Posttraumatic hydrocephalus epidemiology

see Missori P, Paolini S, Currà A. Prevalence of post-traumatic hydrocephalus in moderate to severe head injury. Acta Neurochir (Wien). 2022 Oct 7. doi: 10.1007/s00701-022-05381-w. Epub ahead of print. PMID: 36202946.

The Kids Inpatient Database (2003, 2006, 2009, 2012) was queried using the International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) codes to identify all patients (age 0 to 20) with TBI (850.xx to 854.xx) and noncongenital hydrocephalus (331.3 to 331.5, exclude 742.3). Variables included patient demographics and comorbidities, TBI severity (level of consciousness, injury type), treatment, and outcome-related measures. Risk factors associated with Posttraumatic hydrocephalus were identified using univariate and multivariable analyses.

PTH occurred in 1265 of 124,444 patients (1.0%) hospitalized with TBI and was managed by ventriculoperitoneal shunt (32.7%) and extraventricular drain (10.7%). PTH had the highest rate in shaken baby syndrome (6.7%, n = 19) and firearm injury (3.4%, n = 74). PTH varied by type of TBI: subdural hematoma (2.4%), subarachnoid hemorrhage (1.4%), epidural hematoma (1.0%), cerebral laceration (0.9%), concussion (0.2%). Multivariable risk factors for PTH included age zero to five years old (versus six to 20), Medicaid (versus private), electrolyte disorder, chronic neurological condition, weight loss, subarachnoid hemorrhage, subdural hematoma, open wound, postoperative neurological complication (iatrogenic stroke), and septicemia ($P < 0.05$). PTH rates are higher among surgically managed patients (6.0% vs 0.5%) unless managed within the first 24 hours (0.8% vs 4.1%) ($P < 0.05$). PTH was associated with greater length of stay (25 days versus five days) and hospital costs ($86,596 vs $16,791), but lower mortality (1.1% vs 5.4%).

PTH in children is relatively uncommon compared with adults. Risk factors identified here, along with the influence of surgical intervention, warrant further investigation [1].

Posttraumatic hydrocephalus was found in 39.3% of patients with severe head injury and in 27.3% of those with a moderate head injury. Increased ventricular size was evident 4 weeks after injury in 57.6% and 2 months after injury in 69.7%.

No relationship was found between post-traumatic ventriculomegaly and age, initial GCS score, the presence of SAH, or type of lesion (focal or diffuse). Post-traumatic ventriculomegaly was significantly correlated with outcome. Post-traumatic ventriculomegaly is a frequent and early finding in patients with moderate or severe traumatic brain injury. [2].

The incidence of posttraumatic hydrocephalus (PTH) has been reported to be 0.7-51.4%, and De Bonis et al., have frequently observed the development of PTH in patients undergoing decompressive craniectomy (DC) [3].

1)
Rumalla K, Letchuman V, Smith KA, Arnold PM. Hydrocephalus in Pediatric Traumatic Brain Injury: National Incidence, Risk Factors, and Outcomes in 124,444 Hospitalized Patients. Pediatr Neurol. 2018 Mar;80:70-76. doi: 10.1016/j.pediatrneurol.2017.11.015. Epub 2017 Dec 11. PubMed PMID: 29429778.
2)

Poca MA, Sahuquillo J, Mataró M, Benejam B, Arikan F, Báguena M. Ventricular enlargement after moderate or severe head injury: a frequent and neglected problem. J Neurotrauma. 2005 Nov;22(11):1303-10. PubMed PMID: 16305318.

3)

De Bonis P, Pompucci A, Mangiola A, Rigante L, Anile C. Post-traumatic hydrocephalus after decompressive craniectomy: an underestimated risk factor. J Neurotrauma. 2010 Nov;27(11):1965-70. doi: 10.1089/neu.2010.1425. PubMed PMID: 20812777.