines. The Trauma Chatbot was developed to assist healthcare professionals in navigating trauma management protocols at a level II trauma center. This study aimed to evaluate the functionality of the Trauma Chatbot among trauma care providers, specifically assessing its performance in adhering to clinical guidelines and identifying any inaccuracies in its outputs. The chatbot can improve its performance over time by employing machine learning techniques, and intense learning, through continuous learning from user interactions.

Methods: A comprehensive evaluation was conducted with residents and attending physicians from our institution's trauma care team. Participants were asked to engage with the Trauma Chatbot by scanning a QR code, which directed them to the chatbot system. They were asked to input clinical scenarios related to trauma management, each requiring an appropriate response based on institutional established protocols. The scenarios included a variety of trauma situations, such as blunt chest trauma, suspected pelvic fractures, and head injuries. The chatbot's responses were analyzed for accuracy, relevance, and completeness, focusing on detecting hallucinations (inaccurate outputs) and drift (deviation from clinical context).

Results: A total of 70 prompts were used to train and evaluate the performance of the AI Trauma Chatbot. The chatbot demonstrated a 0% rate of hallucinations and drift, indicating that it consistently provided accurate, guideline-based information relevant to the scenarios presented. However, 3 out of the 70 responses were noted to be incomplete, primarily due to vague prompts from participants. When the chatbot was prompted to provide 5 pieces of information not in the clinical practice guidelines, it consistently stated, "I cannot answer that prompt as it is not in the trauma clinical practice guideline."

Conclusion: This study showed that the Trauma Chatbot using clinical practice guidelines as a data source, can provide specific accurate and reliable responses without hallucinations and drift, thus, becoming a reliable tool for trauma care providers. Future enhancements should focus on refining the chatbot's capacity to handle more complex and nuanced queries, ensuring it remains an invaluable resource for clinicians in real-world fast-paced settings.

Poster #69

PHYSICIAN-STAFFED AIR MEDICAL TRANSPORT OF TRAUMA PATIENTS: WHO IS A CANDIDATE?

Ryo Yamamoto, MD, PhD; Ramon Cestero, MD;
Brian J. Eastridge, MD FACS; Keitaro Yajima, MD; Akira Endo, MD, PhD;
Kazuma Yamakawa, MD, PhD; Junichi Sasaki, MD, PhD
Keio University

Introduction: Air medical transport has been utilized for trauma patients across the world. However, the benefit of physician presence during air transportation remains controversial particularly for civilian victims, and small studies with different prehospital medical systems reported conflicting results. We aimed to elucidate optimal candidates for physician-staffed air transport by examining survival benefits depending on physiological status.
Methods: A retrospective observational study was conducted using a nationwide Japanese trauma database, including trauma patients aged ≥ 18 years who were transported by air medical services to ≥ 250 institutions in 2019-2022. Patients were divided into two groups with and without deteriorated physiological signs at the scene (systolic blood pressure < 90 mmHg, respiratory rate < 10 or ≥30 per min, and/or Glasgow Coma Scale [GCS] ≤12). In each group, survival to discharge was compared between patients transported by physician- and non-physician-staffed air medical services. Potential differences in patient characteristics between physician- and non-physician staffed air medical transportation were balanced using inverse probability weighting which adjusted age, comorbidities, mechanism and severity of injury, vital signs at the scene, transportation time, and institutional and regional differences in management of trauma patients.
Results: Among 6,076 patients included in this study, 2,227 (36.7%) had at least one deteriorated physiological sign at the scene. Physiologically deteriorated patients (median GCS=11 and Injury Severity Score [ISS]=22) showed a higher survival rate in physician-staffed transportation than in non-physician-staffed transportation (73.1% vs. 64.9%; adjusted odds ratio, 1.47 [1.29-1.67]; $p < 0.001$). Conversely, patients without any deteriorated physiological signs (median GCS=15 and ISS=16) had a lower survival rate when transported by physician-staffed services (95.5% vs. 98.5%; adjusted OR, 0.32 [0.23-0.45]; $p < 0.001$). During air transportation, intubation and transfusion were more frequently conducted by physician-staffed services regardless of the presence of deteriorated physiological signs at the scene.
Conclusion: Physician presence during air transportation may be beneficial for physiologically deteriorated trauma patients.

Poster #70

SURVIVING PENETRATING TRAUMA: A RACE AGAINST TIME? A NATIONAL ANALYSIS OF EMS VS. PRIVATE TRANSPORT

Hadi S. Hamdan, MD; Ahmad S. El Nouiri, MD;
Milosh Djuric, MS; Jeffrey L. Johnson, MD
Henry Ford Health System

Introduction: Prehospital management of penetrating injuries is critical and while EMS is the standard mode of transport, some patients arrive in private vehicles, receiving limited prehospital care. Recent studies suggest private transport has a lower adjusted risk of mortality with this advantage often attributed to shorter hospital arrival times, however, this is largely speculation without data. Using the largest and most recent US national trauma dataset, this study examines EMS versus private transport on mortality and evaluates hospital arrival time as a potential confounder. Our hypothesis was that, when adjusting for shock, time and severity of injury, there would be no difference between the modes of transport.
Methods: Using the 2019-2023 TQIP database, 370,646 patients aged ≥16 years with penetrating trauma transported by EMS or private vehicle were included. Age, sex, race, shock index, NISS, and total GCS were used to determine risk adjusted mortality rates. A subgroup analysis of patients with recorded hospital arrival time was conducted.
Results: Most patients (77.6%) were transported by EMS, while 22.4% arrived via private transport. Unadjusted mortality was lower in private transport (2.0% vs. 12.0%, $p< 0.001$). When adjusting for demographics and injury severity using multivariable analysis, private transport remained associated with 37% lower mortality (OR=0.633, $p< 0.001$). In a subgroup of 171,799 patients, adding hospital arrival time to the regression model did not explain this survival difference, as private transport still had lower mortality risk (OR=0.469, $p< 0.001$).
Conclusion: Private transport was associated with lower mortality risk than EMS in penetrating trauma, even after adjusting for injury severity. Hospital arrival time did not change this, suggesting other confounding variables. These findings highlight the need to reassess prehospital triage, transport strategies and, potentially, EMS interventions.

Poster #71

THE CONTEMPORARY US PROMPT STUDY COMPARED TO THE UK REBOA TRIAL

Ernest E. Moore, MD; Matthew Vassy, MD, FACS;
Alison Smith, MD, PhD; Michal Radomski, MD;
Kaushik Mukherjee, MD; Bradley Dennis, MD;
Stephen Gondek, MD, MPH; Jorge Lopez, PhD; Jessica Raley, PhD;
Andrew Beckett, MD, FACS; Jonathan Nguyen, DO
Denver Health Medical Center

Introduction: The recent UK trial concluded REBOA was ineffective based on 19 balloon deployments in 16 institutions over a 5-year period. The pREBOA-PRO (pREBOA) was designed for partial occlusion and piloted in selected centers with a formal educational program. The NIH recommends 6-hour mortality as the key endpoint for studies designed to prevent hemorrhage related death. We hypothesized that 6-hour mortality would be lower in the US Partial REBOA Outcomes Multicenter Prospective (PROMPT) study than reported in the UK REBOA trial.
Methods: Inclusion criteria were similar for US PROMPT study and the UK REBOA trial. In the prospective US study, there were 113 patients enrolled in 7 trauma centers from 04/2023 – 10/2024. The primary endpoint was mortality at 6 hours. Kaplan-Meier survival was employed to assess timing of death.
Results: In the UK trial 0.24 REBOAs/Institution/year were inflated compared to 10.8 REBOAs/Institution/year in the PROMPT study. Systolic blood pressure at REBOA initiation was 80mmHg in the PROMPT study and 85mmHg in the UK trial, while age was similar (46). The 6-hour mortality with pREBOA in the PROMPT study was 11.6% versus 28.2 % in the UK trial. The Kaplan-Meier profiles demonstrate the lack of early control of fatal hemorrhage in the UK experience contrasted to the US outcomes.
Conclusions: The contemporary experience with the pREBOA in the US indicates more effective hemorrhage compared to UK approach. These data challenge the translation of the UK REBOA study to the US.

Poster #72

ASSESSING THE PERFORMANCE OF UPDATED PREHOSPITAL TRIAGE GUIDELINES WITH THE NEED FOR TRAUMA INTERVENTION (NFTI) METRIC

Tyler Johnston; Dina Filiberto, MD; Peter Dephillips;
Chandler Morel; Emily Lenart, DO; Peter Fischer, MD;
Andy Kerwin, MD; Saskya Byerly, MD
University of Tennessee Health Science Center

Introduction: Pre-hospital triage can have major consequences for patients and trauma caregivers. Over-triage can lead to strain on resources and burn-out, and under-triage (UT) can result in treatment delays and poor outcomes. The study aimed to assess the sensitivity (SN) of the updated 2021 Field Triage Guidelines (FTGs) related to Need for Trauma Intervention (NFTI) and compared to local trauma activation criteria (TAC).

Methods: We retrospectively reviewed level 1 trauma center patients from 6/1/23-7/31/23 transported by fire department with other transport types excluded. Data on pre-hospital vitals, injury characteristics, and mechanism were recorded and patients were classified as meeting Red Criteria (RC) or Yellow criteria (YC) based on FTGs. Data from hospital course were used to record NFTI: pRBC within 4 hours, operating room within 90 minutes, interventional radiology, ICU length-of-stay $\geq$3 days, mechanical ventilation within 3 days, or death within 60 hours. SN, specificity (SP), positive predictive values (PPV), and negative predictive values (NPV) were analyzed for RC and YC as well as TAC. Lastly, a multivariable logistic regression (MLR) assessed covariates associated with UT.

Results: Of 319 patients, 163 met RC, 121 met YC, and 91 were NFTI positive. RC had SN: 79%, SP: 60%, PPV: 44%, and NPV: 88%. RC and YC combined had SN: 89%, SP: 34%, PPV: 35%, and NPV: 89%. MLR showed UT by TAC were more likely to have blunt mechanism (AOR: 9.45, 95% CI: 1.22-73.09, p=.03) and less likely to have met RC or YC (AOR:0.06, 95% CI: 0.01-0.79, p=.03). There was no difference in Glasgow Coma Scale score, age, Injury Severity Score, or shock index. UT patients were NFTI+ most often for mechanical ventilation followed by pRBC transfusion (see table).

Variables	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Red Criteria	79	60	44	88
Yellow Criteria	47	66	36	76
Red/Yellow Combined	89	34	35	89
Yellow-only	10		13	
Institution Full-Activation	79	70	51	89

Figure 1. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) for NFTI

Component	Red Under-triage (%)	Yellow Under-triage (%)	Institution Under-triage (%)
PRBC	32	38	26
OR	5	35	11
IR	11	4	11
MechVent	58	52	58
ICU	16	10	26
Death	16	33	0

Figure 2. Frequency of individual NFTI components for under-triaged patients

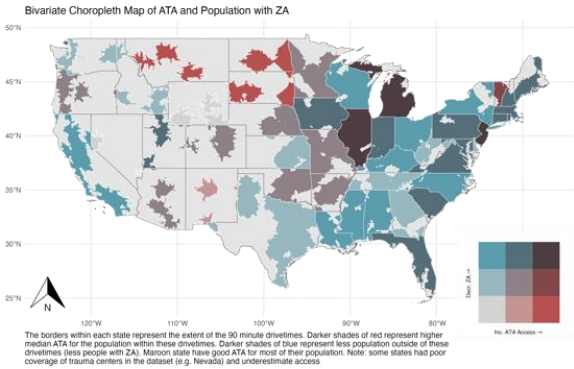
Conclusions: While not designed to be activation criteria, the FTGs are fairly sensitive for NFTI. Under-triage by FTG was predominantly for mechanical ventilation or pRBC which, while not ideal, may be acceptable.

Poster #73

USING THE ENHANCED TWO-STEP FLOATING CATCHMENT AREA METHOD TO EVALUATE DISPARITIES IN ACCESS TO TRAUMA CENTERS IN THE UNITED STATES

Taylor Wurdeman, MD, MPH; Nikathan Kumar, MD, MS;
John Scott, MD, MPH; Nakul P. Raykar, MD, MPH;
Robert Riviello, MD, MPH; Tarsicio Uribe Leitz, MD, MPH;
Molly P. Jarman, PhD, MPH
Brigham & Women's Hospital

Introduction: Timely access to trauma care is essential to achieve zero preventable trauma deaths. We used the Enhanced Two-Step Floating Catchment Area (E2SFCA) approach, which incorporates hospital capacity and population density, to create an aggregate trauma access (ATA) indicator to evaluate spatial access to Trauma Centers (TCs).
Methods: Using the AHA 2023 annual survey, we identified level 1/2 TCs in the continental US and employed the E2SFCA approach with 30/60/90-minute catchments and 5 capacity variables (beds, ICU beds, hospital volume, ORs, procedures) to calculate the ATA indicator. Locations had zero access (ZA) if they lived more than 90 minutes from a TC.
Results: Overall, 6.6% of the population has ZA to level 1/2 TCs. Among the capacity variables, access to hospital volume was lowest (median 0.12) and access to ORs was the highest (median 0.21) with 2.7% and 28.0% of the population having access greater than 0.33, respectively. ATA had state-level variability, ranging from a median of 0.07 (Delaware, 6.1% ZA) to 0.55 (N. Dakota, 44.9% ZA). Among states with less than 20% ZA, Michigan has the highest ATA (median 0.37) (Fig). Urban areas had higher ATA (median 0.25 vs 0.21, $p < 0.001$).
Conclusion: There are significant disparities in access to trauma care in the US. This granular approach can help determine appropriate TC capacity/allocation to help redefine policy objectives towards achieving zero preventable trauma deaths.



Poster #74

THE HIDDEN WOUND: RESILIENCY AS A PREDICTOR OF POST-TRAUMA MENTAL HEALTH

Victoria J. Siu, BA; Mamadou Balde, BS; Aaron O'Neill, BS; Laura Bonavita, BS; Sridevi Kotha, BS; Michelle Robert, MBA; Sadia Ali, MPH; Lawrence Brown, PhD; Carlos Brown, MD
Dell Medical School

Introduction: Resiliency, the ability to adapt and recover from adversity, has been increasingly recognized as a critical factor influencing patient outcomes following traumatic injury. While clinical interventions focus on physiological stabilization, psychological and emotional resilience may play a significant role in recovery trajectories. This study investigates the impact of resiliency on trauma patient outcomes.
Methods: This is a prospective study of a convenience sample of trauma admissions (10/8/24 to 1/31/25). The Brief Resiliency Scale (BRS) was used to measure resiliency at admission. Based on the mean BRS, the entire population was divided into two groups, low resiliency (LR) below the mean and high resiliency (HR) above the mean. The primary outcomes, measured at discharge, were SF-12 Mental Component Score (MSC) and Physical Component Score (PCS), and Injured Trauma Survivor Screen (ITSS) for depression and PTSD.
Results: There were 68 patients enrolled, 35 (51%) LR and 33 (49%) HR. When comparing groups, there was no difference in age, gender, race, insurance status, or primary language. However, the LR group was more often unhoused (14% vs. 0%, p=0.02). There was no difference in SF-12-PSC (33 vs. 34, p=0.72), but LR patients had a lower SF-12-MSC (50 vs. 57, p=0.005). The ITSS revealed higher depression scores in LR patients (0.36 vs. 0.12, p=0.02), but no difference in PTSD scores (0.42 vs. 0.27, p=0.19). When controlling for confounding variables, only SF-12-MSC was independently associated with resiliency (1.08 [1.0-1.1], p=0.02).
Conclusion: BRS can be used to measure resiliency in trauma patients. Low resiliency trauma patients have lower mental health scores and higher depression scores at discharge. BRS may be a potential screening method to determine patients at risk for psychiatric sequelae following traumatic injury.

Poster #75

CAN POINT OF CARE BLOOD TESTS REPLACE CT SCANS FOR MILD TBI? A CLINICAL VALIDATION STUDY

Lillie Tien, MD; Gurmukh Singh, MD;
Stephen Shiver, MD; Jennifer Kangas, BS; Nicole Gutierrez, BS;
Bhargav Doddala, PhD; Erin Switzer, MD; Andrew Lawson, MD;
Eliza Fox, MD; Terence O'Keeffe, MD
Augusta University

Introduction: It has been estimated that there may be over 50 million mild Traumatic Brain Injuries (mTBI) globally. The mainstay of diagnosis is via CT scanning, which is costly, time consuming and utilizes ionizing radiation. We sought to evaluate the performance of a new commercially available blood test for mTBI. Our hypothesis was that this test would be highly sensitive for the presence of mTBI.
Methods: Patients who had potentially suffered an mTBI who presented for evaluation to the Emergency Department were prospectively studied. After consent was obtained, blood was obtained for testing using a commercially available test for biomarkers associated with mTBI. The results of the test were not available to the clinicians treating the patient. We compared the results of the blood test to the findings of the CT scans. Our primary outcome measure was the sensitivity of the test. Secondary outcome measures were specificity, positive and negative predictive values.
Results: 108 patients were enrolled in the study; 54 were male and 54 were female. The mean age was 65.2 years. Median Glasgow Coma Scale (GCS) was 15 (13,15) There were 94 positive tests and 14 negative tests. Only 17 patients of those evaluated (15.7%) had positive CT scan findings. The blood test utilized showed a sensitivity of 100% - all patients with a positive CT scan tested positive. However, there were 77 false positives, leading to a specificity of only 15%. The negative predictive value was 100%, but the positive predictive value was only 17%. All patients with a positive CT scan were admitted, but no patient required a surgical intervention.
Conclusion: The test had a high negative predictive value and would have been useful in ruling out the presence of significant TBI but was overly sensitive. Employing the test in clinical decision making could have avoided 14 unnecessary CT scans. Larger scale research is needed to help define the patient population in which it can be used most cost-effectively.

Poster #76

EVALUATION OF THORACOLUMBAR SPINE INJURY BY PLAIN FILM IN THE PEDIATRIC POPULATION: A MULTI-CENTER STUDY

Tarun Prabhala, MD; Ava Herzog, BS; Rachel Scheub, MD;
Ashar Ata, PhD; Travis Bevington, MD; Tiffany Fabiano, MD;
Drew Pierce, MD; Irim Salik, MD; Daniel Edelman, MD;
Derek Wakeman, MD; Kim Wallenstein, MD; Mary Edwards, MD
Albany Medical Center

Introduction: Pediatric thoracolumbar spinal fractures (TLSF) are rare and uncommonly require surgical intervention. Current guidelines recommend CT scan of the entire spine if one injury is found, and localized CT to screen for suspected injuries. In adults, plain films are not sensitive enough to screen for spinal injury, but utilization in pediatrics is variable across institutions and supportive evidence is lacking. Given the rarity of significant injury, liberal CT screening for TLSF results in significant unnecessary radiation exposure. We hypothesize that cross sectional imaging should be reserved for patients with pertinent physical exam findings and concerning findings on plain films.

Methods: Children 18 years and younger with MRI or CT-confirmed TLSF between 2017 and 2022 at 5 level 1 pediatric trauma centers were identified. ICD10 codes for injuries, imaging types, intervention (surgery or bracing), age, mechanism, BMI, fracture-type (thoracic, lumbar, both), comorbidities, physical exam findings (tenderness, gross deformity, neurologic deficit), and type of radiograph (spine, chest, abdomen) were identified and compared.

Results: 232 children with MRI or CT-confirmed TLSF were identified during this period (46% thoracic, 34.9% lumbar, 18.1% both). 57.3% of patients underwent dedicated spine radiographs, while the others underwent chest (37.5%) or abdominal (4.3%) radiographs. 12.8% of patients underwent surgery, 43.9% required bracing, and the remaining were observed clinically. Of the patients with dedicated spine films, 82.7% of patients had accurate identification of their fractures. 70.7% of patients had positive physical exam findings concerning for associated spine injuries. Patients with positive spine films and pertinent physical exam findings were significantly more likely to require intervention ($p< 0.001$), while those with positive films alone were strongly correlated ($p=0.06$). Among those with isolated lumbar injuries, patients with positive spine films alone ($p=0.019$) and patients with positive radiographs and physical exam findings ($p< 0.001$) were significantly more likely to undergo intervention. 11% of patients with lumbar injuries required bracing in the absence of radiographic or physical exam findings. Radiographic findings with or without pertinent physical exam findings were not significantly associated with intervention among those with thoracic or mixed fracture types. No patient with a normal plain film required surgery for injury.

Conclusion: TLSF in pediatric trauma rarely requires surgical intervention, and recommendations for bracing are variable. Cross-sectional imaging is liberally used based on current guidelines. Children with suspected lumbar injuries with reassuring plain films and physical exam findings may be monitored clinically without immediate cross-sectional imaging. Children with suspected thoracic or multi-level injuries may require CT scanning for injury detection, particularly if a physical exam cannot be obtained.

Poster #77

KETAMINE AND TBI: DEBUNKING MYTHS AND REDEFINING SAFETY IN NEUROTRAUMA CARE

David A. Borrelli, MD; Darwin Ang, MD; Cody Anderson, MD;
Khafra Garcia Henry, MD; Huazhi A. Liu, MBA
University of Central Florida

Introduction: Prior studies on ketamine use in traumatic brain injury (TBI) have yielded mixed results, with concerns about potential neurotoxicity and intracranial pressure elevation, while emerging data suggest neuroprotective benefits. This study evaluates the impact of ketamine on in-hospital mortality and neurological recovery in adults with TBI, using propensity score-matched cohorts to control for key prehospital confounders.
Methods: A retrospective analysis of 2,606 adult TBI patients was conducted, comparing ketamine-exposed (n=1,303) and non-ketamine (n=1,303) groups matched by injury mechanism, vital signs, and prehospital variables. Primary outcomes included in-hospital mortality and Glasgow Coma Scale (GCS) improvement at discharge. Secondary analyses stratified outcomes by Injury Severity Score (ISS), neurosurgical intervention, intracranial hemorrhage (ICH), age, and TBI severity on admission. Logistic regression models adjusted for age, gender, race, and insurance status.
Results: Post-matching, baseline characteristics were comparable between the two groups. The ketamine group had a lower unadjusted mortality rate (9.2% vs. 11.5%), but this was not significant after adjustment (AOR 1.26, 95% CI 0.97–1.62). However, ketamine-exposed patients had significantly greater GCS improvement (59.7% vs. 45.4%, AOR 0.57, 95% CI 0.48–0.67). Stratified analyses confirmed higher GCS recovery across ISS categories, with no mortality difference in patients undergoing neurosurgical intervention, ICH-positive patients or patients of older age.
Conclusion: In this propensity-matched study, ketamine use in TBI was not associated with increased mortality and was linked to higher rates of GCS improvement. Further prospective research is warranted to confirm and refine ketamine protocols in acute TBI management.

Poster #78

LOST IN TRANSITION: LONG-TERM FOLLOW-UP IN TBI PATIENTS

Marco J. Henriquez, MD; Danyi Wang, BA;
Fabiana C. Sanchez, MD; Ricardo A. Fonseca, MD;
Michael W. Alchaer, MD; Grant V. Bochicchio, MD, MPH;
Leonardo J. Diaz, MD; Lindsay M. Kranker, MD;
Douglas J. E. Schuerer, MD; Grace M. Niziolek, MD
Washington University in St. Louis

Introduction: Traumatic Brain Injury (TBI) is a significant public health problem with patients frequently suffering from long-term neurologic, psychiatric, and cognitive symptoms. Systematic follow-up after discharge is required to identify deficits, maximize recovery, and enhance functional outcomes. We hypothesized that a majority of TBI patients are not routinely seen following their index hospitalization and therefore do not receive ancillary services that may contribute to their long-term recovery.
Methods: We conducted a retrospective, single-center analysis of all trauma patients admitted between January 2022 and January 2024. Patients with radiographically confirmed TBI who survived hospitalization were included. Chart reviews determined post-discharge clinic appointments and referrals to ancillary services, including physical therapy, occupational therapy, speech-language pathology, and neurocognitive testing.
Results: Out of 1,142 TBI patients analyzed, 605 (53%) returned for follow-up. Of those, 543 (89.8%) were seen by Neurosurgery for repeat cross-sectional imaging and post-surgical care. Clinic notes rarely discussed quality of life, cognitive deficits, or behavioral changes, and ancillary referrals were infrequent (< 2%). In multivariate analysis, discharge to a facility (OR 0.541, $p < 0.001$) and uninsured status (OR 0.591, $p=0.016$) were both predictive of less follow-up, whereas high AIS Head score (OR 1.446, $p < 0.001$) and decompressive craniectomy (OR 2.867, $p=0.003$) predicted more follow-up.
Conclusion: Nearly half of hospitalized TBI patients have no follow-up after discharge, and ancillary services are rarely utilized, highlighting major gaps in post-injury care. Uninsured patients and those discharged to a facility had lower follow-up rates. Efforts to improve outpatient follow-up are essential to optimize recovery.

Poster #79

MMA EMBOLIZATION IN ACUTE INTRACRANIAL HEMORRHAGE

Amy Howk, MD; Sarah King, Meng; Brian Daley, MD
University of Tennessee Medical Center at Knoxville

Introduction: Middle menial artery embolization (MMAE) is a new minimally invasive procedure with increased success rates of treating chronic subdural hematoma (SDH). While benefit has been demonstrated in chronic SDH, MMAE as a treatment modality for acute SDH has not been evaluated. This study compares MMAE in the acute setting to conventional treatment.
Methods: A retrospective cohort study of patients that underwent MMAE between Jan 2016 – Dec 2023 at a Level 1 Trauma Center. The MMAE group was compared to patients who did not undergo MMAE in a 4:1 ratio.
Results: The MMAE group had and average age=71.6±13.6 years; 67.7% male; 47.3% discharged home. The mortality rate in MMAE group for in-hospital was 9.5% and at 1 year was 36.5%. 25.7% had at least 1 treatment failure that required other intervention. ICU readmission rate was 18.9%, and hospital readmission was 27.9%. The three most common complications post-MMAE were headache (32.4%), extremity weakness (23.0%), and aphasia (9.5%). A total of 371 patients were included in the second portion of the study – 74 patients who underwent MMAE and 295 did not. MMAE patients had a longer hospital stay, longer ICU stay, average of largest hematoma size and midline shift distance ($p< 0.01$, all). Average SDH/SAH was larger in MMAE group (13 mm [9,18] vs 6 mm 4,10], $p< 0.001$). Mortality rate was 13% in MMAE group, and 25% in no MMAE ($p=0.739$).
Conclusion: MMA embolization in the acute setting is associated with notable complications and need for recurrent interventions, as well as increased ICU and hospital length of stay without improvement in survival compared to standard treatment.

Poster #80

PREDICTING IN-HOSPITAL MORTALITY IN TRAUMATIC BRAIN INJURED SERVICE MEMBERS USING MACHINE LEARNING

Tuan D. Le, MD, MPH, DrPH; Alan Cook, MD, MS, FACS;
Jennifer Gurney, MD, FACS; Karan P. Singh, PH.D.
UNIV OF TEXAS HSCT-TYLER

Introduction: Traumatic brain injury (TBI) is the leading cause of death. Accurate mortality risk prediction is essential to signal and indicate the need for timely intervention to reduce mortality and mitigate complications. The availability of rapid and reliable assessment tools to predict mortality risk in deployed medical treatment facilities (MTF), combat support hospitals, and civilian trauma centers is a significant unmet clinical need. Machine learning (ML) algorithms have been proven effective in predicting clinical outcomes. This study aimed to identify ML models with the best diagnostic performance for predicting mortality in TBI patients in both military and civilian populations.

Methods: A retrospective observational study was performed using data from the Department of Defense Trauma Registry (dodtr) between January 1, 2003, and December 31, 2023, on 11,604 U.S. service members (sms) who suffered TBI and registered in the dodtr. Thirty-five features were selected, including demographics, injury characteristics (mechanism and type of injury, injured body region, injury severity score, TRISS, revised trauma score, and combat mortality index), vital signs, and other related factors. Eight ML models, including decision tree (DT), Ensemble (ES), Generalized Additive Model (GAM), Gradient Boosting (GB), Logistic Regression (RL), Neural Network (NN), Random Forest (RF), and Support Vector Machine (SVM) were identified to predict in-hospital mortality. ML models were compared by the area under the receiver operating characteristics curve (AUROC) and Kolmogorov-Smirnov statistics (KS; Youden) for the best diagnostic performance for predicting mortality in TBI patients, especially on the battlefield, ensuring a comprehensive and rigorous approach to the analysis.

Results: A total of 11,604 TBI patients (11,241 [96.9%] male; mean [SD] age, 26 [6.3] years) with median [IQR] AIS-head, 2 [1-2], 337 resulted in in-hospital mortality [2.9%]). The AUROC scores for the DT, ES, GAM, GB, LR, NN, RF, and SVM models were 0.921, 0.987, 0.978, 0.988, 0.918, 0.900, 0.989, and 0.979, respectively. The KS values were 0.811, 0.908, 0.851, 0.910, 0.833, 0.675, 0.926, and 0.886, respectively. The random forest model emerged as the champion model with superior AUROC and KS values. The five most crucial features (Table) in prediction across all models are head injury severity (AIS-head), Injury severity score (ISS), Glasgow coma scale (GCS), Combat Mortality Index (CMI), and Revised Trauma Scale (RTS) .

Conclusion: The approaches outlined in this study may provide valuable tools in identifying TBI patients at risk for mortality, offering hope for improved survivability. The random forest model emerged as the best-performing ML model, demonstrating the highest AUROC and KS values without overfitting, correctly predicting 98.11% of the test partition. This reliability in predicting mortality underscores the potential of this research to significantly improve patient outcomes in TBI care, both in military and civilian populations. The findings of this study have the potential to not only improve the quality of care but also to inspire further research and development of new reliably useful prognostic tools, ultimately reducing mortality rates in TBI patients.

Poster #81

RETHINKING TRAUMA TRANSFERS: CAN MINOR TBI PATIENTS BE SAFELY MANAGED AT LOWER-LEVEL TRAUMA CENTERS?

Yuqian Tian, MD; Tyler Piston, MD; Jordan Rasmussen, BS; Jack Mordeson, BS; Sophie Bouldoukian, BS; Daryl Gress, MD; Daniel Surdell, MD; Zachary Bauman, DO, MHA, FACOS, FACS
University of Nebraska Medical Center

Introduction: The Modified Brain Injury Guidelines (mBIG) optimize hospital resources by stratifying traumatic brain injury (TBI) patients and providing tiered treatment plans. However, implementation has been limited to Level I/II trauma centers, and a significant amount of hospital resources is allocated to transferring TBI patients initially triaged at lower-level trauma centers/critical access hospitals to higher level centers, often for neurosurgical oversight. This study evaluates minor TBI (mBIG 1/2) patients transferred to our level 1 trauma center to assess the potential for local management of selected patients, reducing unnecessary transfers and optimizing resources.

Methods: We analyzed 535 adult TBI patients transferred to our trauma center, categorizing them into mBIG 1, 2, and 3 based on clinical presentations. For mBIG 1/2, we evaluated neurological deterioration requiring higher care, including mental status changes, worsening CT, and neurosurgical intervention.

Results: The mBIG 1 group included 91 patients, none of whom experienced clinical neurological deterioration. However, two patients had worsening CT findings, though neither required neurosurgical intervention. In the mBIG 2 group (n=67), five patients showed radiographic worsening, with one also experiencing a mental status change, ultimately requiring neurosurgical intervention.

Conclusion: In this study, < 1% of mBIG 1/2 TBI patients required higher level of care for TBI progression. This finding suggests that lower-level trauma centers may be able to manage minor TBI cases without other injuries necessitating transfer, which further optimizes medical resources while still ensuring safety with regional Level I/II trauma centers as back up support.

	mBIG 1 (n=91)	mBIG2 (n=67)
Age, mean [SD]	68 [19]	65 [20]
Sex, No. [%]		
Male	38 [42]	33 [49]
Female	53 [58]	34 [51]
Initial GCS, No. [%]		
15	81 [89]	57 [85]
14	10 [11]	9 [13]
13	0 [0]	1 [1]
ISS, median [IQR]	10 [7,17]	14 [9,21]
Head AIS, No. [%]		
5	0 [0]	2 [3]
4	23 [25]	21 [31]
3	33 [36]	27 [40]
2	35 [38]	17 [25]

Poster #82

SHOULD PLATELET TRANSFUSION BE USED TO REVERSE PREINJURY ANTIPLATELET AGENTS IN TBI? A META-ANALYSIS

Benoit Blondeau, MD, MBA, FACS; Nicholas Larson, BA;
Abigail Rhone, BS; Ella Chrenka, MS; Jennifer Feeken, MLIS;
David Dries, MD, MSE, FACS; Frederick Rogers, MD, MA, MS, FACS
University of Nebraska Medical Center

Introduction: Platelet transfusion (P) is a scarce resource in many trauma centers that is not without its own complications. Controversy exists in the literature regarding P in the setting of TBI in patients on antiplatelet agents.
Methods: A search of the MEDLINE database was used to identify all studies examining P, and antiplatelet agents related to TBI published from inception to April 2024. Study selection, data extraction, and bias assessment were conducted independently by two reviewers. Heterogeneity was assessed via I^2 statistic and publication bias was evaluated using Newcastle Ottawa Scale for cohort studies. Meta-analysis was performed to estimate pooled treatment effects with 95% confidence intervals.
Results: Of the 131 studies initially identified, fourteen studies met inclusion criteria comprising of 1476 patients who received P and 5670 patients who did not. Across studies, patients receiving P were more severity injured than those who did not (mean GCS 13.1±3.1 vs 14.1±2.4). Heterogeneity was high across all outcomes (I^2 = 63% to 90%) necessitating use of random effects models. Pooled analysis found that receiving P did not significantly change the likelihood of mortality or hemorrhage progression (OR 1.32 95%CI 0.76, 2.30; OR 0.81 95%CI 0.29, 2.30, respectively). Both LOS and ICU LOS were found to be significantly longer with P (2.6 days longer 95%CI 1.15, 4.06; 3.1 days longer 95%CI 2.0, 4.13).
Conclusion: Reversal of preinjury antiplatelet agents with P is not beneficial in TBI since it increases LOS with no benefit to mortality or hemorrhage progression

Poster #83

THE PROGNOSTIC UTILITY OF ACUTE EXOSOMAL BIOMARKERS AT ADMISSION AND THEIR SYNERGISTIC ROLE WITH MARSHALL SCORE AND FUNCTIONAL OUTCOME PREDICTION IN TRAUMATIC BRAIN INJURY

Naushad A. Khan, PhD; Ayman El-Menyar, MD; Mohammad Asim, PhD; Ruben Peralta, MD; Sandro Rizoli, MD; Hassan Al -Thani, MD
Hamad Medical Corporation

Introduction: Traumatic brain injury (TBI) outcomes are often predicted using central nervous system (CNS)-derived proteins, but the potential of plasma-derived exosomal (PDE) proteins as a novel biomarker approach remains underexplored. This pilot study investigated the additive and cumulative value of PDE biomarkers such as Total-Tau (T-Tau), Neuron-Specific Enolase (NSE), and Glial Fibrillary Acidic Protein (GFAP) in improving prognosis in TBI patients.

Methods: A prospective observational study was conducted involving 45 TBI patients (mild, n=15; moderate, n=15; severe, n=15) admitted to the Level I trauma center at Hamad General Hospital in Doha, Qatar, along with 15 healthy controls. Exosomes were isolated from plasma samples collected at admission and exosomal proteins were assayed using multiplex immunoassay and were evaluated for their association and predictive value alongside Marshall and 3-month Glasgow Outcome Scale Extended (GOSE) scores.

Results: The mean age of the study population was 38 years and the majority of patients were male (97.8%). Patients with moderate to severe TBI had significantly higher exosomal NSE and Tau levels than those with mild TBI. The Marshall CT score was higher in moderate and severe TBI ($p=0.04$), and GOSE at three months was significantly worse in severe cases. All biomarkers (TAU, GPAF, and NSE) demonstrated significant prognostic utility for predicting functional outcomes stratified by favorable (GOSE ≥ 5) and unfavorable (GOSE < 5) in TBI patients. NSE had the highest AUROC (0.896), indicating the strongest discriminatory ability, followed by GPAF (0.874) and TAU (0.831). TAU ($r = 0.386$, $p = 0.009$) and GPAF ($r = 0.333$, $p = 0.02$) significantly correlated with Marshall CT score, while NSE showed no significant association. Notably, all the three studied biomarkers GPAF ($r = -0.470$, $p = 0.001$); TAU ($r = -0.378$, $p = 0.01$) and NSE ($r = -0.346$, $p = 0.02$) showed significant negative correlation with functional outcome (GOSE) at 3 months. Overall, TAU emerged as the most consistent biomarker, significantly correlating with functional outcomes, injury severity, and CT-based brain injury classification.

Conclusions: The current pilot study showed plasma-derived exosomal biomarkers improve injury severity assessment and outcome prediction when combined with Marshall and GOSE scores.