**Supplemental Digital Content 2.** **Risk of bias**

**Bias assessment of included papers**

Risk of bias for the included papers was assessed using tools specific to the type of study. The 59 observational papers were categorised into Cohort (n=55), Case Series (n=1) and Case Control (n=3) studies and assessed using their respective Newcastle-Ottawa scoring tool\*.1 These tools were domain-based evaluations, where critical assessments are made separately for individual domains. The Newcastle-Ottawa Score has 3 domains; ‘selection’, ‘comparability’ and ‘outcome/exposure’, and awards ‘stars’ based upon meeting criteria in each domain.2 The total number of stars in each domain is used to convert the Newcastle-Ottawa Score to AHRQ standards: good, fair, and poor.

Two reviewers (RH, AR) assessed each paper independently after agreement of the criteria. Any disparities were resolved through discussion, with the input of a third reviewer (AV) if required. The majority (86%) of papers were assessed to be fair-good.

Chart, pie chart

Description automatically generated

**Supplemental Digital Content 2, Figure 1**: AHRQ Assessment of Observational Papers (n=59)



**Supplemental Digital Content 2, Figure 2**: Summary of Newcastle-Ottawa score for cohort studies



**Supplemental Digital Content 2, Figure 3**: Summary of Newcastle-Ottawa score for case-control/case series studies

**Supplemental Digital Content 2, Table 1:** Summary of Newcastle-Ottawa score for cohort studies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cohort (n=56)** | **2 stars** | **1 star** | **No star** | **Total** |
| Representativeness of the exposed cohort |  | 21 | 34 | 55 |
| Selection of Non-Exposed Cohort |  | 49 | 6 | 55 |
| Ascertainment of exposure |  | 54 | 1 | 55 |
| Demonstration that outcome of interest was not present at the start of the study |  | 13 | 42 | 55 |
| Comparability of cohorts on the basis of the design or analysis | 25 | 27 | 3 | 55 |
| Assessment of outcome |  | 31 | 24 | 55 |
| Was follow-up long enough for outcomes to occur? |  | 54 | 1 | 55 |
| Adequacy of follow up of cohorts |  | 47 | 8 | 55 |

**Supplemental Digital Content 2, Table 2:** Summary of Newcastle-Ottawa score for case-control/case series studies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Case control/case studies (n=4)** | **2 stars** | **1 star** | **No star** | **Total** |
| Is the case definition adequate? |  | 3 | 1 | 4 |
| Representativeness of cases |  | 2 | 2 | 4 |
| Selection of controls |  | 2 | 2 | 4 |
| Definition of controls |  | 1 | 3 | 4 |
| Comparability of cohorts on the basis of the design or analysis controlled for confounders | 2 | 2 | 0 | 4 |
| Ascertainment of exposure |  | 4 | 0 | 4 |
| Same method of ascertainment for cases and control |  | 3 | 1 | 4 |

**Supplemental Digital Content 2, Table 3:** Newcastle-Ottawa score breakdown for each cohort study.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author (first) and year** | Representativeness of the exposed cohort | Selection of Non-Exposed Cohort | Ascertainment of exposure | Demonstration that outcome of interest was not present at the start of the study | **Selection Total** | **Comparability** of cohorts on the basis of the design or analysis | Assessment of outcome | Was follow-up long enough for outcomes to occur? | Was follow-up complete? | Outcome Total | **Rating** |
| Abbasi M, *2004*3 | 1 | 1 | 1 | 0 | 3 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Al Nimer F, *2015* (e)4 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 1 | 2 | **Poor** |
| Bogoslovsky T, *2017*5 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | **Fair** |
| Carabias CS, 20206 | 1 | 0 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Castello LM, *2018*7 | 1 | 0 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 3 | **Good** |
| De Oliveira CO, *2007*8 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 2 | **Fair** |
| Dickens AM, *2018*9 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Egea-Guerrero JJ, *2012*10 | 0 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 3 | **Good** |
| Egea-Guerrero JJ, *2018*11 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |
| Faulkinberry S, *2019*12 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 1 | **Poor** |
| Ghonemi MO, *2013*13 | 1 | 1 | 1 | 0 | 3 | 2 | 1 | 1 | 1 | 3 | **Good** |
| Guzel A, *2008*14 | 1 | 1 | 1 | 1 | 4 | 2 | 0 | 1 | 1 | 2 | **Good** |
| Hatefi M, *2016*15 | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | **Good** |
| Heidari K, *2015*16 | 1 | 1 | 1 | 1 | 4 | 2 | 0 | 1 | 1 | 2 | **Good** |
| Herrmann M, *2000*17 | 1 | 1 | 1 | 0 | 3 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Ingebrigtsen T, *1999* (b)18 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 2 | **Fair** |
| Kelmendi FM, *2018*19 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |
| Korfias S, *2007*20 | 1 | 1 | 1 | 0 | 3 | 2 | 1 | 1 | 1 | 3 | **Good** |
| Kou Z, 201321 | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 2 | **Fair** |
| Langness S, *2018*22 | 1 | 1 | 1 | 0 | 3 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Li Q, *2017*23 | 0 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Lo TY, *2009*24 | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 1 | 1 | 2 | **Poor** |
| McMahon PJ, *2015*  (a)25 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |
| Metting Z, *2012*26 | 1 | 1 | 1 | 0 | 3 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Mondello S, *2012* (c)27 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | **Fair** |
| Mondello S, *2016*28 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |
| Muller K, *2007*29 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 2 | **Fair** |
| Naeimi ZS, *2006*30 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | **Fair** |
| Okonkwo DO, *2013* (a)31 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 0 | 2 | **Fair** |
| Pandey S, *2017*32 | 0 | 1 | 1 | 1 | 3 | 1 | 0 | 1 | 1 | 2 | **Good** |
| Papa L, *2017*33 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | **Fair** |
| Papa L, *2014*34 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | **Fair** |
| Pelinka LE, *2004* (d)35 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 2 | **Fair** |
| Pelinka LE, *2004* (d)36 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |
| Posti JP, *2016*37 | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | **Good** |
| Raabe A, *1998*38 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | **Fair** |
| Radwan W, *2013*39 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | **Poor** |
| Romner B, *2000* (b)40 | 0 | 1 | 1 | 1 | 3 | 2 | 0 | 1 | 1 | 2 | **Good** |
| Rubenstein R, *2017* (a)41 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | **Fair** |
| Sandsmark DK, *2019*42 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 0 | 2 | **Fair** |
| Shakeri M, *2014*43 | 0 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 3 | **Good** |
| Skandsen T, *2018*44 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | **Poor** |
| Skogseid IM, 199245 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | **Fair** |
| Thelin EP, *2019* (e,f)46 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | **Fair** |
| Thelin EP, *2016* (e,f)47 | 1 | 1 | 1 | 0 | 3 | 2 | 0 | 1 | 1 | 2 | **Good** |
| Thelin EP, *2013* (e)48 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 3 | **Fair** |
| Thelin EP, *2016* (f)49 | **1** | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | **Fair** |
| Tomita K, *2019*50 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 3 | **Good** |
| Vervliet B, *2012*51 | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 1 | **Poor** |
| Vos PE, *2004*52 | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 2 | **Fair** |
| Wolf H, *2015*53 | 1 | 1 | 1 | 0 | 3 | 2 | 0 | 1 | 1 | 2 | **Good** |
| Yue JK, *2019* (a)54 | **0** | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |
| Zurek J, *2011* (g)55 | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | **Good** |
| Zurek J, *2010* (g)56 | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | **Good** |
| Zurek J, *2011* (g)57 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |

The itemised domain scores of papers according to Newcastle-Ottawa Quality Assessment Form for Cohort Studies. Note: A study can be given a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability.

**Supplemental Digital Content 2, Table 4:** Newcastle-Ottawa score breakdown for each case-control/case series study

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Authors** | Is the case definition adequate? | Representativeness of cases | Selections of controls | Definition of controls | **Selection Total** | Comparability of cohorts on the basis of the design or analysis controlled for confounders | Ascertainment of exposure | Same method of ascertainment for cases and control | Non-Response Rate | Outcome Total | **Ratings** |
| Honda M, *2010*58 | 1 | 1 | 1 | 1 | 4 | 2 | 1 | 1 | 1 | 3 | **Good** |
| Ljungqvist J, *2017*59 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 2 | **Poor** |
| Mondello S, *2011* (c)60 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | **Fair** |
| Pleines, UE *2001*61 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 2 | **Poor** |

The itemised domain scores of papers according to Newcastle-Ottawa Quality Assessment Form for Case Control/Case Series studies. Note: A study can be given a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability.

**Supplemental Digital Content 2. References**

1. Higgins J, Green S. Cochrane Handbook for Systematic Reviews of Interventions - Version 5.1.0. Cochrane Collab., Appendix. www.cochrane-handbook.org. Published 2011. Accessed April 5, 2020.

2. Wells G, Shea B, O’Connell D, et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. The Ottawa Hospital Research Institute. http://www.ohri.ca/programs/clinical\_epidemiology/oxford.htm. Published 2019. Accessed April 5, 2020.

3. Abbasi M, Sajjadi M, Fathi M, Maghsoudi M. Serum S100B protein as an outcome prediction tool in emergency department patients with traumatic brain injury. *Turkiye Acil Tip Derg*. 2014;14(4):147-152. doi:10.5505/1304.7361.2014.74317

4. Al Nimer F, Thelin E, Nyström H, et al. Comparative assessment of the prognostic value of biomarkers in traumatic brain injury reveals an independent role for serum levels of neurofilament light. *PLoS One*. 2015;10(7):e0132177. doi:10.1371/journal.pone.0132177

5. Bogoslovsky T, Wilson D, Chen Y, et al. Increases of plasma levels of glial fibrillary acidic protein, tau, and amyloid β up to 90 days after traumatic brain injury. *J Neurotrauma*. 2017;34(1):66-73. doi:10.1089/neu.2015.4333

6. Carabias CS, Gomez PA, Panero I, et al. Chitinase-3-Like Protein 1, Serum Amyloid A1, C-Reactive Protein, and Procalcitonin Are Promising Biomarkers for Intracranial Severity Assessment of Traumatic Brain Injury: Relationship with Glasgow Coma Scale and Computed Tomography Volumetry. *World Neurosurg*. 2020;134:e120-e143. doi:10.1016/j.wneu.2019.09.143

7. Castello LM, Salmi L, Zanotti I, et al. The increase in copeptin levels in mild head trauma does not predict the severity and the outcome of brain damage. *Biomark Med*. 2018;12(6):555-563. doi:10.2217/bmm-2018-0041

8. De Oliveira CO, Reimer AG, Da Rocha AB, et al. Plasma von Willebrand factor levels correlate with clinical outcome of severe traumatic brain injury. *J Neurotrauma*. 2007;24(8):1331-1338. doi:10.1089/neu.2006.0159

9. Dickens AM, Posti JP, Takala RSK, et al. Serum Metabolites Associated with Computed Tomography Findings after Traumatic Brain Injury. *J Neurotrauma*. 2018;35(22):2673-2683. doi:10.1089/neu.2017.5272

10. Egea-Guerrero JJ, Revuelto-Rey J, Murillo-Cabezas F, et al. Accuracy of the S100β protein as a marker of brain damage in traumatic brain injury. *Brain Inj*. 2012;26(1):76-82. doi:10.3109/02699052.2011.635360

11. Egea-Guerrero JJ, Rodríguez-Rodríguez A, Quintana-Díaz M, et al. Validation of S100B use in a cohort of Spanish patients with mild traumatic brain injury: a multicentre study. *Brain Inj*. 2018;32(4):459-463. doi:10.1080/02699052.2018.1429019

12. Faulkinberry S, Wang K., Yang Z, Li X, Kerrigan M, Ghosh S. Tau as a potential biomarker for prognosis and diagnosis of pediatric traumatic brain injury. *J Neurotrauma*. 2019;36(13):A139-A139.

13. Ghonemi MO, Rabah AA, Saber HM, Radwan W. Role of Phosphorylated Neurofilament H as a diagnostic and prognostic marker in traumatic brain injury. *Egypt J Crit Care Med*. 2013;1(3):139-144. doi:10.1016/j.ejccm.2013.03.002

14. Guzel A, Er U, Tatli M, et al. Serum neuron-specific enolase as a predictor of short-term outcome and its correlation with Glasgow Coma Scale in traumatic brain injury. *Neurosurg Rev*. 2008;31(4):439-445. doi:10.1007/s10143-008-0148-2

15. Hatefi M, Dastjerdi MM, Ghiasi B, Rahmani A. Association of Serum Uric Acid Level with the Severity of Brain Injury and Patient’s Outcome in Severe Traumatic Brain Injury. *J Clin Diagn Res*. 2016;10(12):OC20-OC24. doi:10.7860/JCDR/2016/21918.8993

16. Heidari K, Asadollahi S, Jamshidian M, Abrishamchi SN, Nouroozi M. Prediction of neuropsychological outcome after mild traumatic brain injury using clinical parameters, serum S100B protein and findings on computed tomography. *Brain Inj*. 2015;29(1):33-40. doi:10.3109/02699052.2014.948068

17. Herrmann M, Jost S, Kutz S, et al. Temporal profile of release of neurobiochemical markers of brain damage after traumatic brain injury is associated with intracranial pathology as demonstrated in cranial computerized tomography. *J Neurotrauma*. 2000;17(2):113-122. doi:10.1089/neu.2000.17.113

18. Ingebrigtsen T, Waterloo K, Jacobsen EA, Langbakk B, Romner B. Traumatic brain damage in minor head injury: Relation of serum S-100 protein measurements to magnetic resonance imaging and neurobehavioral outcome. *Neurosurgery*. 1999;45(3):468-476. doi:10.1097/00006123-199909000-00010

19. Kelmendi FM, Morina AA, Mekaj AY, et al. Serum S100B Levels Can Predict Computed Tomography Findings in Paediatric Patients with Mild Head Injury. *Biomed Res Int*. 2018;2018:6954045. doi:10.1155/2018/6954045

20. Korfias S, Stranjalis G, Boviatsis E, et al. Serum S-100B protein monitoring in patients with severe traumatic brain injury. *Intensive Care Med*. 2007;33(2):255-260. doi:10.1007/s00134-006-0463-4

21. Kou Z, Gattu R, Kobeissy F, et al. Combining biochemical and imaging markers to improve diagnosis and characterization of mild traumatic brain injury in the acute setting: Results from a pilot study. *PLoS One*. 2013;8(11). doi:10.1371/journal.pone.0080296

22. Langness S, Ward E, Halbach J, et al. Plasma D-dimer safely reduces unnecessary CT scans obtained in the evaluation of pediatric head trauma. *J Pediatr Surg*. 2018;53(4):752-757. doi:10.1016/j.jpedsurg.2017.08.017

23. Li Q, Zhou Q. Relationship between CT features and serum gfAP, NSE and S100B protein in patients with severe traumatic brain injury. *Biomed Res*. 2017;28(22):9926-9929.

24. Lo TYM, Jones PA, Minns RA. Pediatric brain trauma outcome prediction using paired serum levels of inflammatory mediators and brain-specific proteins. *J Neurotrauma*. 2009;26(9):1479-1487. doi:10.1089/neu.2008.0753

25. McMahon PJ, Panczykowski DM, Yue JK, et al. Measurement of the glial fibrillary acidic protein and its breakdown products GFAP-BDP biomarker for the detection of traumatic brain injury compared to computed tomography and magnetic resonance imaging. *J Neurotrauma*. 2015;32(8):527-533. doi:10.1089/neu.2014.3635

26. Metting Z, Wilczak N, Rodiger LA, Schaaf JM, Van Der Naalt J. GFAP and S100B in the acute phase of mild traumatic brain injury. *Neurology*. 2012;78(18):1428-1433. doi:10.1212/WNL.0b013e318253d5c7

27. Mondello S, Jeromin A, Buki A, et al. Glial neuronal ratio: A novel index for differentiating injury type in patients with severe traumatic brain injury. *J Neurotrauma*. 2012;29(6):1096-1104. doi:10.1089/neu.2011.2092

28. Mondello S, Kobeissy F, Vestri A, Hayes RL, Kochanek PM, Berger RP. Serum Concentrations of Ubiquitin C-Terminal Hydrolase-L1 and Glial Fibrillary Acidic Protein after Pediatric Traumatic Brain Injury. *Sci Rep*. 2016;6:28203. doi:10.1038/srep28203

29. Müller K, Townend W, Biasca N, et al. S100B serum level predicts computed tomography findings after minor head injury. *J Trauma - Inj Infect Crit Care*. 2007;62(6):1452-1456. doi:10.1097/TA.0b013e318047bfaa

30. Naeimi ZS, Weinhofer A, Sarahrudi K, Heinz T, Vécsei V. Predictive value of S-100B protein and neuron specific-enolase as markers of traumatic brain damage in clinical use. *Brain Inj*. 2006;20(5):463-468. doi:10.1080/02699050600664418

31. Okonkwo DO, Yue JK, Puccio AM, et al. GFAP-BDP as an acute diagnostic marker in traumatic brain injury: Results from the prospective transforming research and clinical knowledge in traumatic brain injury study. *J Neurotrauma*. 2013;30(17):1490-1497. doi:10.1089/neu.2013.2883

32. Pandey S, Singh K, Sharma V, et al. A prospective pilot study on serum cleaved tau protein as a neurological marker in severe traumatic brain injury. *Br J Neurosurg*. 2017;31(3):356-363. doi:10.1080/02688697.2017.1297378

33. Papa L, Mittal MK, Ramirez J, et al. Neuronal Biomarker Ubiquitin C-Terminal Hydrolase Detects Traumatic Intracranial Lesions on Computed Tomography in Children and Youth with Mild Traumatic Brain Injury. *J Neurotrauma*. 2017;34(13):2132-2140. doi:10.1089/neu.2016.4806

34. Papa L, Silvestri S, Brophy GM, et al. GFAP out-performs S100β in detecting traumatic intracranial lesions on computed tomography in trauma patients with mild traumatic brain injury and those with extracranial lesions. *J Neurotrauma*. 2014;31(22):1815-1822. doi:10.1089/neu.2013.3245

35. Pelinka LE, Kroepfl A, Leixnering M, Buchinger W, Raabe A, Redl H. GFAP versus S100B in serum after traumatic brain injury: Relationship to brain damage and outcome. *J Neurotrauma*. 2004;21(11):1553-1561. doi:10.1089/neu.2004.21.1553

36. Pelinka LE, Kroepfl A, Schmidhammer R, et al. Glial fibrillary acidic protein in serum after traumatic brain injury and multiple trauma. *J Trauma*. 2004;57(5):1006-1012. doi:10.1097/01.ta.0000108998.48026.c3

37. Posti JP, Takala RSK, Runtti H, et al. The Levels of Glial Fibrillary Acidic Protein and Ubiquitin C-Terminal Hydrolase-L1 during the First Week after a Traumatic Brain Injury: Correlations with Clinical and Imaging Findings. *Neurosurgery*. 2016;79(3):456-463. doi:10.1227/NEU.0000000000001226

38. Raabe A, Grolms C, Keller M, Döhnert J, Sorge O, Seifert V. Correlation of computed tomography findings and serum brain damage markers following severe head injury. *Acta Neurochir (Wien)*. 1998;140(8):787-792. doi:10.1007/s007010050180

39. Radwan W, Rabah A, Saber H. Phosphorylated neurofilament heavy subunit (PNF-H) in blood as a potential diagnostic and prognostic biomarker in traumatic brain injury. ESICM 2013 - Abstracts of Oral Presentations and Poster. *Intensive Care Med*. 2013;39:201–539. doi:http://dx.doi.org/10.1007/s00134-013-3095-5

40. Romner B, Ingebrigtsen T, Kongstad P, BoØrgesen SE. Traumatic brain damage: Serum S-100 protein measurements related to neuroradiological findings. *J Neurotrauma*. 2000;17(8):641-647. doi:10.1089/089771500415391

41. Rubenstein R, Chang B, Yue JK, et al. Comparing plasma phospho tau, total tau, and phospho tau–total tau ratio as acute and chronic traumatic brain injury biomarkers. *JAMA Neurol*. 2017;74(9):1063-1072. doi:10.1001/jamaneurol.2017.0655

42. Sandsmark DK, Bogoslovsky T, Qu B-X, et al. Changes in Plasma von Willebrand Factor and Cellular Fibronectin in MRI-Defined Traumatic Microvascular Injury. *Front Neurol*. 2019;10:246. doi:10.3389/fneur.2019.00246

43. Shakeri M, Dokht YGM, Panahi F, Mahdkhah A, Foladi P. S100B protein value in predicting brain death after head trauma. *Neurosurg Q*. 2014;24(4):291-296. doi:10.1097/wnq.0b013e3182a2fc6e

44. Skandsen T, Clarke G., Einarsen C., et al. Levels of blood biomarkers in patients with mtbi were related to injury severity, but not to the post-concussive symptoms. *J Neurotrauma*. 2018;35(16):A209-A209.

45. Skogseid IM, Nordby HK, Urdal P, Paus E, Lilleaas F. Increased serum creatine kinase BB and neuron specific enolase following head injury indicates brain damage. *Acta Neurochir (Wien)*. 1992;115(3-4):106-111. doi:10.1007/BF01406367

46. Thelin E, Al Nimer F, Frostell A, et al. A Serum protein biomarker panel improves outcome prediction in human traumatic brain injury. *J Neurotrauma*. 2019;36(20):2850-2862. doi:10.1089/neu.2019.6375

47. Thelin EP, Jeppsson E, Frostell A, et al. Utility of neuron-specific enolase in traumatic brain injury; relations to S100B levels, outcome, and extracranial injury severity. *Crit Care*. 2016;20(1). doi:10.1186/s13054-016-1450-y

48. Thelin EP, Johannesson L, Nelson D, Bellander B-M. S100B Is an Important Outcome Predictor in Traumatic Brain Injury. *J Neurotrauma*. 2013;30(7):519-528. doi:10.1089/neu.2012.2553

49. Thelin EP, Zibung E, Riddez L, Nordenvall C. Assessing bicycle-related trauma using the biomarker S100B reveals a correlation with total injury severity. *Eur J Trauma Emerg Surg*. 2016;42(5):617-625. doi:10.1007/s00068-015-0583-z

50. Tomita K, Nakada T aki, Oshima T, Motoshima T, Kawaguchi R, Oda S. Tau protein as a diagnostic marker for diffuse axonal injury. *PLoS One*. 2019;14(3):e0214381. doi:10.1371/journal.pone.0214381

51. Vervliet B, Hulscher J, Van Der Naalt J, Ten Duis H., Nijsten M, Wilczak N. The diagnostic value of brain fatty acid binding protein in traumatic brain injury. *Brain Inj*. 2012;26(4):678-678. doi:http://dx.doi.org/10.3109/026990...- opens in a new window

52. Vos PE, Lamers KJB, Hendriks JCM, et al. Glial and neuronal proteins in serum predict outcome after severe traumatic brain injury. *Neurology*. 2004;62(8):1303-1310. doi:10.1212/01.wnl.0000120550.00643.dc

53. Wolf H, Frantal S, Pajenda G, Leitgeb J, Sarahrudi K, Hajdu S. Analysis of s100 calcium binding protein b serum levels in different types of traumatic intracranial lesions. *J Neurotrauma*. 2015;32(1):23-27. doi:10.1089/neu.2013.3202

54. Yue JK, Yuh EL, Korley FK, et al. Association between plasma GFAP concentrations and MRI abnormalities in patients with CT-negative traumatic brain injury in the TRACK-TBI cohort: a prospective multicentre study. *Lancet Neurol*. 2019;18(10):953-961. doi:10.1016/S1474-4422(19)30282-0

55. Žurek J, Bartlová L, Fedora M. Hyperphosphorylated neurofilament NF-H as a predictor of mortality after brain injury in children. *Brain Inj*. 2011;25(2):221-226. doi:10.3109/02699052.2010.541895

56. Žurek J, Bartlová L, Marek L, Fedora M. Serum S100B Protein as a Molecular Marker of Severity in Traumatic Brain Injury in Children. *Czech Slovak Neurol Neurosurg*. 2010;73(1):37-44.

57. Žurek J, Fedora M. Dynamics of glial fibrillary acidic protein during traumatic brain injury in children. *J Trauma - Inj Infect Crit Care*. 2011;71(4):854-859. doi:10.1097/TA.0b013e3182140c8c

58. Honda M, Tsuruta R, Kaneko T, et al. Serum glial fibrillary acidic protein is a highly specific biomarker for traumatic brain injury in humans compared with S-100B and neuron-specific enolase. *J Trauma - Inj Infect Crit Care*. 2010;69(1):104-109. doi:10.1097/TA.0b013e3181bbd485

59. Ljungqvist J, Zetterberg H, Mitsis M, Blennow K, Skoglund T. Serum Neurofilament Light Protein as a Marker for Diffuse Axonal Injury: Results from a Case Series Study. *J Neurotrauma*. 2017;34(5):1124-1127. doi:10.1089/neu.2016.4496

60. Mondello S, Papa L, Buki A, et al. Neuronal and glial markers are differently associated with computed tomography findings and outcome in patients with severe traumatic brain injury: A case control study. *Crit Care*. 2011;15(3):R156. doi:10.1186/cc10286

61. Pleines UE, Morganti-Kossmann MC, Rancan M, Joller H, Trentz O, Kossmann T. S-100β reflects the extent of injury and outcome, whereas neuronal specific enolase is a better indicator of neuroinflammation in patients with severe traumatic brain injury. *J Neurotrauma*. 2001;18(5):491-498. doi:10.1089/089771501300227297