

Severe Head Injury

EVIDENCE REPOSITORIES

Evidence repositories are collections of best available resources and evidence (clinical guidelines, peer reviewed literature, systematic reviews, etc.), collated by our knowledge synthesis team and content advisors. This evidence repository is not intended to be an exhaustive list of resources for a topic, but rather a curated list of current, evidence-based resources, based on expert consensus of relevance and usability for a general emergency department setting. We search databases (Cochrane Library, PubMed, TRIP Database) and web search engines (Google, Google Scholar) to locate evidence. Additionally, hospital websites are browsed for guidance documents, such as clinical practice guidelines (CPG) for healthcare professionals.

Every effort is made to identify resources that are open access (i.e. publicly available, free of charge, not requiring a subscription).

More information about the creation of our evidence repositories can be found at <https://pubmed.ncbi.nlm.nih.gov/28537762/>

CONTENT TEAM

Thank you to the following content experts and Knowledge Synthesis team who led the development of this evidence repository.

Sue Beno, MD

Associate Professor, Department of Paediatrics, University of Toronto
Co-Director Trauma Program, Co-Director Paediatric Emergency Medicine Fellowship, The Hospital for Sick Children

Joe Nemeth, MD

Emergency Medicine Physician/Trauma Team Leader, MUHC, Montreal General Hospital, Montreal Children's Hospital, Director - Trauma Fellowship for the Emergency Medicine Physician

Liza Bialy

Knowledge Synthesis Project Coordinator, Alberta Research Centre for Health Evidence, Department of Pediatrics, University of Alberta

Severe Head Injury

TREKK developed resources for healthcare providers and parents & families can be found [here](#).

Clinical Guidelines

1. National Institute for Health and Care Excellence. [Head injury: Assessment and early management](#). 2023.
2. Bussolin L, Falconi M, Leo MC, et al. [The management of pediatric severe traumatic brain injury: Italian guidelines](#). *Minerva Anesthesiol*. 2021;87(5):567-79.
3. Babl FE, Tavender E, Dalziel S, et al. [Australian and New Zealand guideline for mild to moderate head injuries in children](#). *Emergency Medicine Australia*. 2021.
4. Kochanek PM, Tasker RC, Bell MJ, et al. [Management of pediatric severe traumatic brain injury: 2019 consensus and guidelines-based algorithm for first and second tier therapies](#). *Pediatr Crit Care Med*. 2019;20(3):269-79.
5. Lumba-Brown A, Yeates KO, Sarmiento K, et al. [Centers for disease control and prevention guideline on the diagnosis and management of mild traumatic brain injury among children](#). *JAMA Pediatr*. 2018;172(11):e182853.
6. Da Dalt L, Parri N, Amigoni A, et al. [Italian guidelines on the assessment and management of pediatric head injury in the emergency department](#). *Ital J Pediatr*. 2018;44(1):7.
7. Farrell CA. [Management of the paediatric patient with acute head trauma](#). Canadian Paediatric Society. 2013.
8. Society CP. [Multidisciplinary guidelines on the identification, investigation and management of suspected abusive head trauma](#). 2008.

Systematic Reviews

1. Nacoti M, Fazzi F, Biroli F, et al. [Addressing key clinical care and clinical research needs in severe pediatric traumatic brain injury: Perspectives from a focused international conference](#). *Front Pediatr*. 2020;8:594425.
2. Lumba-Brown A, Totten A, Kochanek PM. [Emergency department implementation of the brain trauma foundation's pediatric severe brain injury guideline recommendations](#). *Pediatr Emerg Care*. 2020;36(4):e239-e41.
3. Lewis SR, Baker PE, Andrews PJ, et al. [Interventions to reduce body temperature to 35 °c to 37 °c in adults and children with traumatic brain injury](#). *Cochrane Database Syst Rev*. 2020;10(10):Cd006811.
4. Pedersen SH, Lilja-Cyron A, Astrand R, et al. [Monitoring and measurement of intracranial pressure in pediatric head trauma](#). *Front Neurol*. 2019;10:1376.
5. Gelineau-Morel RN, Zinkus TP, Le Pichon JB. [Pediatric head trauma: A review and update](#). *Pediatr Rev*. 2019;40(9):468-81.
6. Mikhael M, Frost E, Cristancho M. [Perioperative care for pediatric patients with penetrating brain injury: A review](#). *J Neurosurg Anesthesiol*. 2018;30(4):290-8.
7. Belisle S, Lim R, Hochstadter E, et al. [Approach to pediatric traumatic brain injury in the emergency department](#). *Curr Pediatr Rev*. 2018;14(1):4-8.
8. Appenteng R, Nelp T, Abdelgadir J, et al. [A systematic review and quality analysis of pediatric traumatic brain injury clinical practice guidelines](#). *PLoS One*. 2018;13(8):e0201550.
9. Lewis SR, Evans DJ, Butler AR, et al. [Hypothermia for traumatic brain injury](#). *Cochrane Database Syst Rev*. 2017;9(9):Cd001048.
10. Zeiler FA, Teitelbaum J, West M, et al. [The ketamine effect on ICP in traumatic brain injury](#). *Neurocrit Care*. 2014;21(1):163-73.

Severe Head Injury

11. Perel P, Roberts I, Shakur H, et al. [Haemostatic drugs for traumatic brain injury](#). Cochrane Database Syst Rev. 2010(1):Cd007877.
12. Alderson P, Roberts I. [Corticosteroids for acute traumatic brain injury](#). Cochrane Database Syst Rev. 2005;2005(1):Cd000196.
13. Thompson DC, Rivara FP, Thompson R. [Helmets for preventing head and facial injuries in bicyclists](#). Cochrane Database Syst Rev. 2000;1999(2):Cd001855.

Key Studies

1. Yoo G, Leach A, Woods R, et al. [Computed tomography practice standards for severe pediatric traumatic brain injury in the emergency department: A national survey](#). J Child Adolesc Trauma. 2021;14(2):271-6.
2. Alberto EC, Harvey AR, Amberson MJ, et al. [Assessment of non-routine events and significant physiological disturbances during emergency department evaluation after pediatric head trauma](#). Neurotrauma Rep. 2021;2(1):39-47.
3. Katar S, Aydin Ozturk P, Ozel M, et al. [The use of Rotterdam CT score for prediction of outcomes in pediatric traumatic brain injury patients admitted to emergency service](#). Pediatr Neurosurg. 2020;55(5):237-43.
4. Delaplain PT, Grigorian A, Lekawa M, et al. [Intracranial pressure monitoring associated with increased mortality in pediatric brain injuries](#). Pediatr Surg Int. 2020;36(3):391-8.
5. Vavilala MS, King MA, Yang JT, et al. [The Pediatric Guideline Adherence and Outcomes \(PEGASUS\) programme in severe traumatic brain injury: A single-centre hybrid implementation and effectiveness study](#). Lancet Child Adolesc Health. 2019;3(1):23-34.
6. Stopa BM, Amoroso S, Ronfani L, et al. [Comparison of minor head trauma management in the emergency departments of a united states and Italian children's hospital](#). Ital J Pediatr. 2019;45(1):24.
7. Rosario BL, Horvat CM, Wisniewski SR, et al. [Presenting characteristics associated with outcome in children with severe traumatic brain injury: A secondary analysis from a randomized, controlled trial of therapeutic hypothermia](#). Pediatr Crit Care Med. 2018;19(10):957-64.
8. Rhine T, Cassidy A, Yeates KO, et al. [Investigating the connection between traumatic brain injury and posttraumatic stress symptoms in adolescents](#). J Head Trauma Rehabil. 2018;33(3):210-8.
9. Murphy S, Thomas NJ, Gertz SJ, et al. [Tripartite stratification of the Glasgow coma scale in children with severe traumatic brain injury and mortality: An analysis from a multi-center comparative effectiveness study](#). J Neurotrauma. 2017;34(14):2220-9.
10. Liras IN, Caplan HW, Stensballe J, et al. [Prevalence and impact of admission acute traumatic coagulopathy on treatment intensity, resource use, and mortality: An evaluation of 956 severely injured children and adolescents](#). J Am Coll Surg. 2017;224(4):625-32.
11. Jennings RM, Burtner JJ, Pellicer JF, et al. [Reducing head CT use for children with head injuries in a community emergency department](#). Pediatrics. 2017;139(4).
12. Azim A, Jehan FS, Rhee P, et al. [Big for small: Validating brain injury guidelines in pediatric traumatic brain injury](#). J Trauma Acute Care Surg. 2017;83(6):1200-4.
13. Ajdari A, Boyle LN, Kannan N, et al. [Examining emergency department treatment processes in severe pediatric traumatic brain injury](#). J Healthc Qual. 2017;39(6):334-44.
14. Rakes L, King M, Johnston B, et al. [Development and implementation of a standardized pathway in the pediatric intensive care unit for children with severe traumatic brain injuries](#). BMJ Qual Improv Rep. 2016;5(1).

Severe Head Injury

15. Vavilala MS, Kernic MA, Wang J, et al. [Acute care clinical indicators associated with discharge outcomes in children with severe traumatic brain injury](#). Crit Care Med. 2014;42(10):2258-66.
16. Hymel KP, Armijo-Garcia V, Foster R, et al. [Validation of a clinical prediction rule for pediatric abusive head trauma](#). Pediatrics. 2014;134(6):e1537-44.
17. Benedict LA, Paulus JK, Rideout L, et al. [Are CT scans obtained at referring institutions justified prior to transfer to a pediatric trauma center?](#) J Pediatr Surg. 2014;49(1):184-7; discussion 7-8.
18. Whittaker B, Christiaans SC, Altice JL, et al. [Early coagulopathy is an independent predictor of mortality in children after severe trauma](#). Shock. 2013;39(5):421-6.
19. Parri N, Crosby BJ, Glass C, et al. [Ability of emergency ultrasonography to detect pediatric skull fractures: A prospective, observational study](#). J Emerg Med. 2013;44(1):135-41.
20. Chang LC, Raty SR, Ortiz J, et al. [The emerging use of ketamine for anesthesia and sedation in traumatic brain injuries](#). CNS Neurosci Ther. 2013;19(6):390-5.
21. Bell MJ, Adelson PD, Hutchison JS, et al. [Differences in medical therapy goals for children with severe traumatic brain injury-an international study](#). Pediatr Crit Care Med. 2013;14(8):811-8.
22. Adelson PD, Wisniewski SR, Beca J, et al. [Comparison of hypothermia and normothermia after severe traumatic brain injury in children \(Cool Kids\): A phase 3, randomised controlled trial](#). Lancet Neurol. 2013;12(6):546-53.
23. Hendrickson JE, Shaz BH, Pereira G, et al. [Coagulopathy is prevalent and associated with adverse outcomes in transfused pediatric trauma patients](#). J Pediatr. 2012;160(2):204-9.e3.
24. Osmond MH, Klassen TP, Wells GA, et al. [CATCH: A clinical decision rule for the use of computed tomography in children with minor head injury](#). Cmaj. 2010;182(4):341-8.
25. Zebrack M, Dandoy C, Hansen K, et al. [Early resuscitation of children with moderate-to-severe traumatic brain injury](#). Pediatrics. 2009;124(1):56-64.
26. Kuppermann N, Holmes JF, Dayan PS, et al. [Identification of children at very low risk of clinically-important brain injuries after head trauma: A prospective cohort study](#). Lancet. 2009;374(9696):1160-70.
27. Jagannathan J, Okonkwo DO, Yeoh HK, et al. [Long-term outcomes and prognostic factors in pediatric patients with severe traumatic brain injury and elevated intracranial pressure](#). J Neurosurg Pediatr. 2008;2(4):240-9.
28. Shore PM, Hand LL, Roy L, et al. [Reliability and validity of the pediatric intensity level of therapy \(pilot\) scale: A measure of the use of intracranial pressure-directed therapies](#). Crit Care Med. 2006;34(7):1981-7.
29. Greenes DS, Schutzman SA. [Clinical significance of scalp abnormalities in asymptomatic head-injured infants](#). Pediatr Emerg Care. 2001;17(2):88-92.

Other Resources

1. National Institute for Health and Care Excellence. [Assessment in the emergency department](#). 2023.
2. Helman A, Beno S, Alnaji F. [Emergency medicine cases podcast: Pediatric trauma](#). Emergency Medicine Cases. 2017.