

## **Early MRI in a pediatric cohort of moderate and severe TBI - traumatic axonal injury and association to outcome.**

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**Background:** Traumatic axonal injury (TAI) in adult patients with moderate and severe traumatic brain injury (msTBI) is frequently detected on MRI [1; 2] and the burden of TAI is known to be of prognostic importance [3; 4]. However, few studies of TAI and its prognostic importance in the pediatric TBI population exist [5-9]. The primary aim of this study was to in a pediatric cohort, explore the occurrence and burden of TAI on early MRI and as a secondary aim, explore the association to outcome.

**Materials and methods:** 63 children (0-18 years) with moderate (n=33) or severe (n=30) TBI and MRI within 6 weeks were prospectively included. TAI lesions detected on FLAIR, DWI and T2\*GRE or SWI were registered according to a standardized template including number, volume and location of lesions. Outcome was assessed with Glasgow Outcome Scale Extended (GOSE) at 12 months and dichotomized into good long-term outcome (GOSE 7 and 8) or not (GOSE  $\leq$  6). Descriptive statistics were performed with appropriate summary measures.

**Results:** Median age was 14 years (IQR 9.3-16.5), 70% of the patients were boys. Median time from date of injury to MRI was 8 days (IQR 4.0-12.3). 19% of the patients had evacuation of mass lesions. In total 76% of the patients had TAI on MRI, 67% of the moderate and 87% of the severe. TAI grade 3 was found in 18% of the moderate and 42% of the severe, TAI grade 2 in 23% vs 27% and TAI grade 1 in 59% vs 35%. Overall, 68% of the children with msTBI had good long-term outcome out of which 74% had TAI on MRI. In contrast 89% of children with poor long-term outcome had TAI on MRI.

**Conclusions:** We have studied TAI on MRI in the pediatric msTBI population (0-18 years). TAI was found in the majority of the patients with a prevalence similar to studies on adults with TBI. More of the children with poor long-term outcome had TAI on MRI.

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