Diagnosis requires a thorough patient history, standardized neurological physical examination and radiographic imaging of the spinal cord.

Biochemical biomarkers to determine the injury severity and the potential for functional recovery of traumatic spinal cord injury (TSCI) are highly warranted; however, it remains to be clarified whether cerebrospinal fluid (CSF) or peripheral blood (PB) is the ideal sample media. This study aims to measure and compare biomarker concentrations in CSF and PB and to explore associations between biomarker concentrations and injury severity, i.e., American Spinal Injury Association (ASIA) Impairment Scale (AIS) grade, and biomarker concentrations and clinical outcome, i.e., AIS grade improvement and Spinal Cord Independent Measure version III (SCIM-III) score.

Methods: From 2018 to 2020, we conducted a single-center prospective pilot study of TSCI patients (n=15) and healthy controls (n=15). Sample collection and clinical outcome assessment were performed at median 13 h [IQR: 19], 9 days [IQR: 2], and 148 days [IQR: 49] after TSCI. Concentrations of neuron-specific enolase (NSE); glial fibrillary acid protein (GFAP); neurofilament light chain (NfL); interferon-γ (IFN-γ); interleukin (IL)-1ß, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70, and IL-13; and tumor necrosis factor α (TNF-α) were measured and associated to clinical outcomes.

Results: The biomarker concentrations were higher in CSF than PB. CSF concentrations of GFAP, NSE, IFN-y, TNF-a, IL-2, IL-12p70, IL-4, IL-10, and IL-13 and PB concentrations of GFAP and IFN-y were significantly associated with AIS grade, but not with AIS grade improvement or SCIM-III score.

The results support GFAP as a potential diagnostic biomarker that may be measured in CSF as well as PB [1].

1)
Wichmann TO, Kasch H, Dyrskog S, Høy K, Møller BK, Krog J, Hoffmann HJ, Hviid CVB, Rasmussen MM. Glial fibrillary acidic protein is a robust biomarker in cerebrospinal fluid and peripheral blood after traumatic spinal cord injury: a prospective pilot study. Acta Neurochir (Wien). 2023 Feb 15. doi: 10.1007/s00701-023-05520-x. Epub ahead of print. PMID: 36790588.