## Pediatric mild traumatic brain injury

- Prognostic Utility of Immediate Memory and Delayed Recall Assessments for Adolescent Concussion
- Altered autonomic cardiovascular function in adults with persisting post-concussive symptoms and exercise intolerance
- Influence of Social Determinants of Health on Treatment Completion for Pediatric Mild Traumatic Brain Injury in a Safety Net Hospital
- Time-limited association between plasma transfusion and mortality in pediatric traumatic brain injury
- Regional and Global Changes in Brain Structure 1-Year Post Pediatric "Mild" Traumatic Brain Injury
- Factors affecting mortality risk in pediatric head injuries in Africa: a meta-analysis
- Behavioral, non-pharmacological intervention modalities to alleviate persistent headache attributable to traumatic brain injury: A systematic review of patient pain outcomes in the context of the mutual maintenance model
- Posttraumatic headache and clinical recovery after pediatric concussion

While the majority of concussions in the pediatric population are the result of the sport other mechanisms of injury include trauma such as falls, road traffic accident, and assaults <sup>1) 2)</sup>.

There are nearly 1 million emergency department (ED) visits per year for mild traumatic brain injury for patients of all ages, with the highest reported rates in patients aged 12-17 years old. The majority of ED visits for pediatric concussion are from male patients (estimates between 55% and 60%). The true incidence of concussion, however, is likely significantly higher than estimated, as studies have shown the majority of pediatric concussion is diagnosed and treated outside of an ED

## **Risk Stratification**

PECARN traumatic brain injury algorithm.

KIIDS-TBI.

## Outcome

Cognitive impairment and post-concussive symptoms (PCS) represent hallmark sequelae of pediatric mild traumatic brain injury (pmTBI).

Few studies have directly compared cognition as a function of PCS status longitudinally. Cognitive outcomes were therefore compared for asymptomatic pmTBI, symptomatic pmTBI, and healthy controls (HC) during sub-acute (SA; 1-11 days) and early chronic (EC; approximately 4 months) post-

## injury phases.

Robertson-Benta et al. predicted worse cognitive performance for both pmTBI groups relative to HC at the SA visit. At the EC visit, we predicted continued impairment from the symptomatic group, but no difference between asymptomatic pmTBI and HCs. A battery of clinical (semi-structured interviews and self-report questionnaires) and neuropsychological measures were administered to 203 pmTBI and 139 HC participants, with greater than 80% retention at the EC visit. A standardized change method classified pmTBI into binary categories of asymptomatic or symptomatic based on PCS scores. Symptomatic pmTBI performed significantly worse than HCs on processing speed, attention, and verbal memory at SA visit, whereas lower performance was only present for verbal memory for asymptomatic pmTBI. Lower performance in verbal memory persisted for both pmTBI groups at the EC visit. Surprisingly, a minority (16%) of pmTBI switched from asymptomatic to symptomatic status at the EC visit. Current findings suggest that PCS and cognition are more closely coupled during the first week of injury but become decoupled several months post-injury. Evidence of lower performance in verbal memory for Doth asymptomatic and symptomatic pmTBI suggests that cognitive recovery may be a process separate from the resolution of subjective symptomatology <sup>3</sup>

Pituitary insufficiency was present 1 year after mild TBI in about 7% of children. Based on this results, we suggest testing children after mild TBI in case of clinical abnormalities. i.e., for GH axis, IGF-1, which should be assessed in children with a delta height <0 SDS, 6 to 12 months after TBI, and a dynamic GH testing (preferentially by an ITT) should be performed in case of IGF-1  $\leftarrow$ 1SDS, with a GH threshold at 20 mUI/L. However, if a systematic pituitary assessment is not required for mild TBI, physicians should monitor children 1 year after mild TBI with particular attention to growth and weight gain <sup>4</sup>.

Health related quality of life (HRQOL) is an emerging method to quantify the consequences of pediatric mild traumatic brain injury (mTBI)/concussion in both clinical practice and research. However, to utilize HRQOL measurements to their full potential in the context of mTBI/concussion recovery, a better understanding of the typical course of HRQOL after these injuries is needed.

The objective of a study was to summarize current knowledge on HRQOL after pediatric mTBI/concussion and identify areas in need of further research. The following databases from their earliest date of coverage through June 1, 2015 were used: MEDLINE(®), PubMed, Embase, Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL), SPORTDiscus, Cochrane Central Register of Controlled Trials (CENTRAL), Physiotherapy Evidence Database (PEDro), and Child Development and Adolescent Studies (CDAS). Studies must have examined and reported HRQOL in a pediatric population after mTBI/concussion, using a validated HRQOL measurement tool. Eight of 1660 records identified ultimately met inclusion criteria. Comprehensive data were extracted and checked by a second reviewer for accuracy and completeness. There appears to be a small but important subgroup of patients who experience poor HRQOL outcomes up to a year or longer post-injury. Potential predictors of poor HRQOL include older age, lower socioeconomic status, or a history of headaches or trouble sleeping. Differing definitions of mTBI precluded meta-analysis. HRQOL represents an important outcome measure in mTBI/concussion clinical practice and research. The evidence shows that a small but important proportion of patients have diminished HRQOL up to a year or longer post-injury. Further study on this topic is warranted to determine the typical longitudinal progression of HRQOL after pediatric concussion <sup>5</sup>.

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