

The Impact of Pediatric Cranial Gunshot Wounds and Factors Associated With Inpatient Mortality

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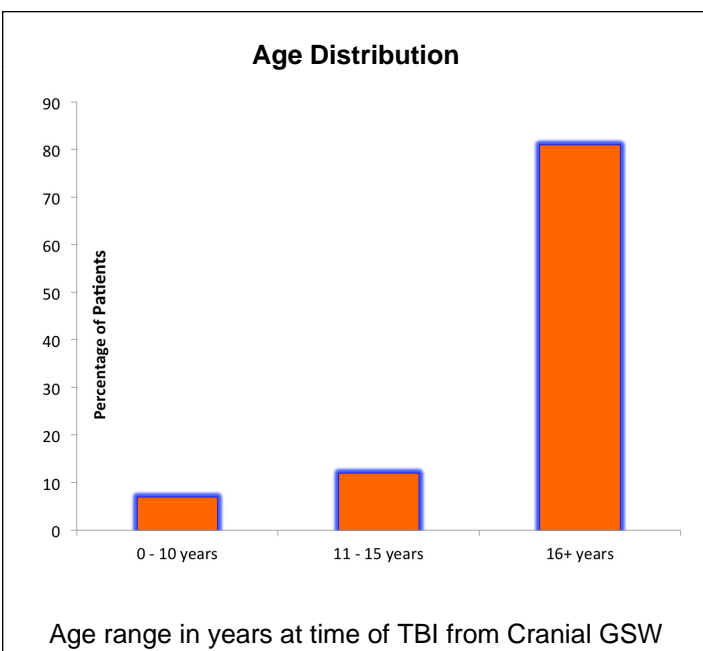


Learning Objectives

To examine the occurrence of pediatric cranial gunshot wounds and factors associated with inpatient mortality.

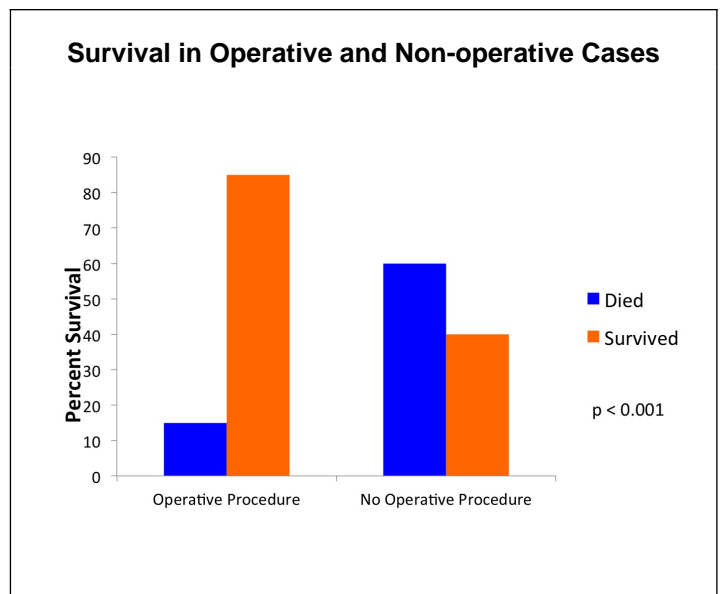
Introduction

Cranial gunshot wounds in children and adolescents, though not common, result in significant morbidity and mortality in the affected population. Very little research has addressed the economic and clinical impact of pediatric intracranial injuries related to firearms, and in fact, most of our knowledge and treatment paradigms regarding management of pediatric intracranial gunshot wounds has been derived from studies examining the adult population. It is not known whether findings in the adult population translate to the pediatric population. To assess the occurrence of and to further characterize the clinical and economic impact of cranial gunshot wounds in children, we utilized the 2012 Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID) to examine inpatient care for children with traumatic brain injury (TBI) from cranial gunshot wound (GSW) and to identify factors associated with in-hospital mortality.



Methods

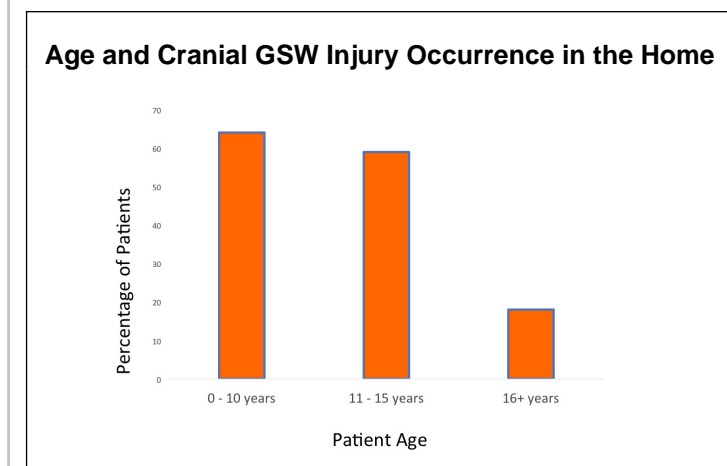
The 2012 Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID) was used to identify pediatric admissions for TBI from cranial GSW using ICD-9 diagnosis and procedure codes. Unweighted, the 2012 KID contains 3,195,782 discharges. Weighted, it estimates 6,675,222 discharges nationwide in the USA. Hospital charges, length of stay, and variables associated with in-hospital mortality were assessed. Categorical data was compared with Fisher's Exact test. Variation between means was compared with analysis of variance (anova). Statistical analyses were completed using SAS software version 9.4 (SAS Institute Inc, Cary, NC).



Results

In the 2012 KID there were 423 observations, estimating an actual national total of 590 discharges for pediatric TBI with firearm injury. The mean hospital discharge was \$151,132 (SEM \$11,130) and total hospital charges were \$62,115,604 (weighted, estimates hospital charges of \$86,240,364). Medicare and Medicaid charges totaled \$32,904,113 (weighted, estimates total charges of \$45,213,663). The mean length of stay was 8 days (SEM 0.60), totaling 3,494 hospital days (weighted, estimates 4,891 total hospital days). The majority of patients were adolescents (81% ages 16+ years, 342 patients) or older children (12% aged 11-15 years, 49 patients).

31 patients were young children (7% aged 0-10 years). 39% of patients died (167 deaths). The occurrence of an operative procedure was a significant indicator of survival - possibly as an indirect measure of injury severity: 85% of patients who underwent an operative procedure survived, compared to 40% of patients who did not undergo an operative procedure ($p < 0.001$). No difference in mortality was observed by weekend (vs. weekday) admission status or by race. In 26% of cases, the firearm injury occurred in the home. However, among children aged 10 years and younger, 64% of injuries occurred in the home.



Conclusions

Pediatric cranial gunshot wounds represent a significant societal financial burden that warrants increased attention. Not surprisingly, patients that underwent operative intervention had better odds of survival. This may be an surrogate measure of severity of injury, as it is likely that patients who were brain-dead on arrival or had a very poor neurologic exam and severe injury were not offered a surgical intervention. Finally, in the the younger pediatric population the majority of intracranial gunshot wounds occurred in the home, speaking to the need for a higher level of awareness and firearm security in the homes of gun-owners with young children.