

ICMM 2023 World Congress Abstract

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TITLE (100/150 char):

Sleep Disorders, Glymphatic Function and Traumatic Brain Injury: Future Biomarkers and Interventions

ABSTRACT (1894 / 2000 char)

Summary. Traumatic brain injury (TBI) is a major public health concern associated with adverse health outcomes and significant economic costs borne by patients, payers, and society. Of the adverse sequelae following TBI, sleep disorders such as insomnia and obstructive sleep apnea affect 24-75% of TBI patients – twice the prevalence among adults in the general population. Sleep disorders can cause, exacerbate, or prolong the most serious sequelae of TBI including post-traumatic stress disorder (PTSD), depression, chronic pain, poor cognitive performance, and diminished quality of life (See Figure 1). In part because early treatment of sleep disorders has been shown to prevent progression while improving mood and cognitive function after TBI, sleep disorders may be modifiable treatment targets to improve outcomes after TBI.

This overview will discuss sleep physiology, including the glymphatic system, a putative brain waste-clearance mechanism linked to sleep and shown in animals to be disrupted after TBI. It will also discuss novel biomarkers in development to measure this biology and accurately classify novel TBI-related sleep disorders. The talk will close with an exemplary clinical case and discussion of management strategies in accordance with the United States Defense Health Agency's TBI Center of Excellence (TBICoE) clinical recommendations, for which I was a coauthor.

Methods / Results. A review of sleep-related epidemiologic and physiologic changes observed after TBI will be integrated with a presentation of novel approaches to examine sleep and the glymphatic system. Unpublished data using blood biomarkers and brain water measurements captured during sleep may be presented – depending on the scope preference of the committee.

Conclusion. Military operations and exposures such as TBI predispose warfighters to multiple sleep disorders, which may have unique pathophysiology that demands detailed investigation and characterization for preventative and treatment development. Measurement and enhancement of sleep physiology, such as the

glymphatic system, which appears to have important links to sleep, stress, and TBI, may hold important implications for human performance and military readiness.