Poster #41

CHALLENGES AND OPPORTUNITIES IN ADDRESSING ALCOHOL AND SUBSTANCE ABUSE AMONG PENETRATING TRAUMA PATIENTS

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Introduction: Alcohol and drug use impact a significant proportion of trauma patients at our urban, academic, level one trauma center. We recently introduced a Hospital Violence Intervention Program (HVIP) focusing on the holistic care of our penetrating trauma patients. At that time, we enhanced screening efforts for alcohol and substance abuse using provider questionnaires. We hypothesized that with these intensified efforts, we would identify more patients who may benefit from attention and resources related to alcohol and substance abuse through future HVIP initiatives.
Methods: We performed a retrospective chart review of all patients injured by gunfire or stab wounds one year prior to the initiation of the HVIP (October 2021-September 2022) and during the first year of the HVIP (October 2022-September 2023). Descriptive statistics were conducted, and the comparisons between groups (pre- vs. post-implementation) were tested with Independent-Samples Mann-Whitney U tests or Person Chi-square/Fisher's Exact tests.
Results: Overall 357 patients were included (pre-HVIP = 165, HVIP = 192). The majority of penetrating trauma cases were observed in Hispanic/Latino males. Upon increased screening, substance and/or alcohol use disorder rates were notably higher in the HVIP group compared to the pre-HVIP group (48 patients, 25% vs. 22 patients, 13.3%; p-value = 0.006). The incidence of comorbid mental health disorders was marginally lower in the HVIP group (15.1% vs. 17.6%; p-value = 0.528), although this difference was not statistically significant. The overall rate of post-discharge rehabilitation for drug and alcohol treatment was 17.1%, consisting of behavioral therapy (7.1%), outpatient detoxification (5.7%), and inpatient detoxification (5.7%), with no statistically significant variation observed between the two groups.
Conclusions: Increased surveillance of alcohol and substance use disorders among patients injured by gunfire or stab wounds revealed alarmingly high prevalence rates, yet effective intervention rates remained low. Recovery services for drug and alcohol abuse represent a crucial area of future focus for our HVIP.

Poster #42

COULD WE HAVE STOPPED THE BLEED? AN EXAMINATION OF 5765 HOMICIDE AUTOPSIES ACROSS 13 YEARS

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Introduction: Since 2015, the Stop the Bleed (STB) Campaign has taught bystanders to render aid in bleeding emergencies, through tourniquet application, wound packing, and compression of extremity injuries. Despite training more than 3 million Americans, little is known about potential lives saved by STB at the population-level. We performed a statewide evaluation of autopsy reports to quantify such deaths.
Methods: The Maryland Chief Medical Examiner's office investigates all homicides statewide. We analyzed autopsies for all gunshot (GS) or stab wound (SW) homicide victims from 2005-2017. We categorized homicides into isolated extremity or non-isolated extremity wound groups. We identified patients with vascular injuries amenable to STB techniques, including femoral, axillary, popliteal, brachial, and other uncategorized peripheral arterial injuries. Multivariate logistic regressions compared odds of major vascular injury between isolated vs. non-isolated extremity injuries. Analyses were stratified by injury mechanism (GS or SW).
Results: 5765 homicides were analyzed (88% male, 82% black, median age 28 years). The majority were due to GS only (84%), followed by SW only (16%). 47% of GS and 35% of SW victims had extremity injuries. For GS victims with extremity injuries, 2.4% (n=55) had isolated wounds; 5.3% (n=17) of SW victims with extremity injuries had isolated wounds. Victims with isolated vs. non-isolated extremity injuries had higher prevalence of major vascular injuries (GS: 33% vs. 5.0%, SW: 59% vs. 9.5%). GS victims with isolated extremity wounds had 10-fold greater odds of concomitant vascular injury relative to GS victims with non-isolated extremity injuries (OR = 10.1 [95%-CI: 5.8 – 17.5], $P < 0.01$). The difference was not significant for SW victims (OR = 3.7 [95% CI: 0.5 – 17.1], $P = 0.11$).
Conclusion: We found a significant burden of extremity wounds with major vascular injury amongst a large cohort of GS and SW homicide victims. GS victims who died from isolated extremity injuries were significantly more likely to have sustained major vascular injury. Isolated extremity wounds therefore provide an ideal, focused opportunity for hemorrhage control through STB techniques, which may save lives. This reinforces the utility of STB training as a potentially life-saving public health intervention.

Poster #43

INVOLVEMENT WITH HOSPITAL BASED VIOLENCE INTERVENTION PROGRAM IMPROVES CLINIC FOLLOW UP AFTER VIOLENT TRAUMATIC INJURY

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Introduction: Patients who have suffered a violent traumatic injury may develop medical and psychological complications after discharge, such as wound infections, poorly healing wounds, acute traumatic stress disorder (ATSD), and post-traumatic stress disorder (PTSD). These complications are most easily detected in outpatient follow up visits. However, clinic follow up after a suffered trauma is typically low. Hospital Based Violence Intervention Programs (HVIPs) assist patients who have suffered a violent traumatic injury with psychological and logistical resources. Previously it has not been studied whether HVIPs improve clinic follow up. We hypothesized that increased involvement with a HVIP leads to increased follow up in trauma, specialty, and primary care (PCP) clinics.
Methods: This was a retrospective chart review study analyzing 185 patients who had suffered a violent traumatic injury and were treated at an urban Level 1 Trauma Center, and who had at least one HVIP encounter. Patients were analyzed for amount of PCP, trauma, and specialty clinic appointments scheduled and attended. Other factors studied were sex, race, ethnicity, zip code, substance use, stable housing, employment, and incarceration. We performed univariate analyses followed by a multivariate linear regression.
Results: There was a statistically significant difference in trauma appointments attended ($p = .0063$) as well as specialty clinic appointments scheduled ($p=.0293$) and attended ($p= .0294$) based on number of HVIP encounters. Those in the medium (2-3) and high (4+) encounter groups, had higher numbers of clinic follow up. No significant difference was found with PCP appointments scheduled or attended based on HVIP encounters. The number of trauma clinic appointments attended were independent of injury type and age and there was no difference in appointments scheduled or attended based on race, housing stability, incarceration, or amount of substance use.
Conclusion: Increased involvement with HVIPs improves clinic follow up both in trauma clinics and specialty clinics. Clinic appointments are useful in detecting medical or psychological complications after a violent traumatic injury thus hopefully improving outcomes and reducing disparities.

Poster #44

TREAD LIGHTLY: EVALUATING GEOGRAPHIC DISTRIBUTION AND SEVERITY OF PEDESTRIAN VS. AUTO INJURIES IN A MAJOR METROPOLITAN AREA

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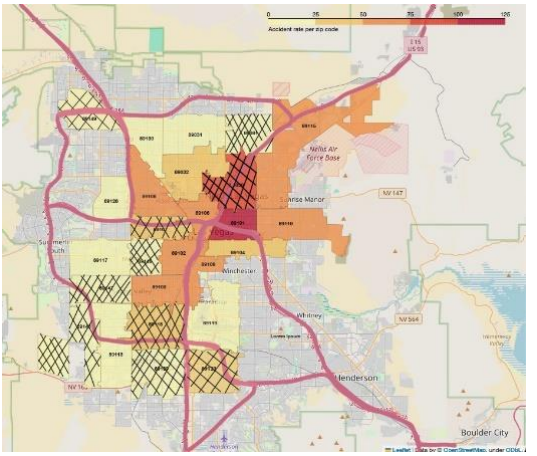
Introduction: Pedestrian vs. automobile collisions are a prevalent cause of traumatic injury, leading to significant morbidity and mortality. The United States Department of Transportation (DOT) mandates annual Transparency Reports from state DOTs, focusing on locations with severe traffic safety needs. This study aims to identify high-risk areas for such collisions within our city and determine which high-volume injury locations are associated with severe injury.

Methods: Following IRB approval, we conducted a retrospective cohort study on adult trauma patients with the ICD-10 injury mechanism "Pedestrian vs. Auto" from January 2018 to December 2022. After obtaining injury incidence, we grouped patients according to injury ZIP code. Heat maps were then generated, with darker colors indicating higher injury incidence. We then calculated the median patient ISS and added cross-hatching to the heat map for all ZIP codes with >33% of patients with ISS greater than 15.

Results: We identified 1172 patients, of which 67.6% were male, median ISS was 9, and 30.5% of the total cohort had an ISS > 15. After heat mapping, we identified ten ZIP codes with >33% of patients with ISS>15. ZIP code 89030 exhibited both a high incidence of injuries (89 patients) and a high proportion of severe injury (33.7%, see Figure).

Conclusions: Our study is the first of its kind to examine a major metropolitan area by ZIP code to identify "hot spots" for severe pedestrian vs. automobile collisions, in a way that can be easily replicated in other cities, to help inform DOT investigations into associated factors. Incorporation of injury severity in our analysis helps to further focus safety interventions to the areas that need it most.



Poster #45

SIGNIFICANT VARIATIONS IN THE RATES AND TIMING OF TRACHEOSTOMY AND GASTROSTOMY FOR ADOLESCENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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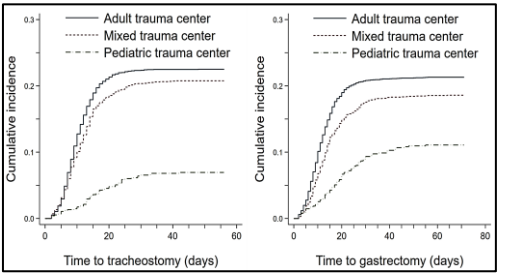
Introduction: The objective of this study is to explore variations between different trauma center types in the rates and timing of tracheostomy and gastrostomy for adolescent patients with severe traumatic brain injury (TBI).
Methods: This retrospective cohort study analyzed the ACS-TQIP database (2017-2021). We included trauma patients aged 14-18 years with severe TBI (Head AIS:3-5 & GCS:3-8). Trauma centers were classified as: adult (ATC), mixed (MTC), and pediatric trauma centers (PTC). We developed a multilevel mixed-effect Poisson regression model to assess the association between trauma center type and rates of tracheostomy and gastrostomy.
Results: Of 6,978 adolescent patients, tracheostomy and gastrostomy were performed in 22.5% and 21.3% at ATC, 20.8% and 21.3% at MTC, and 6.9% and 11.1% at PTC, respectively. The timing of tracheostomy and gastrostomy were significantly later at PTC (Figure). In the regression model adjusting for covariates, compared to ATC, the adjusted incidence rate ratios (IRR) for tracheostomy and gastrostomy were 0.38 (95 % CI: 0.28-0.52, p<0.001) and 0.58 (95 % CI: 0.44-0.75, p<0.001) at PTC (Table). There was no significant difference in the incidence of ventilator-associated pneumonia between ATC and PTC.



Conclusions: Our results suggest that there are significant practice variations in performing tracheostomy and gastrostomy for adolescent patients with severe TBI between ATC, MTC, and PTC. Further research is warranted to examine the impact on short- and long-term outcomes and to standardize care process for adolescent patients.

Trauma center type	IRR for Tracheostomy	IRR for Gastrostomy
ATC	Reference	Reference
MTC	0.94 (0.82-1.07)	0.87 (0.76-1.01)
PTC	0.38 (0.28-0.52)	0.58 (0.44-0.75)

Poster #46

SIMILAR RISK OF COMPLICATIONS AND DEATH FOR ADOLESCENTS WITH GUNSHOT WOUNDS TREATED AT PEDIATRIC ONLY HOSPITALS WHEN COMPARED TO COMBINED ADULT/PEDIATRIC CENTERS

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Introduction: Adult trauma centers including combined adult/pediatric centers (CPAC) see a higher volume of penetrating trauma. Thus, adolescents with gunshot wounds (GSWs) may have improved outcomes at CPACs vs pediatric only hospitals (POHs). This study aimed to compare differences in injury patterns, complications, and mortality for adolescents sustaining GSWs presenting to CPACs vs POHs, hypothesizing decreased associated risk of complications and mortality at CPACs.
Methods: The 2017-2021 TQIP was queried to identify adolescents (aged 12-17) who sustained GSWs. Patients transferred and those with a traumatic brain injury were excluded. CPAC included centers with both adult and pediatric ACS-verification while POHs only had pediatric ACS-verification. A multivariable logistic regression analysis was performed to identify risk factors for in-hospital complications and mortality while controlling for age, injury severity score (ISS), vitals on arrival, and need for transfusion.
Results: Of the 3,064 adolescent GSWs, 1,512 (49.3%) presented to a CPAC. CPAC patients were slightly older (median, 16 vs. 15 years old, $p<0.001$) and had a higher median ISS (9 vs. 4, $p<0.001$), as well as increased injuries to the spine (9.3% vs. 5.7%, $p<0.001$), heart (2.3% vs. 0.7%, $p<0.001$), lung (19.1% vs. 10.6%, $p<0.001$), liver (8.5% vs. 4.8%, $p<0.001$), and spleen (3.2% vs. 1.5%, $p=0.002$). CPAC adolescents also more frequently underwent emergent operations (31.9% vs. 23.5%, $p<0.001$). CPAC adolescents had higher rates of complications (5.2% vs. 3.1%, $p=0.003$) and mortality (7.7% vs. 3.1%, $p<0.001$). However, after adjusting for confounders, CPAC adolescents had similar associated risk of in-hospital complications (OR 0.81, CI 0.53-1.25, $p=0.34$) and mortality (OR 0.75, CI 0.40, 1.43, $p=0.38$).
Conclusion: Adolescent trauma patients after risk adjustment had similar outcomes at POHs compared to CPACs, confirming similar care across different types of pediatric centers.

Poster #47

THE ABDOMEN DOES NOT LIE, BUT THE LABS MIGHT: PREDICTORS OF INTRAABDOMINAL INJURY ON CT IMAGING AMONG PEDIATRIC BLUNT TRAUMA PATIENTS

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Introduction: Based on latest ACS practice guidelines, isolated abnormal laboratory tests necessitate obtaining abdominal CT for pediatric patients with blunt abdominal trauma (BAT), regardless of the abdominal examination. This study aims to identify the predictors of intra-abdominal injury (IAI) and the role of blood tests in CT imaging in pediatric BAT patients.

Methods: This is a retrospective review at a Level I adult and Level II pediatric trauma center (2018-2022). Children (<17 years) who presented with BAT and received abdominal CT imaging were included. Outcomes included the rates of intra-abdominal injuries and interventions. Multivariable regression analysis was performed to identify the predictors of IAI on CT imaging, using clinical and lab information available in the trauma bay.

Results: Of 3,707 pediatric patients over 5 years, 483 patients with BAT and abdominal CT imaging were identified. Mean age was 13, 58% were male, mean lowest SBP was 85, and median GCS was 15. Overall, 19% had abdominal pain, 6 had post-injury emesis, 26% had abdominal tenderness, and 11% had pelvic tenderness on initial evaluation. Moreover, 90% had an initial FAST examination, of which 9.5% were positive. Based on initial lab tests, 8% had abnormal serum aspartate aminotransferase (AST) (>200 U/L), 3% had abnormal hematocrit (<30%), 1.2% had abnormal UA (>5 RBC/hpf), and 0.8% had abnormal lipase. 17% had at least one IAI, of which 17% underwent operative or interventional procedures. On multivariable regression analysis, abdominal tenderness, abnormal plain x-ray, positive FAST, blood transfusion requirements, and abnormal AST were identified as independent predictors of IAI upon abdominal CT findings (Table). Among patients with IAI, only 37% had abnormal labs, all of whom had one of the predictors of IAI. Among patients with abnormal lab results (n=57), only 9 patients had none of the predictors of IAI, out of which none were found to have IAI on abdominal CT.

Conclusion: More than 80% of all abdominal CT imaging had negative results, with less than 5% receiving any intervention. Our findings highlight the significant role of clinical findings in the trauma bay, regardless of lab findings, when deciding about requesting abdominal CT imaging for pediatric trauma patients with BAT.

Table – Independent Predictors of Intraabdominal Injuries on Abdominal CT Imaging

variables	aOR	95% CI	p-value
Abdominal Tenderness	1.78	1.21-3.12	**0.021**
Abnormal Plain X-ray	2.23	1.04 - 4.75	**0.038**
Positive FAST	17.28	5.80-51.50	**<0.001**
Blood Transfusion Requirements	4.30	1.15-15.94	**0.030**
Abnormal AST	18.42	6.96-48.75	**<0.001**

Poster #48

THE GRAY ZONE: COMPARING TEENAGE TRAUMA RESUSCITATION IN ADULT AND PEDIATRIC EMERGENCY DEPARTMENTS.

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Introduction: Evidence shows injured children < 15 years old are most effectively treated at Pediatric Trauma Centers. There is no consensus for teen trauma patients (TTP) 15-17.99 years old. We historically treated TTP in our Adult ED (AED). To enhance our Pediatric ED (PED) readiness, we transitioned to treating TTP in our PED. Our hypothesis was that transitioning would not affect hospital length of stay (LOS) or mortality but lead to longer ED LOS given unfamiliarity with high acuity patients in PED.
Methods: This is a retrospective review of two consecutive 13-month time periods (1/21-1/22 and 2/22-2/23) comparing trauma resuscitations in TTP in AED with TTP in PED, respectively. This occurred at our combined ACS verified, Level 1 Trauma Center. Trauma specific variables were collected. Outcomes of interest were ED LOS (primary), inpatient mortality and hospital LOS (secondary). Univariate and multivariate analysis was performed. The analysis was repeated for Code 1 (highest acuity) patients.
Results: A total of 743 TTP were identified: 378 were treated in AED and 365 were treated in PED. For Code 1 activations, 77 TTP were treated in AED and 76 in PED. There was no difference in mortality between AED vs PED. There was no significant difference between groups with univariate or multivariate analysis. (Table 1)
Conclusion: Determining the best location for teen trauma resuscitation remains a challenge. This study provides evidence that TTP receive excellent, timely care in both AED and PED. Further study is needed to determine the impacts for younger pediatric patients.

	Adult ED Triage	Peds-ED Triage	p-value
All-Code Mortality	13 (3.44%)	7 (1.94%)	p=0.21
All-Code Hospital LOS (days)	4.70 (STD 13.6)	3.66 (STD 6.07)	p=0.79
All-Code ED LOS (min)	234 (IQR 124-312)	252 (IQR 136-336)	p=0.10
All-Code Injury Severity Score	11.1 (IQR 4-16)	10.0 (IQR 4-13)	p=0.17
Code 1 Mortality	13 (16.9%)	6 (8.11%)	p=0.10
Code 1 Hospital LOS (days)	6.06 (STD 8.0)	6.04 (STD 7.8)	p=0.82
Code 1 ED LOS (min)	126 (IQR 38-158)	153 (IQR 47-248)	p=0.05
Code 1 Injury Severity Score	17.3 (IQR 7-25)	13.9 (IQR 3-20)	p=0.05

Poster #49

VALIDATION OF A PEDIATRIC PREDICTION MODEL FOR MORTALITY IN ADULTS WITH TRAUMATIC BRAIN INJURY

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Introduction: Traumatic brain injury (TBI) is a significant cause of morbidity and mortality. While most TBI-related admissions are mild, identifying early predictors of poor outcome may assist with timely medical decisions and effective triage utilization. We sought to validate a clinical tool built in pediatric patients for predicting in-hospital death in adults with a TBI.

Methods: Data was collected from the National Trauma Data Bank between the years of 2007 to 2015. We included adults who sustained any TBI, defined as: (i) open and closed skull fractures, (ii) cerebellar, cortical, or brain stem contusions, and (iii) subarachnoid, subdural, or epidural hemorrhages. Our interest was in assessing the performance of a pediatric trauma mortality model in adults with TBI. The development cohort (years 2007 to 2015) was randomly split into a training (70%) and test set (30%). Model performance was calculated via C-statistic followed by external validation (year 2016).

Results: Mortality rate was 7.2% in the development cohort (n=351,642; median [IQR] age: 60 [41, 77]; 63% males) and 9.8% in the validation cohort (n=9,970; median [IQR] age:58 [38,74]; 66% males). The prediction model included 11 variables: age, gender, race, mechanism, transportation mode, systolic blood pressure, pulse, respiratory rate, oxygen saturation, temperature, and Glasgow coma scale (GCS). The C-statistic in the development cohort was 86.7% (95% CI 86.3, 87.1) and 89.5% (95% CI 88.7, 90.4) in the validation cohort. Our model outperformed some of the currently used and validated trauma scores.

Conclusions: We derived a clinical model that can accurately predict in-hospital death in adult TBI patients. The model was translated into a web-based application that can be quickly implemented to assist in patient triaging and resource allocation.