Session: XV: Quickshot Session I
Paper QS1: 9:05-9:11 am

SMALL BORE CATHETERS ARE EQUALLY EFFICACIOUS WHEN COMPARED TO LARGER CHEST TUBES REGARDLESS OF INDICATION FOR PLACEMENT IN THE TRAUMA PATIENT

Adele P. Williams MD, Taylor E. Hillburn Jerre Hinds RN, Danielle Tatum Ph.D., Terri Frazier BS, Sara Al-Dahir PharmD, Tomas H. Jacome* MD, Victoria Aucoin MD, Claudia Leonardi Ph.D., Patrick Greiffenstein MD, Jennifer L. Mooney MD, LSU Department of Surgery

Invited Discussant: Kenji Inaba, MD

Introduction: Small bore catheters have gained popularity in trauma centers following several studies showing their equivalency in evacuating pneumothorax as compared to traditional large bore tubes. The efficacy of small bore catheters in treating hemothorax is not as well described. Our practice has changed to allow for a more liberal use of small bore catheters regardless of indication for placement. This study compares our experience between small bore catheters (SB) and the more traditional large bore tubes (LB) for both pneumothorax and hemothorax in the injured patient.

Methods: This is a retrospective study involving two regional trauma centers. All adult patients admitted to the trauma service with a chest tube placed between January 2014 and December 2015 were eligible for enrollment. Those who died within the first 24 hours or before chest tube removal were excluded. Patients were then divided into reason for chest tube placement, isolated pneumothorax or presence of hemothorax. We then compared SB versus LB within each group with a primary outcome being effectiveness of tube size at evacuating air or blood. Secondary outcomes consisted of narcotic usage, chest tube duration and insertion related complications. SB was defined as those 19F or less (average 14F) and LB as greater than or equal to 20F (average 32F). Outcomes were compared using generalized linear mixed models adjusting for baseline covariates which were deemed significantly different between the two groups using the SAS/STAT software version 9.4 (SAS Institute Inc., Cary, North Carolina).

Results: A total of 301 tubes were included for analysis. Pneumothorax was the indication for 146 subjects of which 75 were LB and 71 SB. Demographics were similar between groups apart from those in the large bore subset tending to be younger (39.2 vs 45.6, p=0.02) and having a larger proportion of penetrating mechanism of injury (30.8% vs 14.1%, p=0.02). There was no difference in failure to resolve the pneumothorax between the two groups (20.6% vs 17.5%, p=0.64). There was a significant difference in continued air leak at 72 hours (1.9% vs 9.1%, p=0.047); however, this did not translate into increased chest tube duration (3.4 days vs 3.3 days, p=0.75). Narcotic usage was significantly decreased in the SB group (343.8 units vs 214.3 units, p=0.025). Hemothorax led to tube placement in 155 patients of which 102 were LB and 53 SB. The two groups differed demographically in terms of age, sex and proportion of penetrating injury. The LB group was younger (36.6 vs 44.3, p=0.01), male (87.3% vs 73.6%, p=0.03) and with a higher proportion of penetrating mechanism (63.7% vs 32.1%, p<0.001). The SB catheters were equally as efficacious as the LB tubes with a similar rate of failure (25.6% vs 36.6%, p=0.18). Narcotic usage (480.1 units vs 439.3 units, p=0.63), chest tube duration (5.0 days vs 4.4 days, p=0.19) and insertion related complications (2.9% vs 3.8%, p=0.78) were also similar.

Conclusion: To our knowledge this is the largest study comparing tube sizes in trauma patients with hemothorax as an indication. Small bore catheters are equally effective when compared to larger more traditional thoracostomy tubes regardless of indication for placement in the trauma patient.

Session: XV: Quickshot Session I
Paper QS2: 9:11-9:17 am

FIREARM- RELATED INJURIES IN THE UNITED STATES: 6-MONTH READMISSION AND COST BURDEN

Sarabeth A. Spitzer BA, Kristan Staudenmayer* MD, MA, Lakshika Tennakoon MD, MA, Daniel Vail BA, David Spain* MD, Thomas Weiser* MD,MPH, Stanford University

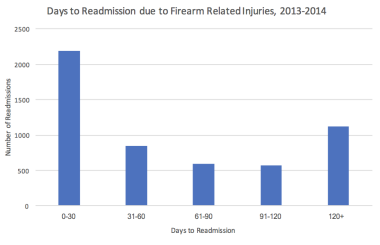
Invited Discussant: Robert Winfield, MD

Introduction: The United States has the highest rate of firearm injuries and deaths of any developed country. In 2014 alone, firearms caused an estimated 33,700 deaths and 81,000 nonfatal injuries. The readmission risk for patients discharged following a firearm injury and the costs of these readmissions are unknown. We hypothesized that a large proportion of patients who suffered a firearm injury would be readmitted after their initial injury, and aimed to determine the financial burden these readmissions impose

Methods: We used the Healthcare Cost and Utilization Project (HCUP) Nationwide Readmission Database (NRD), an all-payer, all-ages national database that allows for longitudinal tracking of inpatient hospitalizations. We identified patients admitted for firearm-related injuries between 2013 and 2014 using ICD-9 codes. Patients were included if discharged within the first six months of each year and readmitted within 180 days of discharge from their initial injury. Charges were converted to costs using the HCUP-NRD cost-to-charge ratio files, and costs were inflation- adjusted to 2014 dollars. Unadjusted and adjusted analyses were performed. Weighted numbers are reported.

Results: During 2013 and 2014, 31,363 patients were admitted for firearm injuries in the first six months of each year. A total of 5,322 patients (17.0%) experienced at least one readmission within 6 months. Of those readmitted, 41.0% were readmitted within 30 days of discharge from their index injury (Figure). The 6-month costs of readmission for firearm-related injuries was $65.5 million dollars (Table). The largest proportion of costs was covered by governmental insurance, totaling $35 million dollars (52.8%) divided between Medicare (10.2%) and Medicaid (43.6%). Self-pay patients generated $10 million (15.2%) in costs.

Conclusion: Readmission following firearm injuries is common, with over half occurring within the first 60 days of discharge. In addition to the known annual costs of approximately $700 million accrued during the initial hospitalization, 6-month readmission costs for firearm related injuries account for an additional 10%, totaling almost $70 million dollars. Forty percent of the financial burden was placed on Medicaid, indicating that firearm-related injuries place a particular burden on government payers. These figures likely underestimate true healthcare costs of readmissions, as they do not include outpatient care. The burden imposed by firearm-related injuries persists beyond patients' initial hospitalization. Future policy should consider the long-term implications of these injuries.



Costs of Inpatient Readmissions for Firearm- Related Injuries by Payer Status, 2013-2014

	Total Readmission Cost	Average Readmission Cost
Medicare	$6,673,087.29	$15,504.42
Medicaid	$28,566,309.40	$19,423.17
Private	$13,382,045.06	$18,379.34
Self- Pay	$9,987,147.63	$11,479.36
Other	$6,854,283.81	$15,060.29
Total	$65,462,873.19	

Session: XV: Quickshot Session I
Paper QS3: 9:17-9:23 am

ROUTINE POSTOPERATIVE HEPATIC ANGIOGRAPHY IS ASSOCIATED WITH DECREASED MORTALITY IN SEVERE LIVER INJURY

Shokei Matsumoto MD, Emily Cantrell MD, Alan Smith Ph.D., Raul Coimbra* MD,Ph.D., University of California, San Diego

Invited Discussant: Daniel Holena, MD

Background: Mortality rate for high grade liver injuries remains high. In recent years, a combined multidisciplinary approach utilizing both surgical and interventional endovascular techniques has been used and may offer survival advantage when compared to surgery alone. As an adjunct to operative management, routine postoperative hepatic angiography (PHA) may have a marked impact on outcome because of its ability to identify continued bleeding not completely controlled by surgical maneuvers, thus triggering arterial embolization when indicated. This study sought to compare outcomes following surgical management of severe liver injuries with and without PHA using propensity score matching analysis. .

Methods: Data from the National Trauma Data Bank (NTDB) from 2007 – 2014 was analyzed. The study population consisted of patients greater than 18 years of age sustaining severe liver injuries (ie AAST-OIS grade IV or V) who underwent acute surgical management. Patients were divided into two groups. The PHA group consisted of those undergoing acute surgical intervention followed by PHA. In the surgery only (SO) group, no angiography was performed. Demographics, patient and injury characteristics, complications and mortality were compared. To determine the impact of PHA on outcomes, propensity score matching analysis (1:1) was utilized.

Results: During the study period, 20,941 patients were identified in the NTDB dataset with severe liver injury. A total of 3,871 patients met inclusion criteria. Of those, 205 patients (5.3%) underwent PHA. The rate of severe liver injury undergoing surgical intervention followed by PHA was noted to increase during the study period. Prior to matching, patients in the PHA group had higher liver injury severity and ISS, but overall in-hospital mortality was found to be similar between the two groups. One to one propensity-score matching generated 196 pairs with well-balanced baseline characteristics. After propensity score matching, in-hospital mortality was significantly lower in the PHA group compared with the SO group (24.5% vs 34.2%; OR, 0.62; 95% CI: 0.40-0.97). However, hospital length of stay was longer (16.0 [7.0-29.8] vs 12 [1.0-24.0] days, $P < 0.006$) and the incidence of AKI was higher (10.7% vs 4.1%; OR, 2.80; 95% CI: 1.21-6.50) in the PHA group.

Conclusion: The use of PHA was associated with decreased mortality rates in patients with high grade liver injuries and increased hospital length of stay and higher AKI rates. A multimodality approach utilizing both surgical intervention followed routinely by hepatic artery angiography appears to identify patients that may benefit from further intervention (arterial embolization) leading to decreased mortality of severe liver injuries.

Session: XV: Quickshot Session I
Paper QS4: 9:23-9:29 am

BALLOONS UP: SHORTER TIME TO ANGIOEMBOLIZATION AND REDUCED MORTALITY IN PATIENTS WITH SHOCK AND PELVIC FRACTURES

Kathleen M. O'Connell MD, Sarah M. Kolnik MD,MPH, Qian Qiu MBA, Khalida Arif BS, BA, Sean T. Jones MD, Frederick Rivara MD,MPH, Monica Vavilala MD, Christopher Ingraham MD, Eileen Bulger* MD, University of Washington

Invited Discussant: Thomas Scalea, MD

Introduction: A recent AAST multicenter observational study reported a 32% mortality rate for patients with pelvic fractures and shock. (Costantini et al, 2016) Additionally, several prominent Level I trauma centers have reported unacceptably long mobilization times for Interventional Radiology (IR) teams, raising the question whether these patients are better served with immediate operative intervention and preperitoneal packing. We hypothesized that shorter average time from admission to start of angiography/angioembolization is associated with lower in-hospital mortality in patients with pelvic fractures and shock.

Methods: This is a retrospective observational study of patients 18 years and older who were diagnosed with a pelvic fracture after blunt trauma, and admitted to a single regional Level I trauma center from 2012-2016. Patients were included in the study group based on the presence of hemorrhagic shock, using the same criteria as Costantini et al. (systolic blood pressure < 90 mmHg, heart rate > 120 beats per minute, and base deficit >5). Time from admission to procedure start was examined in patients who went directly to IR for angiography, and in patients who went directly to the operating room (OR) for surgical control of hemorrhage. In-hospital mortality rates were examined for the overall cohort, as well as for the shock group.

Results: During the 5 year study period, 1,170 adult patients were admitted with a pelvic fracture; 25% presented during weekdays (0730-1730), and 75% presented during nights and weekends. Sixty-two percent of the patients were male, with a median age of 48 years (IQR 29, 62), and median Injury Severity Score (ISS) of 29 (IQR 21, 38). The study group included 424 (36%) patients who met criteria for shock, with a median ISS of 38 (IQR 30, 50). Within this shock group, 175 (41%) underwent diagnostic angiography, and 129 (30%) received therapeutic angioembolization. 143 (34%) of the 424 shock patients who screened negative for an intra-abdominal source of hemorrhage went directly to IR from the emergency department; median time to start of angiography was 1.4 hours (IQR 1.1, 1.9). 69 (16%) of the shock patients who screened positive for an intra-abdominal source of hemorrhage went directly to the operating room; median time to start of the operation was 0.9 hour (IQR 0.6, 1.2). Resuscitative endovascular balloon occlusion was utilized in three patients, and one patient received extracorporeal life support. Cumulative in-hospital mortality for the entire cohort was 7%, and 15% in the overall shock group. Cumulative in-hospital mortality for patients who went directly to IR was 18%, and 23% for patients who went directly to the OR.

Conclusion: Compared to recent reports of patients with hemorrhagic shock and pelvic fractures at other Level I trauma centers, our median time to IR procedure start and associated cumulative in-hospital mortality are significantly lower. This study supports the use of angioembolization for hemorrhage control, as opposed to pre-peritoneal packing, at institutions equipped to mobilize the IR team expeditiously.

Session: XV: Quickshot Session I
Paper QS5: 9:29-9:35 am

TIME TO ANGIOEMBOLIZATION FOR PELVIC HEMORRHAGE: REAL WORLD EXPERIENCE AND IMPACT ON OUTCOMES

James P. Byrne* MD, Stephanie A. Mason MD, Melissa Hornor MD, Ryan Murphy MPH, Christopher Hoeft MA, Melanie Neal MS, Avery B. Nathens* MD,Ph.D.,
Sunnybrook Health Science Centre

Invited Discussant: Brian Williams, MD

Introduction: Pelvic trauma is a common source of fatal hemorrhage. Angiography for embolization remains the mainstay of treatment in North America. The Committee on Trauma requires that level I and II trauma centers have radiology support available within 30 mins to perform interventional procedures. While timely access to angiography may improve survival, recent studies report significant delays. Therefore, we examined factors influencing time to angiography (AT) and its association with mortality for patients treated at trauma centers participating in the ACS Trauma Quality Improvement Program (ACS TQIP).

Methods: Patients with blunt trauma who underwent angiography with embolization for pelvic hemorrhage were identified in the ACS TQIP database (2013–2016). Data related to injury severity, ED vital signs, transfusion requirements and operations for hemorrhage control were derived. A subgroup of patients with hemorrhagic shock was defined (SBP≤90mmHg). Three analytic approaches were then taken. First, predictors of AT were identified using multiple linear regression with random effects to account for hospital-level clustering. Second, hierarchical logistic regression was used to determine the association between AT and mortality. Finally, hospital-level variability in AT was examined. Specifically, the median odds ratio (MOR) was calculated to measure trauma center variation in achieving early (<90 mins) vs. delayed (≥90 mins) angiography.

Results: We identified 1,369 patients who underwent angioembolization at 248 trauma centers. The median ISS was 34 and overall mortality was 28%. One-in-five patients (n=276) underwent hemorrhage control surgery prior to angiography. Excluding these patients, the median AT was 3 hours (IQR 2–4 hours). Few (1%) received angiography within 30 mins. Hemorrhagic shock and higher institutional volumes of angiography were associated with shorter AT. Presentation on weekends or overnight was predictive of delay. Among all patients, AT was not associated with mortality. However, longer AT was associated with significantly greater risk of death in patients with hemorrhagic shock (Figure 1; aOR 1.50 per hour; 95%CI 1.10–2.05). Between trauma centers, median AT ranged from 1–5.6 hours. The MOR for achieving angiography within 90 mins was 2.1, reflecting significant institutional variability in timely access to angiographic resources.

Conclusion: Delays in angiography are associated with increased risk of death in patients with hemorrhagic shock from pelvic bleeding. Nonetheless, significant variability persists between trauma centers in timely access to angiography. Strategies to reduce delays are needed to minimize mortality in this high-risk patient population.

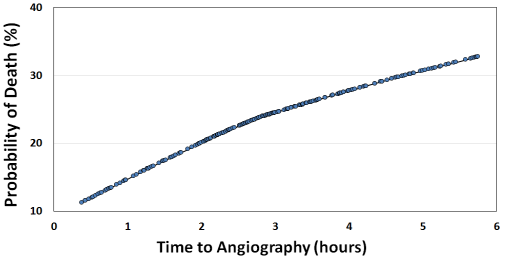


Figure 1. Relationship between AT and mortality in patients with hemorrhagic shock

Session: XV: Quickshot Session I
Paper QS6: 9:35-9:41 am

THE NOVEL TRAUMA WORK FLOW WITH HYBRID EMERGENCY ROOM SHORTENS THE TIME TO START EMERGENCY SURGERY IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

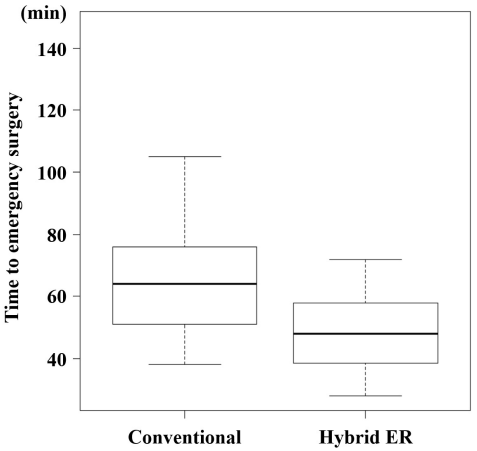
Motohisa Hayashi MD, Takahiro Kinoshita MD, Kazuma Yamakawa MD,Ph.D., Hiroki Matsuda MD, Naoki Nakamoto MD, Satoshi Fujimi MD,Ph.D., Osaka General Medical Center

Invited Discussant: Christopher Dente,MD

Introduction: In August 2011, an interventional radiology - computed tomography (CT) system was installed in our trauma resuscitation room. We named the novel room "Hybrid emergency room (ER)" as it was possible to perform both examinations including X-ray, ultrasonography, and CT, and life-saving procedures including damage control surgery, transarterial embolization, and burr hole craniostomy on the same CT examination and intervention table. Since then, we tried to reduce time to treatment for patients with traumatic brain injury (TBI) by using the Hybrid ER.

Methods: This retrospective historical control study, conducted in a tertiary care hospital in Japan from August 2007 to July 2015, included 181 patients with severe TBI (Glasgow coma scale [GCS] ≤ 8) who were transferred directly from the scene. These patients were divided into two groups: Conventional group (from August 2007 to July 2011) and Hybrid ER group (from August 2011 to July 2015). We set the primary endpoint as the time interval from arrival on the trauma resuscitation room to the beginning of emergency operation including burr hole craniostomy, craniotomy, and craniectomy. The secondary endpoints included 28 day mortality and Glasgow outcome scale - extended at 6 months after injury. Unfavorable outcome was defined as death, vegetative state, or severe disability. Multivariable logistic regression analysis was performed to adjust for hemoglobin, prothrombin time - international normalized ratio, injury severity score, and risk of unfavorable outcome calculated by Corticosteroid Randomization After Significant Head injury (CRASH) trial prognostic model.

Results: There were no significant differences between the two groups in age (53 years vs 54 years, $p = 0.96$), admission GCS score (6 vs 5, $p = 0.38$) and risk of unfavorable outcome calculated by CRASH trial prognostic model (0.89 vs 0.88, $p = 0.64$). The time interval between arrival and emergency operation was significantly shorter in the Hybrid ER group (64 minutes vs 48 minutes, $p < 0.01$). After adjusting for confounders, Hybrid ER group had significantly lower 28 day mortality (odds ratio [OR], 0.43; 95 % confidential interval [CI], 0.18−0.96), however, there was no significant difference in the ratio of unfavorable outcome at 6 months (OR, 0.50; 95 % CI, 0.23−1.08).



Conclusion: Hybrid ER may shorten the time to emergency surgery and improve mortality in patients with severe TBI. The efficacy of Hybrid ER on neurological prognosis, however, is still unclear.

Session: XV: Quickshot Session I
Paper QS7: 9:41-9:47 am

POST-DISCHARGE STROKE RISK AFTER BLUNT CEREBROVASCULAR INJURY

Cordelie E. Witt MD, Robert H. Bonow MD, Mahmud Mossa-Basha MD, Frederick P. Rivara MD,MPH, Monica S. Vavilala MD, Joseph Cuschieri* MD, Randall M. Chesnut MD, Saman Arbabi* MD,MPH, University of Washington

Invited Discussant: Walter Biffl, MD

Introduction: Injury to the internal carotid (ICA) or vertebral arteries (VA) as a result of blunt trauma is associated with increased risk of stroke detected during admission. While many strokes occur shortly after injury, it is unknown whether elevated stroke risk persists long-term. The objective of this study was to assess the risk of post-discharge stroke or transient ischemic attack (TIA) among patients with blunt cerebrovascular injury (BCVI) compared to blunt trauma patients without BCVI.

Methods: This was a retrospective cohort study of blunt trauma patients hospitalized at our Level I trauma center from 2009-2015. The primary exposure was BCVI diagnosed during index hospitalization, ascertained via radiology review. Unexposed patients were all those who underwent CTA screening within 3 days of hospital arrival, but were not diagnosed with BCVI. Since patients may later receive care at other institutions following discharge from trauma admission, patients were probabilistically linked to statewide hospital discharge and vital statistics records to assess outcomes through 2015. The primary outcome was post-discharge stroke or TIA, ascertained using diagnosis codes in the statewide discharge data. Data were analyzed using Cox proportional hazards and adjusted for Injury Severity Score, maximum head Abbreviated Injury Scale score, and age over 65 years.

Results: 704 BCVI patients and 2,099 control patients were included. Median age was 48 years (IQR 28-65) in both BCVI and control groups. Median ISS was 26 (IQR 14-36) in the BCVI group compared to 19 (IQR 11-29) in the control group. Post-discharge stroke/TIA was identified in 6 (1.3%) of BCVI patients and 31 (2.0%) of control patients. Of the six BCVI patients who developed stroke/TIA, four had isolated VA injuries (grades 1, 2, 2, 4), one had bilateral grade 1 VA injuries, and one had a grade 4 VA injury as well as a grade 1 ICA injury. After adjustment, there was no significant difference in the hazard of stroke/TIA among BCVI patients compared to controls (aHR 0.63, 95% CI 0.26-1.52). Median time to post-discharge stroke was similar: 20.0 months (IQR 2.9-37.2) in BCVI patients (IQR 6.8-38.6) compared to 19.2 months in control patients (p=0.74).

Conclusion: This is the only study to date which assess post-discharge stroke risk after BCVI. In our data, BCVI was not associated with a significant difference in post-discharge stroke/TIA compared to blunt trauma patients with negative screening CTAs. While patient compliance with risk-reducing therapies is unknown, these data suggest that the risk of post-discharge stroke is low and/or that provided treatments are effective.

Session: XV: Quickshot Session I
Paper QS8: 9:47-10:03 am

THE THINK AHEAD SCORE: ADMISSION FRAILTY ASSESSMENT IN HOSPITALIZED ELDERS AT RISK OF DEATH PREDICTS 6 MONTH MORTALITY AFTER A FALL

Christine M. Leeper MD, MS, Elizabeth Lin BS, Matthew Rosengart* MD,MPH, Gregory Watson* MD, UPMC

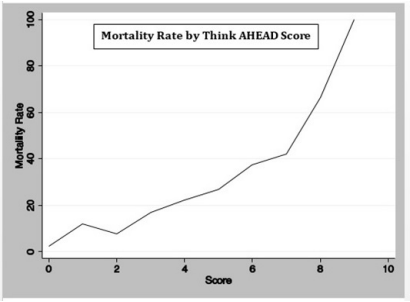
Invited Discussant: Erika Rangel, MD

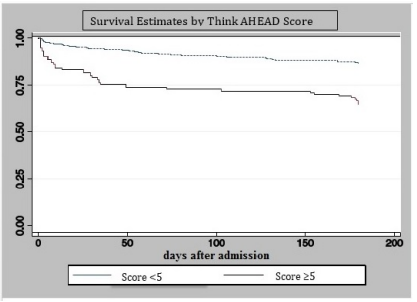
Introduction: Falls are common in older adults and are associated with poor prognosis. Frailty is a contributing factor to falls and mortality in geriatric trauma patients. Our objective was to risk stratify patients at increased risk of 6-month mortality after a fall.

Methods: We developed and validated the Think AHEAD Score using our level 1 academic center trauma database. Subjects from 01/01/2013-12/31/2013 were included in the working dataset if >age 65 and mechanism of fall with CT abdomen, height and weight documented. Stepwise regression modeling identified patient and injury characteristics associated with mortality; these comprised the score. We validated the score in a cohort of patients from 01/01/2014-12/31/2014 with the same inclusion criteria. Wilcoxon rank sum and Kaplan-Meier testing were utilized to compare groups. Youden index defined the score cutoff point with highest sensitivity and specificity for mortality prediction.

Results: 445 subjects were included in the working dataset. Patient and injury characteristics associated with mortality, and therefore included in the score, were sarcopenia, age, pre-injury residence in skilled nursing facility, ICU admission, severe traumatic brain injury, and cervical spine fracture. 514 subjects were included in the validation dataset. In this cohort, subjects who died had significantly higher Think AHEAD scores (median(IQR)=6(4-7)) than surviving subjects (median(IQR)=4(3-5))($p<0.001$). Each point increase correlated with an increased odds of death of 50%. Scores ≥6 best predicted mortality with an odds ratio of 3.46 (95% CI 2.14-5.60, $p<0.001$).

Conclusion: The Think AHEAD Score can reliably predict 6-month mortality risk after a fall. Clinicians can utilize this score to identify patients on admission for consultation and therapies (nutrition, home services, palliative care), counseling regarding risks/benefits of interventions, and close interval followup.





Session: XV: Quickshot Session I
Paper QS9: 10:03-10:09 am

VALPROIC TREATMENT CHANGES THE TRANSCRIPTOME OF THE INJURED BRAIN TO ENHANCE NEURONAL PROTECTION

Vahagn C. Nikolian MD, Gerald A. Higgins MD,Ph.D., Isabel S. Dennahy MD, Michael Weykamp BS, Patrick E. Georgoff MD, Hassan Eidy BS, Mohammed Ghandour BS, Panpan Chang MD, Hasan B. Alam* MD, University of Michigan

Invited Discussant: Sandro Rizoli, MD

Introduction: Early treatment with valproic acid (VPA) has demonstrated neuroprotective effects in pre-clinical models of traumatic brain injury (TBI), including smaller brain lesion size, decreased brain edema, reduced neurologic disability, and faster recovery. Mechanisms underlying these favorable outcomes are poorly understood, especially at the level of the transcriptome. Given the magnitude of the beneficial effects, we hypothesized that administration of VPA would cause protective changes in the transcriptional signals of injured brain and that these changes could be measured within hours of treatment.

Methods: Ten female swine (40-45 kg) were subjected to a standardized protocol of TBI and 40%total blood volume hemorrhage. They were maintained in a state of shock for 2 hours before being resuscitated with (n=5/group) normal saline (NS; 3X volume of shed blood), or NS + VPA (150 mg/kg). Following 6 hours of observation, brain tissue was harvested to evaluate for lesion size and edema. Tissue from the penumbra was processed to isolate RNA, which was subjected to high-throughput RNA-Sequencing data analysis using DESeq2. Gene set enrichment and pathway analysis was performed to determine the differential gene expression patterns following injury.

Results: All animals demonstrated comparable degrees of shock and response to resuscitation. No adverse events were associated with VPA treatment. Animals treated with VPA were noted to have a significant reduction in brain lesion size (46% decrease, $p = 0.01$) and ipsilateral edema (57% decrease, $p = 0.01$). Analysis of transcripts demonstrated that VPA significantly up-regulated genes involved in morphology of the nervous system (p=1.39E-41; Fisher's exact test), neuronal development (p=4.37E-39) and neuron quantity (p=5.74E-35). VPA treatment downregulated pathways related to apoptosis (p=5.12E-28), glial cell proliferation (p=6.07E-26), and neuroepithelial cell differentiation (p=2.94E-25). Ingenuity Pathway Analysis identified VPA as the top upstream regulator of activated transcription (p=1.51E-20), supporting it as a direct cause of these transcriptional changes. Master transcriptional regulator NEUROD1 was also significantly upregulated (p=1.78E-19), suggesting that VPA may induce additional transcription factors.

Conclusions: Administration of a single dose of VPA attenuated brain lesion size, reduced brain edema, and induced significant changes in the transcriptome of injured brain within 6 hours. Patterns of differential expression were consistent with the proposed neurogenic and pro-survival effects of VPA treatment.

Session: XV: Quickshot Session I
Paper QS10: 10:09-10:15 am

PERIOPERATIVE GLYCEMIC CONTROL AND POSTOPOERATIVE COMPLICATIONS IN PATIENTS UNDERGOING EMERGENCY GENERAL SURGERY: WHAT IS THE ROLE OF HBA1C

Faisal Jehan MD, Muhammad Khan MD, Terence O'Keeffe* MB, ChB, MSPH, FACS, Andrew L. Tang* MD, FACS, Fahad S. Ahmed MD, Narong Kulvatunyou* MD, FACS, Arpana Jain MD, Gary A. Vercruysse* MD, FACS, Lynn M. Gries MD, Bellal A. Joseph* MD, FACS University of Arizona - Tucson

Invited Discussant: Panna Codner, MD

Introduction: Plasma Hemoglobin A1c (HbA1c) reflects quality of glucose control in diabetic patients. Literature reports that patients with an elevated HbA1c level are associated with increased postoperative morbidity and mortality undergoing surgery. The aim of our study was to evaluate the impact of HbA1c level on outcomes in Emergency General Surgery (EGS).

Methods: 3 year analysis of prospectively maintained database of EGS patients was performed. All patients who had HbA1c levels measured within 3 months before surgery were included. Patients were divided into two groups (HbA1c<6 and HbA1c≥6) Primary outcome measure was in-hospital major complication, using the Clavien-Dindo complication system (II, III, IV, and V). Multivariate, and linear regression were performed to control for confounders.

Results: 402 patients included in the analysis. Mean age was 61±12 y and 53% were females. 63.8% patients were diabetics. Overall 49% patients had HbA1c ≥ 6% and mortality rate was 6%. Patients with hypertension, history of coronary artery disease, and BMI ≥30kg/m ^{2} were more likely to have HbA1c ≥ 6.0%. 19.7% patients experienced major complication. Patients with HbA1c ≥ 6% had higher complication rate (31% vs 9.8%, p<0.001) as compared to HbA1c<6. However there was no difference in mortality between two groups (p=0.63). On multivariate regression analysis, after controlling for confounders, HbA1c ≥ 6.0% (odds ratio= 2.9; 95% CI, 2.5-6.6; p<0.001) and post-op RBS ≥200mg/dl (odds ratio= 2.3; 95% CI, 1.9-3.7; p<0.001) was independent predictor of major complications. Patients with HbA1c≥6.0% and post-op RBS≥200 has higher odds (OR: 4.2 [2.4-6.7]) of developing major complication. After adjusting for confounders, higher HbA1c was independently correlated with higher post-op RBS (b= 0.494, [19.7–28.4]), However, there was no correlation with pre-op RBS.

Conclusion: Patients with HbA1c≥6.0% and post-op RBS≥200mg/dl have 4 times higher risk of developing major complications after EGS. Pre-op HbA1c can help stratify patients who are more prone to develop post-op hyperglycemia regardless of their pre-op RBS. Postoperative RBS should be maintained below 200mg/dl.

Session: XV: Quickshot Session I
Paper QS11: 10:15-10:21 am

A DUAL METHOD APPROACH TO IDENTIFYING INTIMATE PARTNER VIOLENCE WITHIN A LEVEL 1 TRAUMA CENTER

Susie Divietro Ph.D., Rebecca Beebe Ph.D., Damian Grasso Ph.D., Christa Green BS, D'Andrea Joseph* MD, Garry Lapidus MPH, PA-C Hartford Hospital

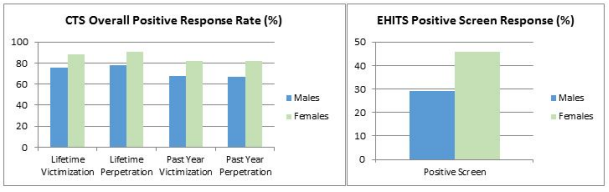
Invited Discussant: Krista Kaups, MD, MSc

Introduction: Intimate partner violence (IPV) is a serious public health problem leading many health care organizations to recommend universal screening as part of standard health care practice. However, our prior work has demonstrated that the vast majority of IPV victims and perpetrators are unidentified by health care staff. A retrospective review of our trauma registry from 2007 to 2015 identified only 19 cases out of 17649 patients (0.1%) that documented IPV. We sought to enhance the capacity of the urban trauma center to identify IPV using a dual method screening tool, and establish a base-rate of IPV victimization and perpetration among our trauma patients

Methods: Recruitment of male and female patients age 18 years or older has been underway at our trauma center since February 2015. Participants were given a touch-screen tablet with the Revised Conflict Tactics Scale (CTS-2) to asses IPV victimization and perpetration. IPV was subsequently assessed by a research assistant who interviewed patients in person using the Extended HITS (EHITS) tool. Chi square goodness of fit was calculated to find a correlation between the two measures in identifying positive results. The data were used to determine a base-rate of IPV among this patient population.

Results: Of 368 eligible patients, 138 have been recruited for the study (37.5% response rate). Preliminary analyses of the 138 cases (excluding 6 withdrawals) currently collected are as follows: The CTS-2 elicited overall lifetime and past-year rates of IPV of 82.6% and 72.5% for perpetration, with 80.4% and 73.2% for victimization respectively. Subscales including psychological aggression, physical assault, injury, and sexual coercion had lifetime and past year rates ranging from 29.7% to 81.9% for perpetration and 30.4% to 79.7% for victimization. The EHITS interview elicited a 34.8% rate of IPV among 125 respondents. We used the lifetime measure of physical assault victimization from the CTS to calculate a chi square test for independence with the EHITS tool, which indicated a significant correlation between the two measures X^2 $(1, n = 125) = 12.077$, $p = .001$.

Conclusion: This study directly compares two methods that identify IPV among male and female trauma patients for both victimization and perpetration. The tablet-based CTS screening demonstrated a higher sensitivity to IPV than the in-person EHITS screening, which is congruent with current literature on IPV disclosure. Our findings provide preliminary evidence to support a proposal to standardize universal IPV screenings in our trauma center. As a result of this study we plan to link screening results to medical record data to identify predictors of patients' current experiences of psychological and physical IPV. Our ultimate goal is to use these predictors to build a model for identifying patients who are at high risk for IPV victimization or perpetration thereby addressing an important injury prevention strategy.



Session: XV: Quickshot Session I
Paper QS12: 10:21-10:27 am

DOES AN ORGANIZED TRAUMA SYSTEM CAPTURE THE MAJOR TRAUMA VICTIM? A STATEWIDE ANALYSIS

Frederick B. Rogers* MD, MS, FACS, Michael A. Horst Ph.D., Brian W. Gross BS, Alan D. Cook* MD, FACS, Eric H. Bradburn DO, MS, FACS Lancaster General Health/Penn Medicine

Invited Discussant: Peter Fischer, MD, MSc

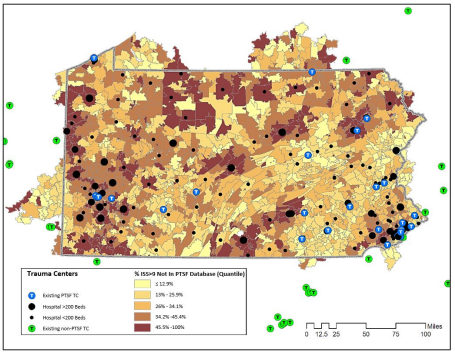
Introduction: Triaging severely injured trauma patients to accredited trauma centers is essential to improve survival. We sought to determine the percentage of patients meeting trauma criteria who are receiving definitive care at non-trauma centers within the Commonwealth of Pennsylvania. We hypothesized that a substantial proportion of the total trauma population would be undertriaged to non-trauma centers.

Methods: Pennsylvania has been an organized, state-designating trauma system since 1986. All adult (aged ≥15) hospital admissions meeting trauma criteria (ICD-9: 800-959; Injury Severity Score [ISS] >9) from 2003-2015 were extracted from the Pennsylvania Health Care Cost Containment Council (PHC4) database, and compared to the total trauma volume within the Pennsylvania Trauma Systems Foundation (PTSF) state registry with an ISS >9. PHC4 contains all hospital admissions within the state, whereas PTSF collects data on all trauma cases managed at designated trauma centers (Level I-IV). Total volume within PHC4 was compared to PTSF to determine the percentage of patients meeting trauma criteria who are undertriaged to non-trauma centers. Network Analyst Location-Allocation function in ArcGIS Desktop was used to generate a geospatial representation of undertriage throughout the state.

Results: Within PTSF, 173,010 trauma cases were identified from 2003-2015, while 255,086 cases meeting trauma criteria (ICD-9: 800-959; ISS >9) were found in the PHC4 database over the same timeframe. This suggests that 82,076 trauma cases (33.2% of total trauma volume) were undertriaged to non-trauma centers throughout the state. Visual geospatial analysis suggests regions with limited access to trauma centers comprise the highest proportion of undertriaged trauma patients (Figure 1).

Conclusion: Despite over 30 years of trauma system maturation within the state of Pennsylvania, over a third of severely-injured trauma patients are managed at hospitals outside of the trauma system. Intelligent trauma system design should include an objective process like geospatial mapping rather than the current system which is driven by competitive models of financial and healthcare system imperatives.

Figure 1. Distribution of Undertriage in the Commonwealth of Pennsylvania



Session: XV: Quickshot Session I
Paper QS13: 10:27-10:33 am

UNPLANNED INTUBATION IN TRAUMA PATIENTS: DOES IT MATTER?

Jordan T. Lilienstein MD, Preston R. Miller* MD, Amy N. Hildreth* MD, Andrew M. Nunn MD, Wake Forest University School of Medicine

Invited Discussant: Raeanna Adams, MD

Introduction: Unplanned intubation in medical intensive care units is associated with increased morbidity and mortality. However, available small studies in trauma patients suggest reintubation does not increase mortality. The purpose of our study is to determine whether reintubation is associated with morbidity and mortality in the trauma population.

Methods: A review of all intubated trauma patients admitted to a Level I trauma center over a 7 year period was performed. Patients successfully extubated were compared to those requiring reintubation. TQIP/NTDB criteria were used to define reintubation (unplanned replacement of endotracheal tube > 24 hours after extubation). Demographics, disposition, mortality and tracheostomy rate were compared.

Results: Between 1/1/2010 and 12/31/2016, 2,505 adult trauma patients were intubated with four hundred eighty-eight (19.5%) requiring reintubation. Reintubated patients were older (57.8 vs 46.3, $p<0.01$), had a higher GCS (12.2 vs 8.1, $p<0.01$), and more commonly had a history of smoking (31.4% vs 23.8%, $p<0.01$) while there was no difference in ISS (21.8 vs 23.2, $p=0.06$) or gender (male 75.8% vs 73.1%, $p=0.21$). Reintubated patients had more ventilator (11.6 vs 5.1, $p<0.01$) and ICU days (12.62 vs 5.96, $p<0.01$), a longer overall stay (24.7 vs 13.9, $p<0.01$), and a higher rate of tracheostomy (32.0% vs 16.1%, $p<0.01$). In those surviving to discharge, reintubation was associated with a higher rate of disposition to SNF, LTAC or rehab (60.3% vs 40.6%, $p<0.01$). On multivariable logistic regression, reintubation independently predicted both need for tracheostomy (OR 2.56, CI 1.99 – 3.28, $p < 0.01$) and mortality (OR 1.74, CI 1.14 – 2.65, $p < 0.01$).

Conclusion: Despite earlier reports, these data show that reintubation in trauma patients is associated with increased mortality and need for tracheostomy. Reintubated patients are also more likely to require inpatient skilled care upon hospital discharge. These findings may inform discussions between physicians and family regarding the consequences of reintubation. Future studies should focus on the modifiable factors that influence the need for reintubation.

Session: XVI: Quickshot Session II
Paper QS14: 10:42-10:48 am

CONTEMPORARY TOURNIQUET USE IN EXTREMITY VASCULAR TRAUMA: THE AAST PROSPECTIVE OBSERVATIONAL VASCULAR INJURY TREATMENT (PROOVIT REGISTRY

Sarah-Ashley Ferencz MD, Joseph J. DuBose* MD, Jamie Hennigan MD, Kailey Nolan BS, James B. Sampson MD, Todd E. Rasmussen* MD, Joseph M. Galante* MD, Tiffany Bee MD, Timothy C. Fabian* MD, Jay A. Menaker MD, Thomas M. Scalea* MD, John B. Holcomb* MD, David J. Skarupa MD, Kenji Inaba* MD, John K. Bini* MD, Wright State University

Invited Discussant: Mark Bowyer, MD

Introduction: Correct tourniquet application can be a lifesaving technique prior to definitive surgical treatment of extremity vascular trauma. After World War II, tourniquet use had fallen out of favor due to potential complications such as nerve damage and limb loss. Current guidelines recommend tourniquet use to control hemorrhage from penetrating lower extremity trauma. There are many reports of successful tourniquet use in military conflicts; however, only a few small studies have evaluated their use in the civilian trauma population. We aimed to describe the contemporary use of tourniquets in the management of civilian extremity vascular trauma and evaluate the associated outcomes.

Methods: We reviewed data from the multicenter AAST Prospective Observational Vascular Injury Treatment (PROOVIT) registry from Feb 2013 to Dec 2016. This data included key elements of vascular trauma presentation, diagnosis, management and outcomes. Data was compared with student t-tests and propensity score matching using R software. Controls were matched using the covariates Injury Severity Score, Abbreviated Injury Score of the extremity, initial systolic blood pressure, initial Glasgow Coma Scale score, initial lactate level, and age. Patients with multiple arterial injuries were excluded from analysis.

Results: A total of 623 patients with extremity arterial injuries were included for analysis. Pre-hospital tourniquets were placed in 17.5% of patients with extremity arterial injury. The overall number of amputations following any arterial extremity injury was low, with or without the placement of a tourniquet, and not statistically different when compared to propensity matched controls (tourniquet 0.04 vs control 0.10; p=0.12). There was no statistical difference between the in-hospital mortality rates when tourniquets were used (tourniquet 0.08 vs control 0.04; p=0.18). In patients with brachial artery injuries the use of tourniquets was associated with a reduced average hospital length of stay (11.3 days vs 17.0 days; p=0.23) and average ICU length of stay (3.5 days vs 7.0 days; p=0.04). When compared to controls, tourniquet use did not significantly affect 24-hour packed red blood cell (pRBC) transfusion requirement (tourniquet 7.98 vs control 7.12; p=0.35), need for post-operative therapeutic anticoagulation (tourniquet 0.65 vs control 0.68; p=0.36), or the rate of infection in the affected limb (tourniquet 0.01 vs control 0.02; p=0.45).

Conclusion: The PROOVIT registry shows that in contemporary civilian practice, tourniquets are used for extremity arterial injury in just 17.5% of cases, a rate much lower than previously reported for both civilian and military settings. Tourniquet use was not associated with an increased rate of amputation, in-hospital mortality, 24-hour pRBC transfusion, or subsequent infection in the affected limb when compared to matched controls. There was a statistically significant shorter ICU length of stay in patients who had tourniquets placed for brachial artery injuries. There was also a trend toward shorter hospital length of stay by over 5 days in this group as well, which while not statistically significant, may have important clinical implications.

Session: XVI: Quickshot Session II
Paper QS15: 10:48-10:54 am

TETHERED-LIQUID OMNIPHOBIC SURFACE COATING INHIBITS BLOOD ADHERANCE TO PLASTIC, DELAYS CLOT FORMATION AND REDUCES CLOT STRENGTH IN EX VIVO HUMAN BLOOD

Teryn R. Roberts MS, Daniel C. Leslie Ph.D., Leopoldo C. Cancio* MD, Andriy I. Batchinsky MD, US Army Institute of Surgical Research

Invited Discussant: Mitchell Cohen, MD

Introduction: Coagulation management is a significant hurdle during extracorporeal life support (ECLS), especially in trauma patients. Anti-thrombogenic surfaces are being developed to prevent clot formation in the circuitry without systemic heparin. We investigated a novel polymer coating for its ability to inhibit blood adherence and prevent thrombus formation. This bilayer coating consists of a covalently bound perfluorocarbon that tethers a mobile, liquid surface layer to create an anti-thrombogenic liquid top-coat, referred to as tethered liquid perfluorocarbon. We hypothesized that application of this coating in thromboelastography (TEG) cups reduces the rate of clot formation and clot strength by inhibiting surface adhesion in *ex vivo* human blood preparation.

Methods: Standard TEG cups were briefly exposed to low-pressure oxygen plasma (100 W), then immersed in a liquid silane solution, rinsed and dried to covalently attach a perfluorinated layer. Before TEG analysis, a thin layer of liquid perfluorodecalin (PFD Group) or liquid Fluorinert FC70 (FC70 group) was applied to the cups. Uncoated TEG cups were used as a control (CTR Group). As an additional control, liquid perfluorodecalin was applied to standard TEG cups without the silane layer (CTR+LP Group) to account for volume changes. 340 µL of citrated human donor blood (n=10) was added to each cup with 20 µL $CaCl_2$. Reaction time (R), clot formation rate (K), fibrin formation and thrombin burst (alpha), clot strength (MA), and percent fibrinolysis at 30 min and 60 min (LY30, LY60) were measured. Cups were weighed before addition of blood, and after TEG was complete and non-adherent blood materials were removed by inversion, to determine the adherent clot weight. Statistical tests were conducted using SAS 9.4 (Cary, NC) with an alpha = 0.05 for significance. Data are expressed as means ± SEM.

Results: Adherent clot weight was significantly lower in FC70 (8.45±2.37 mg) than PFD (95.7±21.3 mg), and both were lower vs. CTR (279±7.00 mg) and CTR+LP (258±46.0 mg). Clot formation rate was prolonged in PFD and FC70 (out of the limit of detection). Alpha was lower in the PFD and FC70 groups versus controls. MA was significantly decreased in PFD (14.9±6.5 mm) vs. FC70 (8.7±0.9 mm), and both were decreased vs. CTR (54.5±5.7 mm) and CTR+LP (59.6±3.2 mm). LY30 and LY60 were higher in FC70 group vs. CTR and CTR+LP.

Conclusion: Tethered liquid bilayer coatings using PFD and FC70 display omniphobic properties by decreasing surface adhesion of blood, reducing the rate of clot formation and decreasing clot strength. This approach has significant potential as an anti-thrombogenic surface and may enable ECLS without systemic anticoagulation.

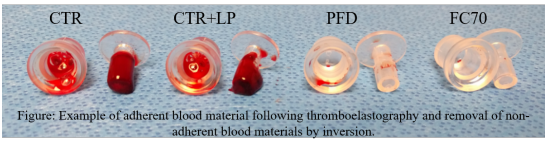


Figure: Example of adherent blood material following thromboelastography and removal of non-adherent blood materials by inversion.

Session: XVI: Quickshot Session II
Paper QS16: 10:54-11:00 am

THE UTILITY OF ADMISSION FUNCTIONAL VITAL CAPACITY COMPARED TO NUMBER OF RIB FRACTURES IN PREDICTING PATIENT OUTCOMES

Uzer Khan MD, Stanley Wolfe Nicole Cornell MS, CCRC, Alison Wilson* MD, West Virginia University

Invited Discussant: Dan Bonville, DO

Introduction: Rib fractures are common injuries, and their severity has classically been stratified anatomically by using the number of ribs fractured (RF). Our institution instituted a rib fracture care pathway based on an injured patient's admission forced vital capacity (FVC). Patients are initially stratified by an admission FVC, followed by daily FVC monitoring. The objective of this pilot study was to compare the accuracy of using the anatomic parameter of number of ribs fractured compared to the physiologic parameter of FVC in predicting outcomes.

Methods: This is a retrospective study completed at a single ACS Level 1 trauma center. Data was collected from the institutional trauma registry and patient charts from January 2009 to December 2014. Data included the number of ribs fractured, admission FVC, lowest FVC, length of stay (LOS), AIS, ISS, presence of COPD, pneumonia, and mortality. Patients were excluded if the FVC was not obtained on admission, or if they had a TBI or altered mental status. Other injuries were not excluded. Statistics were performed by a biostatistician using ANOVA and Fisher's Exact Test.

Results: Data from 1,225 patients were collected and analyzed. An FVC of less than 0.7 was associated with significantly worse mortality. Specifically, in patients who were 60 years of age or older, this increased mortality was demonstrated even when the FVC was less than 0.9 (19.6% vs. 3.0%, p=.0001). Both, decreased FVC (p=.0004) and increased RF (.006) were associated with mortality in this age group. Furthermore, FVC correlated with the occurrence of pneumonia in patients who were 60 years of age or older (p=.01) and with LOS in patients with COPD (p=.02). RF did not correlate with either of these parameters (p=.25 and .29 respectively).

Conclusion: Admission FVC is a useful tool in caring for patients with rib fractures, particularly in the elderly. A FVC<0.9 is associated with a significant risk of death and should prompt careful consideration. FVC can be a helpful adjunct in patients who are 60 years of age or older and in those with COPD. Further evaluation of using FVC in the care of rib fracture patients is warranted.

Session: XVI: Quickshot Session II
Paper QS17: 11:00-11:06 am

CRITICAL LEVEL OF PLASMA FIBRINOGEN IN THE EARLY PHASE OF SEVERE BLUNT TRAUMA PATIENTS

Kenta Ishii MD, Koji Idoguchi MD, Yasuaki Mizushima Ph.D., Yasumitsu Mizobata* Ph.D., Tetsuya Matsuoka Ph.D., Osaka Prefectural Senshu Critical Care Medical Center

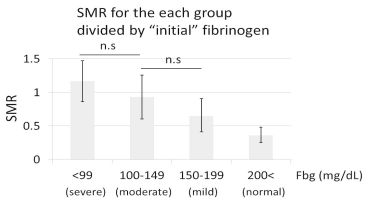
Invited Discussant: Christine Gaarder, MD

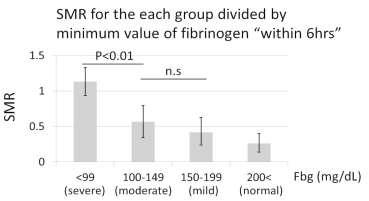
Introduction: In severe trauma patients, hemostatic resuscitation is known as an important part of damage control resuscitation. Fibrinogen is essential for hemostasis and often decreases earlier than other coagulation factors; however, we have little evidence on critical values of fibrinogen in the early phase of trauma care.

Methods: We retrospectively reviewed consecutive severe blunt trauma patients (ISS>15) admitted to single trauma center from January 2011 to December 2015. We routinely measure the initial fibrinogen on their emergency department (ED) arrival, and usually measure repeatedly in the early phase of severe trauma patients. The enrolled patients were divided into four groups according to their values of initial fibrinogen or their "minimum value" of fibrinogen within the first 6 hours. We defined "severe" hypofibrinogenemia as less than 100 mg/dL, "moderate" as 100-149 mg/dL, "mild" as 150-199 mg/dL, and "normal" as more than 200 mg/dL. The mortality and standardized mortality ratio (SMR; ratio of recorded mortality to expected mortality by TRISS method) of each groups were calculated and we regarded high SMR as poor survival.

Results: A total of 763 severe blunt trauma patients were enrolled during six years. In-hospital mortality and SMR for all the enrolled patients was 12.7% (97/763) and 0.568 (95%CI 0.469-0.673), respectively. First, we divided them into four groups using their initial fibrinogen. The mortality and SMRs were 70.4% (19/27) and 1.167 (95%CI 0.861-1.473) for the severe hypofibrinogenemia group, 38.5% (20/52) and 0.932 (95%CI 0.606-1.257) for the moderate group, 17.3% (22/127) and 0.646 (95%CI 0.410-0.910) for the mild group, 6.5% (36/557) and 0.361 (95%CI 0.252-0.481) for the normal group, respectively. There was no significant difference in SMR between the severe group and the moderate group or between the moderate group and the mild group. Second, we divided all the enrolled patients into four groups using their minimum value of fibrinogen within first 6 hours. The mortality and SMRs were 62.2% (46/74) and 1.131 (95%CI 0.935-1.329) for the severe group, 18.2% (20/110) and 0.568 (95%CI 0.340-0.796) for the moderate group, 9.6% (16/167) and 0.419 (95%CI 0.236-0.628) for the mild group, 3.6% (15/412) and 0.262 (95%CI 0.139-0.401) for the normal group, respectively. The SMR of the severe group was significantly higher than that of moderate group with statistical significance and there was no significant difference between the moderate group and the mild group.

Conclusion: In severe blunt trauma patients, the level of fibrinogen less than 100mg/dL within first 6 hours is critical. Intervention studies would be required to confirm the effectiveness of maintaining fibrinogen more than 100mg/dL in the early phase of severe trauma.





Session: XVI: Quickshot Session II
Paper QS18: 11:06-11:12 am

IS IT IN THE BLOOD? LABORATORY VALUES OF COAGULATION AMONG TRAUMA PATIENTS ON NOAs: RESULTS OF AN AAST-MITC STUDY

Leslie M. Kobayashi* MD, Galinos Barmparas MD, Patrick Bosarge* MD, Carlos V. Brown* MD, Marko Bukur* MD, Matthew M. Carrick* MD, Jan Holly-Nicolas MD, Kenji Inaba* MD, Stepehn Kaminski* MD, Raminder Nirula* MD,Ph.D., Tammy Kopelman* MD, Eric J. Ley MD, Jacob Quick MD, Martin Schreiber* MD, Raul Coimbra* MD,Ph.D., AAST Multi-Institutional Trials Committee

Invited Discussant: Luke Leenen, MD, PhD

Introduction: Warfarin is associated with worsened outcomes following trauma, an effect correlated with elevations in international normalized ratios (INR). Reversal of coagulopathy due to warfarin use has been associated with improved outcomes. In contrast, the novel oral anticoagulants (NOAs) such as dabigatran, rivaroxaban, and apixaban have no validated laboratory measure to quantify coagulopathy. It has been suggested that patients on NOAs would have consistently higher than normal aPTT levels. We sought to determine if use of NOAs is associated with elevated aPTT or INR levels among trauma patients or increased clotting times on thromboelastography(TEG).

Methods: This was a post hoc analysis of data from a prospective observational study across 16 trauma centers via the AAST-MITC. Inclusion criteria consisted of any trauma patient admitted on dabigatran, rivaroxaban, or apixaban. Demographic data, admission vital signs, mechanism of injury, laboratory values, transfusions, reversal agents, and interventions were collected. Laboratory values at admission were compared between medication groups and before and after correction. Traditional measures of coagulopathy were compared to TEG results utilizing Spearman's rank coefficient to determine if any correlation existed.

Results: A total of 182 patients on NOA's were enrolled during the study period 6/2013-7/2015; 50 on dabigatran, 123 on rivaroxaban, and 34 apixaban. INR values were mildly elevated among patients on dabigatran (median 1.3, IQR 1.1, 1.4) and rivaroxaban (median 1.3, IQR 1.1, 1.6) compared to apixaban (median 1.1, IQR 1.0, 1.2). Patients on dabigatran presented with slightly higher than normal aPTT values (median 35 IQR 29.8, 46.3), while those on rivaroxaban and apixaban did not. Fifty patients had TEG results. Median values for R, Alpha, MA and lysis were within normal limits for all medication groups (Table 1). PT and aPTT had a high correlation in all medication groups (dabigatran p=0.0005, rivaroxaban p<0.0001, apixaban p<0.0001). aPTT correlated with R value on TEG in patients on dabigatran (p=0.0094) and rivaroxaban (p=0.0028) but not apixaban (p=0.2532).

Conclusion: Neither traditional measures of coagulation nor TEG were able to detect clinically significant coagulopathy in patients on NOAs, although aPTT values were slightly higher than normal among patients on dabigatran.

Table 1. Laboratory measures of coagulation among patients on NOAs (Significant values in bold). Normal values: PT=9.7-12.5; aPTT=25-34; R=5-10, Alpha=53-72, MA=50-70, Lysis=0-8%.

	Dabigatran	Rivaroxaban	Apixaban	P-value
N	50	123	34	
PT value median (IQR)	14.1 (12.1, 15.5)	13.8 (11.8, 17.3)	13.4 (11.3, 15)	0.441
INR median (IQR)	1.3 (1.1, 1.4)	1.3 (1.1, 1.6)	**1.1 (1.0, 1.2)**	0.011
aPTT median (IQR)	**35.0 (29.8, 46.3)**	30.4 (27.0, 35.9)	28.7 (25.7, 33.9)	0.002
TEG R median (IQR)	5.3 (3.9, 7.5)	5.6 (4.4, 8.0)	4.4 (4.0, 5.0)	0.207
TEG Alpha median (IQR)	69.5 (67.6, 72.6)	70.7 (65.7, 73.8)	71.2 (65.6, 76.4)	0.873
TEG MA median (IQR)	66.8 (62.9, 69.8)	67.3 (62.2, 71.0)	67.1 (62.4, 72.5)	0.986
Lysis median (IQR)	0.0 (0.0-1.5)	0.0 (0.0-1.0)	0.0 (0.0-0.0)	0.322

Session: XVI: Quickshot Session II
Paper QS19: 11:12 am - 11:18 am

THE TRUE PRICE OF PAKOLOLO: MOTOR VEHICLE CRASH FATALITIES AND UNDERCOMPENSATED CARE ASSOCIATED WITH LEGALIZATION OF MARIJUANA

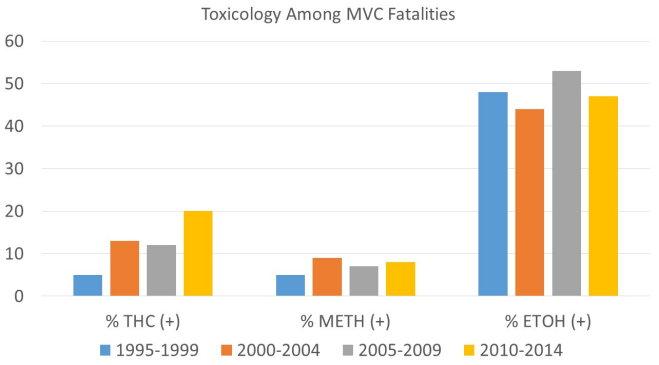
Susan Steinemann* MD, Walter L. Biffl* MD, Susan E. Biffl MD, Daniel Galanis Ph.D.,
University of Hawaii

Invited Discussant: Andrew Kerwin, MD

Introduction: Half of U.S. states have legalized medical marijuana (MJ), and some have legalized it for recreational use. The public health effects of these policies are still being evaluated; studies of the impact on motor vehicle crash (MVC) fatalities have been mixed. We hypothesized that medical MJ legalization has been associated with an increase in MJ-related MVC fatalities, and that MJ use is associated with high-risk behavior and poor insurance status.

Methods: Hawaii legalized medical MJ in 2000. Fatality Analysis Reporting System (FARS) data for Hawaii was analyzed for periods before (1995-1999) and after (2000-2014) legalization. Presence of MJ (THC), methamphetamine (METH), and alcohol (ETOH) in fatally injured MVC occupants were compared. Data from the state's highest level trauma center were also reviewed for THC status from 1997-2013. State Trauma Registry data from 2013-2015 were reviewed to evaluate association between MJ use and risky behaviors (helmet/seatbelt use), as well as payor mix.

Results: Over 90% of fatal crash victims (70/year) are now tested for drugs and ETOH. THC-positivity among MVC fatalities has increased significantly since legalization, with a four-fold increase from the 1995-1999 period to the 2010-2014 period (Figure). In comparison, METH-which has remained illegal- has been present in 5-9% with no statistical change from 1995-2014. ETOH positivity has also remained stable, from 44-53% for each period. The rate of THC-positivity among all injured patients tested at our highest level trauma center increased from 11% before to 20% after legalization. From 2013-2015, THC(+) patients were significantly less likely to have been wearing a seatbelt (57% vs 69%) or helmet (17% vs 42%). They were also significantly more likely to have Medicaid insurance (42% vs 21%) or self-pay (10% vs 6%).



Conclusions: Since legalization of medical MJ in Hawaii, THC positivity among MVC fatalities has quadrupled statewide, and THC positivity among patients presenting to the highest level trauma center has doubled. THC-positive patients are less likely to use protective devices and are less likely to have medical insurance. These findings have implications nationally and underscore the need for further research and policy development to address the public health effects and the costs of increased MJ-related trauma.

Session: XVI: Quickshot Session II
Paper QS20: 11:18-11:24

AN ANALYSIS OF INTENSIVE CARE UNIT BOUNCEBACK ON OUTCOMES IN A MATURE TRAUMA SYSTEM

Eric H. Bradburn DO, MS, FACS, Brian W. Gross BS, Alan D. Cook* MD, FACS, Jo Ann Miller MSN, FNP-C, CCRN, TCRN, Patrick K. Kim* MD, FACS, Frederick B. Rogers* MD, MS, FACS Lancaster General Health/Penn Medicine

Invited Discussant: George Velmahos, MD, PhD

Introduction: With the recent birth of the Pennsylvania TQIP Collaborative, statewide data identified unplanned admissions to the Intensive Care Unit (ICU) as an overarching issue plaguing the state trauma community. In an effort to better understand the global impact of this unique population, we sought to determine the effect of unplanned ICU admission/readmission on mortality and functional status at discharge (FSD). We hypothesized that ICU bounceback patients would experience increased mortality and decreased FSD compared to a non-bounceback control.

Methods: The Pennsylvania Trauma Outcome Study database was retrospectively queried from 2011-2015 for all patients with an unplanned admission to the ICU/return to the ICU after initial discharge (bounceback). Unadjusted mortality rates and FSD scores were compared between bounceback and non-bounceback ICU counterparts. A multilevel mixed-effects logistic regression model assessed the adjusted impact of bounceback on mortality, and a generalized linear mixed-model measured the impact of bounceback on FSD.

Results: A total of 2,070 bounceback patients were identified from 2011-2015 (2,070/72,331 ICU admissions [3%]). Compared to the non-bounceback ICU population, bounceback patients had a significantly lower mean FSD score (15.0±4.6 vs. 17.0±3.9; $p<0.001$) and a significantly higher mortality rate (12% vs. 8%; $p<0.001$). In adjusted analysis, bounceback was associated with an 88% increased odds ratio for mortality (AOR: 1.88, 95%CI: 1.60-2.21; $p<0.001$). Bounceback remained significantly associated with reduced FSD in adjusted analysis (AOR: 0.22, 95%CI: 0.18-0.27; $p<0.001$) (Table 1).

Conclusion: Unplanned admission/readmission to the ICU is associated with worse outcomes in trauma patients. These findings emphasize the usefulness of Collaboratives in identifying statewide issues in need of performance improvement within mature trauma systems.

Table 1. Adjusted Odds Ratios for Mortality and Functional Status at Discharge with Intensive Care Unit Bounceback

		Mortality	Functional Status at Discharge	
Variable	AOR (95% CI)	*p*	AOR (95% CI)	*p*
Bounceback	1.88 (1.60-2.21)	<0.001	0.22 (0.18-0.27)	<0.001
Age				
20 and under	Reference	-	Reference	-
30	1.04 (0.88-1.23)	0.638	0.89 (0.79-1.01)	0.075
40	1.29 (1.10-1.51)	0.002	0.63 (0.56-0.71)	<0.001
50	2.43 (2.11-2.79)	<0.001	0.38 (0.34-0.42)	<0.001
60	5.10 (4.45-5.86)	<0.001	0.18 (0.16-0.21)	<0.001
70	10.0 (8.78-11.5)	<0.001	0.08 (0.07-0.09)	<0.001
80	16.3 (14.4-18.6)	<0.001	0.03 (0.03-0.03)	<0.001
90 and over	20.7 (17.7-24.2)	<0.001	0.01 (0.01-0.01)	<0.001
TMPM	1.46 (1.43-1.48)	<0.001	0.61 (0.60-0.63)	<0.001
GCS	0.79 (0.78-0.79)	<0.001	1.31 (1.30-1.32)	<0.001
Systolic Blood Pressure	0.99 (0.99-0.99)	<0.001	1.00 (1.00-1.01)	<0.001
Injury Year	0.98 (0.95-1.00)	0.051	0.99 (0.97-1.01)	0.447
		AUROC: 0.87		

Session: XVI: Quickshot Session II
Paper QS21: 11:24-11:30 am

POSTTRAUMATIC STRESS DISORDER AFTER INJURY: MECHANISM BUT NOT INJURY SEVERITY MATTERS

Juan P. Herrera-Escobar MD, Michel Apoj BS, Alexandra Geada BS, Alyssa Harlow MPH, Belinda Gabbe Ph.D., Eric B. Schneider Ph.D., Karen Brasel* MD,MPH, George Kasotakis* MD,MPH, Haytham M. Kaafarani* MD,MPH, George Velmahos* MD,Ph.D., Ali Salim* MD, Adil H. Haider* MD,MPH, Deepika Nehra MD, Harvard Medical School/Center For Surgery And Public Health

Invited Discussant: Thomas Esposito, MD, MPH

Introduction: Traumatic injury is strongly associated with long-term mental health disorders but there is little understanding of the psychiatric illness that develops after traumatic injury. We report on a multi-institutional collaboration to collect long-term patient-centered outcomes after trauma including screening for post-traumatic stress disorder (PTSD). The objective of this study is to determine the incidence of and risk factors for the development of PTSD following traumatic injury.

Methods: Adult trauma patients with moderate-severe injuries [ISS ≥9], admitted to three Level I trauma centers were identified retrospectively and screened at 6- or 12-months post-injury for PTSD using the Breslau scale. Patients were divided into three groups by mechanism: Fall, Road Traffic Injury (RTI), and Penetrating trauma. Incidence of PTSD within each group was determined. Multivariable logistic regression analysis was used to determine the association of injury severity, age, and sex on the development of PTSD.

Results: 477/735 (65%) patients contacted completed the PTSD screen. Overall 23% screened positive for PTSD but this differed significantly by mechanism with the lowest incidence after a fall at 16% and highest after penetrating trauma at 65% (Table). Injury severity was not associated with PTSD for any group. Younger age was associated with a higher incidence of PTSD following a fall [OR: 0.96, CI: 0.95-0.98]. Both younger age [OR: 0.98, CI: 0.96-0.99) and female sex [OR: 2.1, CI: 1.1-4.2] were associated with a higher incidence of PTSD following a RTI. Neither age nor sex was associated with PTSD following penetrating trauma. Only 25% of patients who screened positive for PTSD were receiving treatment at the time of the survey.

	Fall (n= 264)	RTI (n= 176)	Penetrating Trauma (n= 37)	*p* -value
Age yrs, mean (SD)	66 (17)	44 (18.6)	31 (11.8)	<0.001
Sex, male	48%	62%	82%	<0.001
Race, white	83%	61%	29%	<0.001
ISS, mean (SD)	12.9 (5.9)	16 (8.7)	17 (9.8)	<0.001
LOS (days), median (IQR)	4 (3-7)	5 (3-8)	8 (4-12)	<0.001
Positive PTSD screening	16%	28%	65%	<0.001

ISS: Injury severity score; LOS: length of stay

Conclusion: PTSD is common after traumatic injury and the incidence varies significantly by injury mechanism but is not associated with injury severity. Few patients who screen positive for PTSD following injury are receiving treatment.

Session: XVI: Quickshot Session II
Paper QS22: 11:30-11:36 am

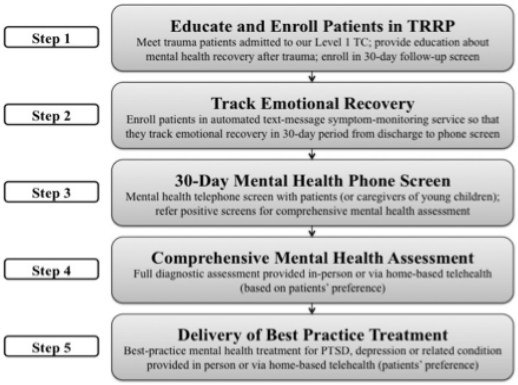
TRAUMA RESILIENCE AND RECOVERY PROGRAM (TRRP): AN INTERDISCIPLINARY, TECHNOLOGY ENHANCED APPROACH TO IDENTIFICATION AND REFERRAL FOR TREATMENT FOR TRAUMA PATIENTS AT A LEVEL 1 TRAUMA CENTER

Samir M. Fakhry* MD, Kenneth J. Ruggiero Ph.D., Tatiana M. Davidson Ph.D., Brian E. Bunnell Ph.D., Pamela L. Ferguson Ph.D., Jennifer Winkelmann MS, James McElligott MD, Medical University of South Carolina

Invited Discussant: Grace Rozycki, MD, MBA

Introduction Progress in trauma care has focused on pre-hospital and hospital settings. Many trauma patients report emotional/psychological distress after injury (19-42%) and these are associated with deficits in physical recovery, social functioning and quality of life. Relatively few US trauma centers (TCs) monitor and address non-physical recovery. We describe an innovative interdisciplinary technology assisted approach to identification and referral for treatment of patients at a Level 1 TC.

Methods: Patients admitted to our level 1 TC (9/1/2015 to 8/31/2016) were approached for inclusion in a 5 step process (Figure).



Results: 510 of 914 inpatients were approached (55%); 16% ≤ age 17, 29.9% female. In year one of operation, we completed 30 day mental health screens in 299, offered mental health treatment to 94 (72 by telehealth) and completed 200 treatment visits (160 by telehealth). Over 95% of patients approached in-hospital agreed to enroll in 30-day screening. 42% of enrolled patients screened positive for PTSD and/or depression. The age group with the highest proportion of positive screens was 28 to 59 (54.3%).

Conclusions: This work demonstrates the feasibility and acceptance of an early intervention program designed to identify and provide follow-up evidence based services to patients who experience clinically elevated mental health difficulties after trauma. We found a high prevalence of PTSD and depression after discharge and high engagement in each level of service we provided. Because emotional/psycholigical health after injury is associated with improved productivity and long-term outcomes, TCs should adopt similar organized, broadly-based approaches to ensure optimal long-term outcomes.

Session: XVI: Quickshot Session II
Paper QS23: 11:36-11:42 am

MACHINE LEARNING ALGORITHM PREDICTS SUCCESSFUL FASCIAL CLOSURE AFTER TRAUMA LAPAROTOMY

Rondi B. Gelbard MD, Seth A. Schobel Ph.D., Christopher J. Dente* MD, Bryan C. Morse MD, MS, Anuradha Subramanian* MD, Peter M. Rhee* MD, Timothy G. Buchman MD,Ph.D., Allan D. Kirk MD,Ph.D., Eric A. Elster MD, Emory University School Of Medicine

Invited Discussant: Eleanor Winston, MD

Introduction: Predicting outcomes of abdominal wall closure following trauma laparotomy remains a challenging endeavor. Bayesian models using biomarker expression have been studied in combat-related injuries to predict wound healing outcomes and direct wound management. Based on our previous research, procalcitonin (ProCT) levels appear to differ among patients that fail fascial closure versus those that heal successfully. We sought to develop a clinical model using machine learning techniques (Bayesian network analysis and random forest modeling) to predict the ability to achieve fascial closure after trauma laparotomy.

Methods: All patients undergoing exploratory laparotomy for blunt or penetrating trauma between September 2014 and June 2016 at a Level 1 trauma center were included. Serum and peritoneal fluid was collected at the initial laparotomy and all subsequent abdominal operations. Luminex and ProCT assays were performed on all specimens. A multiclass model was created to predict the outcomes of 3 groups of patients: 1) those managed with damage control laparotomy without achieving fascial closure, 2) those that achieved successful fascial closure and 3) those who dehisced after fascial closure. Constraint-based and local discovery learning algorithms from the "bnlearn" R package were used. The full dataset was then searched with a Bayesian network algorithm for a reduced variable set to build into the multiclass model. All models were assessed by receiver operator characteristic (ROC) curves and areas under curve (AUC).

Results: Seventy-five patients were enrolled during the study period (67.7% penetrating, 33.3% blunt injury). Of these, 17.3% were managed with damage control laparotomy without achieving fascial closure, 73.3% underwent successful fascial closure, and 9.3% dehisced after fascial closure. There was no significant difference in age, gender, injury severity score, or initial base deficit among groups. The Bayesian network search algorithm selected Peritoneal Lavage ProCT, Serum ProCT, Peritoneal Lavage Interleukin (IL) 17 and Serum IL4. These variables were used to train a random forest classification model that performed well (Kappa 0.41). The model accuracy rate of 0.64 outperformed the no information rate of 0.48. The sensitivity, specificity, and AUC for the 3 groups are summarized in Figure 1. Predicting successful fascial closure had the highest sensitivity (73%), while predicting failure of fascial closure had the highest specificity (92%). Comparing the AUC between groups revealed that predicting successful fascial closure performs the best compared to the other groups.

Conclusion: Bayesian modeling using biomarkers can predict the success or failure of fascial closure after trauma laparotomy. This multiclass model best predicts which patients will undergo successful primary fascial closure. These findings allow for the development of clinical decision support tools to individualize management of injured patients undergoing trauma laparotomy.

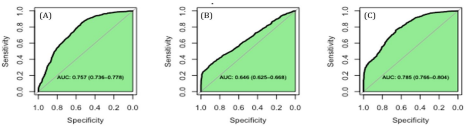


Figure 1. ROC curve plots for: (A) failed fascial closure, (B) open abdomens, and (C) healed closure.

Session: XVI: Quickshot Session II
Paper QS24: 11:42-11:48 am

RETHINKING OUR DEFINITION OF OPERATIVE SUCCESS: PREDICTING EARLY MORTALITY FOLLOWING EMERGENCY GENERAL SURGERY COLON RESECTION

Michael P. DeWane MD, Adrian A. Maung* MD, Kevin M. Schuster* MD,MPH, Kimberly A. Davis* MBA,MD, Robert D. Becher MD, MS Yale School of Medicine

Invited Discussant: David Skarupa, MD

Introduction: The pre-and post-operative care of emergency general surgery patients can be fraught with uncertainty. Although risk calculators exist, there is limited data to inform decisions on the appropriateness of operative intervention, and the likelihood of perioperative adverse outcome. Examination of the temporal trends in mortality following emergent colon resection may help inform complex perioperative decision making. We hypothesized that pre-operative risk factors could be identified to predict early post-operative mortality and better inform decisions to operate.

Methods: This retrospective cohort study investigated the timing of postoperative mortality and patient characteristics associated with early mortality after emergent colon resection utilizing the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database during years 2012 to 2014. The cohort was stratified into three groups: early death (postoperative day 0 to 4), late death (postoperative day 5 to 30), and those who survived past 30 days. Multivariable logistic regression was utilized to explore independent preoperative and postoperative characteristics associated with early death. Kaplan-Meier models and Cox regression analyses were used to determine at which time point postoperatively these factors had a significant effect on early mortality.

Results: A total of 18,803 patients were analyzed. The overall 30-day mortality was 12.5%, and of those 37.1% (899) were early deaths. The preoperative risk factor most predictive of early death was preoperative septic shock (Odds Ratio [OR] 3.62, $p<0.0001$). Others included ventilator dependence (OR 2.81, $p<0.0001$), ascites (OR 1.63, $p=0.0006$), preoperative dialysis dependence (OR 1.61, $p=0.0004$), preoperative sepsis (OR 1.46, $p=0.0032$) and dependent functional status (OR: 1.25, $p=0.0308$). Postoperative complications associated with early death included pulmonary embolism (PE; OR 5.78, $p<0.0001$), postoperative septic shock (OR 4.45, $p<0.0001$) and new onset renal failure (OR 1.886, $p<0.0001$). Of the 2,710 patients with preoperative septic shock, 52% continued to have shock in the early postoperative period. These patients with both pre-and post-operative shock had an overall mortality rate of 47% with over half of all deaths occurring in the early period. Those patients in shock who didn't die in the early period improved their chances of survival by 36%.

Conclusion: Nearly 40% of patients who die after emergent colon resection experience early death, between post-operative day 0 and 4. Early mortality is influenced by multiple factors, most prominently septic shock. Postoperative complications are additional compounding drivers of early mortality; preventing these complications could potentially improve outcomes. Patients with septic shock are at very high operative risk, though those who survive to 5 days post-operatively have an improved probability of survival. These results demonstrate a clear pattern in the temporal trends of mortality, which may inform perioperative patient and family discussions and complex management decisions.

Session: XVI: Quickshot Session II
Paper QS25: 11:48-11:54 am

CONTEMPORARY TIMING OF TRAUMA MORTALITIES

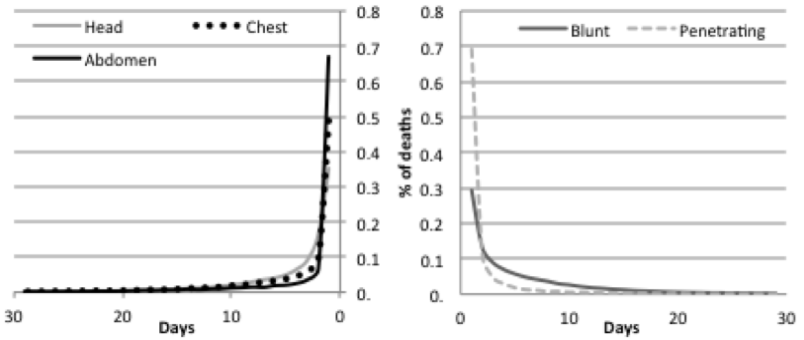
James M. Bardes MD, Kenji Inaba* MD, Morgan Schellenberg MD, Daniel Grabo* MD, Aaron Strumwasser MD, Damon Clark MD, Kazuhide Matsushima MD, Demetrios Demetriades* MD, LAC+USC Medical Center

Invited Discussant: Joaquim Havens, MD

Introduction: The distribution of trauma deaths was classically described as trimodal. With advances in both technology and trauma systems, this was re-evaluated, and found to be bimodal in the early 2000s. This study aims to evaluate the distribution of trauma deaths after the widespread adoption of damage control surgery, damage control resuscitation and modern ICU algorithms.

Methods: The study includes all traumatic deaths from the NTDB (2007-2014). Burn patients were excluded. Hospital length of stay was equated to time until death. Data was collected to included demographics, mechanism of injury (blunt vs. penetrating), ISS and AIS scores.

Results: During the study period 154,845 deaths were identified. Mean age was 55y±24.9, 67% male. Penetrating trauma accounted for 24,052 (15.5%) deaths, and blunt trauma for the remaining 130,793 (84.5%). Within the first four hours 13.7% of all deaths occurred, and by twelve hours 25.1% had occurred. When severe head injuries are removed, 20% of deaths occurred within the first four hours and 29.9% occurred by twelve hours. In penetrating trauma, 69.2% of deaths occurred within 24 hours, however in blunt trauma only 29.3% occurred within 24 hours. In penetrating trauma 37.3% occurred within the first four hours, and by twelve hours, 55.9%. In blunt trauma 10.0% died within the first 4 hours, and by twelve hours 20.2%. The distribution of deaths was similar when patients were analyzed for injury severity (ISS ≥15 or <15), and for severe injuries (AIS≥4) to the chest, abdomen, or head. Distribution was similar across individual years. Unlike historical data, this contemporary analysis shows the distribution of death falls rapidly after the first 24 hours and continues to be flat for 30 days.



Conclusions: The contemporary distribution of trauma deaths no longer appears to be bimodal. The historical second peak, at approximately 1-3 weeks post trauma has disappeared. This may reflect advances in blood product resuscitation, limiting crystalloid use, damage control surgery, and the uniform implementation of evidence based critical care management principles. Early mortality, however, remains a significant challenge. Primary prevention and early hemorrhage control must continue to be a focus of trauma systems.

Session: XVI: Quickshot Session II
Paper QS26: 11:54 am -12:00 pm

IMPACT OF SOCIAL MEDIA ON COMMUNITY CONSULTATION IN EXCEPTION FROM INFORMED CONSENT CLINICAL TRIALS

John A. Harvin* MD, Jeanette M. Podbielski RN, Laura E. Vincent RN, Ethan A. Taub DO, Sasha D. Adams* MD, Michelle K. McNutt* MD, Laura J. Moore* MD, Lillian S. Kao* MD, Charles E. Wade* Ph.D., John B. Holcomb* MD, University of Texas Health Science Center-Houston

Invited Discussant: Jamie Coleman, MD

Introduction: Exception from informed consent (EFIC) by obtaining community consultation (CC) allows clinician scientists to perform emergency research. EFIC and CC methods vary depending upon local Institutional Review Boards (IRB). We aim to determine the impact of the inclusion of a social media (SoMe) campaign on the CC process.

Methods: The time to IRB approval, number of CC meetings, people reached, and cost of CC meetings for four prospective, randomized, EFIC trials were compared. Costs were conservatively estimated using the time personnel took to perform CC meetings, with the following estimates: 1.5 hours per meeting, $33.65/hour salary for research coordinator/IRB member and $144.23/hour for principal investigator. People were considered reached by SoMe if they spent ≥1 minute on the study website.

Results: Overall EFIC costs for the four trials were: Early Whole Blood (EWB) $6,486, Pragmatic Randomized Optimal Platelet and Plasma Ratios (PROPPR) $6,462, Prehospital Tranexamic Acid for Traumatic Brain Injury (TXA) $4,361, and Damage Control Laparotomy Trial (DCL) $4,250. Only DCL utilized SoMe. The table lists results of CC from the 4 trials:

Trial	Time to IRB Approval (months)	CC Meetings	Number of CC Meetings for: PI / RC	People at CC Meetings	People Reached by SoMe	Total People Reached	Cost per Person Reached
EWB	27	14	11 / 14	272	0	272	$23.84
PROPPR	4	14	14 / 14	260	0	260	$24.85
TXA	5	12	6 / 12	198	0	198	$22.02
DCL	**3**	**6**	**6 / 6**	**137**	**229**	**366**	**$11.61**
PI – principal investigator; RC – research coordinator							

Conclusion: Adapting the EFIC process to include a SoMe campaign was associated with a 50% increase in potential patients reached, a 26% reduction in total cost, and a 51% reduction in cost per person reached. SoMe appears to be a valuable adjunct to performing CC in emergency research using EFIC.