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Treatment of pediatric patients with traumatic brain injury by Dutch Helicopter Emergency Medical Services (HEMS)

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Background: Little is known about the prehospital care by Helicopter Emergency Medical Service (HEMS) for pediatric patients with traumatic brain injury (TBI).

Aim: This research focuses on prehospital interventions by Emergency Medical Services (EMS) and HEMS, neurosurgical interventions in hospital and overall mortality in this group.

Methods: Retrospective analysis of pediatric (<18 years) patients with TBI treated by Rotterdam HEMS.

Results: From January 2012-December 2017, we included 415 patients pediatric TBI patients. Intubation was required in 92 (82.9%) of the 111 patients with $GCS \leq 8$, compared to 12 of 77 (15.6%) with Glasgow Coma Scale (GCS) 9-12, and 7 of 199 (3.5%) with GCS 13-15. Hyperosmolar therapy was started in 73, 10 with a $GCS > 8$. Decompressive surgery was required in 16 (5.8%), nine (56.3%) of these received hyperosmolar therapy from HEMS. Follow-up data was available in 277 patients. A total of 107 (38.6%) patients were admitted to a (P)ICU. Overall mortality rate was 6.3% ($n=25$) all with $GCS \leq 8$, 15 (60.0%) died within 24 hours, and 24 (96.0%) within a week. In patients of whom we obtained in hospital follow up data we found that neurosurgical interventions were an indication of a higher mortality rate of 18.0%.

Discussion: HEMS provides essential emergency care for pediatric TBI patients, patients with severe TBI ($GCS \leq 8$) require interventions most often and have the highest mortality, as we expected. However despite relatively good initial GCS (>8) there were patients whom required prehospital intubation and hyperosmolar therapy, this group will require further investigation to optimize (prehospital) care in the future.

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