

ABSTRACT

Monitoring of severe traumatic brain injuries in neurointensive care unit

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Background: The purpose of this narrative review is to provide an overview of the recent studies discussing the current state of multimodality monitoring (MMM) of sTBI using both invasive and non-invasive techniques. Also, to discuss the latest randomized controlled trials (RCTs) on decompressive craniectomy (DC) for the management of refractory post-traumatic intracranial hypertension.

Materials and methods: A literature search was performed in PubMed, Scopus, Google Scholar and ISI Web of Knowledge for articles in English with the keywords “severe traumatic brain injury” together with “secondary injury”, “intracranial hypertension”, “multimodality monitoring”, “neurointensive care unit”, “intracranial pressure”, “cerebral perfusion pressure”, “brain oxygenation”, “microdialysis”, “biomarker”, “decompressive craniectomy” and “randomized controlled trials”. The search included recent guidelines, meta-analyses, RCTs, systematic and narrative reviews.

Results: MMM, specifically, ICP monitoring, brain tissue oxygen tension (PbtO₂), pressure reactivity index (PRx), and cerebral microdialysis (CMD), are a promising group of techniques for understanding the complex neurophysiology following TBI. Invasive intracranial pressure (ICP) monitoring is widely regarded as the most critical modality for the treatment of sTBI patients (Balestreri & Czosnyka, 2006) . Regarding non-invasive brain monitoring, optic nerve sheath diameter, near-infrared spectrometry and transcranial doppler have shown promising results

(Wijayatilake et al., 2015). S100B could serve as a tool in the multimodality monitoring of patients in the neurointensive care unit. In case of intractable ICP after failed maximal medical therapy, secondary DC should be considered as a life-saving option, but it should not be considered a panacea. (Kolias et al., 2022).

Conclusion: We need to remember that in isolation, no monitoring tool is likely to change outcomes, but when used as part of a goal directed therapeutic strategy it could hypothetically influence outcomes. Critical care practitioners need to understand that these tools should be used in an integrated fashion, combining MMM data with the clinical examination, systemic monitoring, neuroimaging, and additional specialized monitoring tools.