Pediatric traumatic brain injury case series

66/87 children, who had endocrine evaluation one-year post severe TBI were included (24 with pituitary dysfunction 1-year post-TBI).

In all children the pituitary hormones basal levels were assessed at least five years post-TBI. Growth hormone stimulation tests were performed 3-4 years post-TBI in children with GH deficiency (GHD) 1-year post-TBI and in all children with low height velocity (□-1 DS) or low IGF-1 (□-2 DS). Central precocious puberty (CPP) was confirmed by GnRH stimulation test.

61/66 children were followed-up 7 [5-10] years post-TBI (median; [range]); 17/61 children had GHD 1-year post-TBI, GHD was confirmed in 5/17 patients. For one boy, with normal pituitary function 1-year post-TBI, GHD was diagnosed 6.5 years post-TBI. 4/61 patients developed CPP, 5.7 [2.4-6.1] years post-TBI. Having a pituitary dysfunction 1-year post-TBI was significantly associated with pituitary dysfunction or CPP more than five years post-TBI.

Severe TBI in childhood can lead to permanent pituitary dysfunction; GHD and CPP may appear after many years. We recommend systematic hormonal assessment in children one-year after severe TBI and a prolonged monitoring of growth and pubertal maturation. Recommendations should be elaborated for the families and treating physicians [1)].

2017

A propensity-weighted effectiveness analysis was conducted using 2 linked national databases with data from 30 US children's hospitals from January 1, 2007, to December 31, 2012, on 3084 children with severe TBI. Clinical events including neurosurgical procedures were identified using validated computable phenotypes. Data analysis was conducted from September 1, 2016, to March 1, 2017.

Of the 3084 children in the study (1128 girls and 1956 boys; mean [SD] age, 7.03 [5.44] years), 1002 (32.4%) underwent ICP monitoring, with substantial hospital variation (6% to 50% by hospital). Overall, 484 children (15.7%) experienced the primary composite outcome. A propensity approach using matching weights generated good covariate balance between those who did and those who did not undergo ICP monitoring. Using a propensity-weighted logistic regression model clustered by hospital, no statistically significant difference was found in functional survival between monitored and unmonitored patients (odds ratio of poor outcome among those who underwent ICP monitoring, 1.31; 95% CI, 0.99-1.74). In a prespecified secondary analysis, no difference in mortality was found (odds ratio, 1.16; 95% CI, 0.89-1.50). Prespecified subgroup analyses of children younger and older than 2 years of age and among those with unintentional and inflicted (intentional) injuries also showed no difference in outcome with ICP monitoring.

With the use of linked national data and validated computable phenotypes, no evidence was found of a benefit from ICP monitoring on functional survival of children with severe TBI. Intracranial pressure monitoring is a widely but inconsistently used technology with incompletely demonstrated effectiveness. A large prospective cohort study or randomized trial is needed [2)].

2016

O'Lynnger et al. performed a retrospective pre- and postprotocol study of 128 pediatric patients with severe TBI, as defined by Glasgow Coma Scale (GCS) scores < 8, admitted to a tertiary care center pediatric critical care unit between April 1, 2008, and May 31, 2014. The preprotocol group included 99 patients, and the postprotocol group included 29 patients. The primary outcome of interest was discharge disposition before and after protocol implementation, which took place on April 1, 2013. Ordered logistic regression was used to assess outcomes while accounting for injury severity and clinical parameters. Favorable discharge disposition included discharge home. Unfavorable discharge disposition included discharge to an inpatient facility or death.

Demographics were similar between the treatment periods, as was injury severity as assessed by GCS score (mean 5.43 preprotocol, mean 5.28 postprotocol; p = 0.67). The ordered logistic regression model demonstrated an odds ratio of 4.0 of increasingly favorable outcome in the postprotocol cohort (p = 0.007). Prior to protocol implementation, 63 patients (64%) had unfavorable discharge disposition and 36 patients (36%) had favorable discharge disposition. After protocol implementation, 9 patients (31%) had unfavorable disposition, while 20 patients (69%) had favorable disposition (p = 0.002). In the preprotocol group, 31 patients (31%) died while 6 patients (21%) died after protocol implementation (p = 0.04).

Discharge disposition and mortality rates in pediatric patients with severe TBI improved after implementation of a standardized protocol among caregivers based on best-practice guidelines [3].

1)
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2)
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3)
O'Lynnger TM, Shannon CN, Le TM, Greeno A, Chung D, Lamb FS, Wellons JC 3rd. Standardizing ICU management of pediatric traumatic brain injury is associated with improved outcomes at discharge. J Neurosurg Pediatr. 2016 Jan;17(1):19-26. doi: 10.3171/2015.5.PEDS1544. Epub 2015 Oct 9. PubMed PMID: 26451717.

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