Hydrocephalus in Pediatric Traumatic Brain Injury: National Incidence, Risk Factors, and Outcomes in 124,444 Patients

Kavelin Rumalla; Vijay Letchuman; Bharadwaj Jilakara; Akhil Pulumati; Usiakimi Igbaseimokumo MBBS FRCS(SN) FRCSC MD

Department of Neurosurgery, Children's Mercy Hospital of Kansas City

CNS 2017 ANNUAL MEETING BOSTON, MASSACHUSETTS OCTOBER 7–11, 2017

Introduction

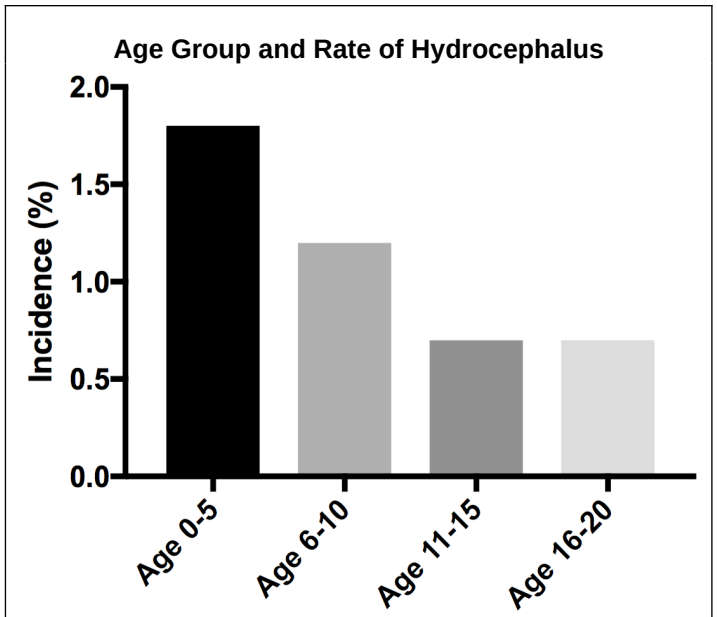
Hydrocephalus is a well-known and life-threatening sequel of traumatic brain injury (TBI) in adults, but is not as well characterized in children. We investigated the national incidence, risk factors, and outcomes associated with hydrocephalus in pediatric TBI.

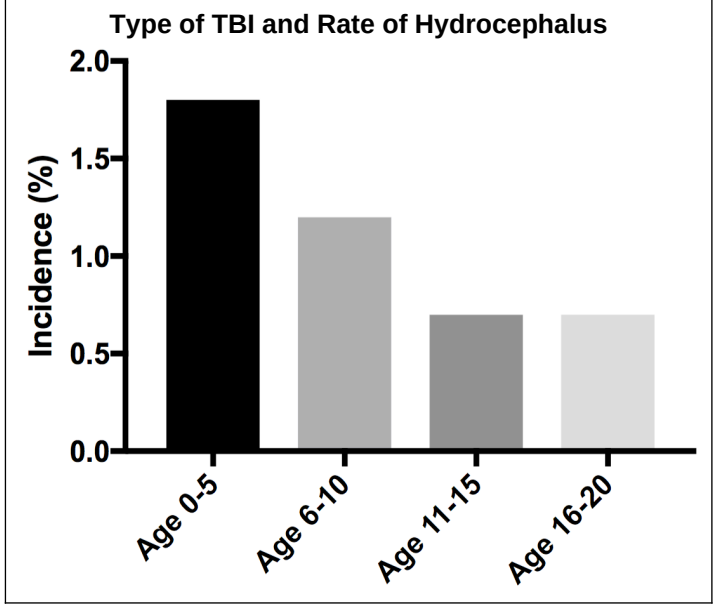
Methods

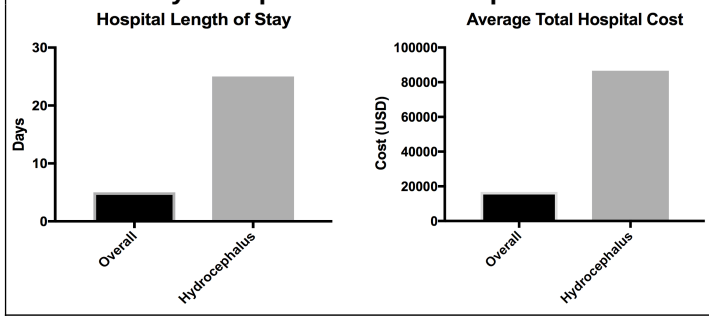
The Kids Inpatient Database (KID) is the largest pediatric hospital database in the U.S. and is sampled every 3 years. We queried the KID 2003, 2006, 2009, and 2012 using ICD-9-CM codes to identify all patients (age 0-20) with a primary diagnosis of TBI (850.xx – 854.xx) and a secondary diagnosis code for hydrocephalus (331.3-331.5, excluding congenital hydrocephalus [742.3]. Variables included demographics, comorbidities, TBI severity (consciousness, type of wound) complications (medical or neurological), and discharge outcomes. Both univariate and multivariable analysis was utilized to identify factors associated with hydrocephalus and alpha was set at $P<0.05$.

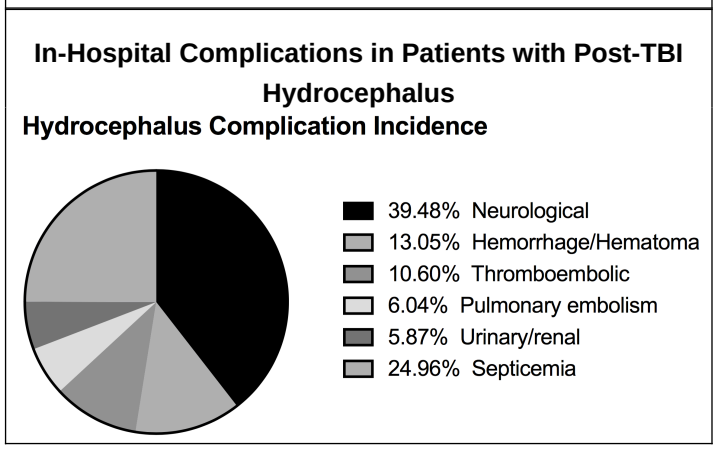
Results

In 124,444 patients hospitalized for TBI. The average rate of hydrocephalus was 1.0% but was affected by the type of TBI: subdural hematoma (2.4%), subarachnoid hemorrhage (1.4%), epidural hematoma (1.0%), cerebral laceration (0.9%), concussion (0.2%). The risk factors for hydrocephalus in multivariable analysis were age 0-5 (compared to other ages), Medicaid insurance, electrolyte disorder, chronic neurological condition, weight loss, subarachnoid hemorrhage, subdural hematoma, open wound, postoperative neurological complication, and









Conclusions

Hydrocephalus following TBI in children is relatively uncommon but is more likely in patients with certain demographics, pre-existing comorbidities, and injury patterns and attracts a higher total hospital cost.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe risk factors and complications associated with hydrocephalus following pediatric TBI, 2) Discuss, in small groups, ways that post-traumatic hydrocephalus may be feasibly screened for and managed in the acute setting, 3) identify patients at highest risk for post-traumatic hydrocephalus.