New recommendations link better sleep to improved concussion outcomes

March 31 2016

Credit: Vera Kratochvil/public domain

A national group of sleep and brain injury specialists recommends

specific steps to test and develop sleep-related treatments to improve the outcome of mild traumatic brain injury (mTBI). The recommendations, developed by a University of Maryland School of Medicine sleep specialist, along with experts from medicine, the military and private industry, appear online ahead of print in the journal *Neurotherapeutics*.

"Clinical practice guidelines in mTBI or concussion are woefully lacking, despite spending tens of millions of dollars over the past decade," says the group's chair, Emerson M. Wickwire, PhD, an assistant professor of psychiatry and medicine. "We still are not very good at improving long-term outcomes and reducing the prevalence of patients who end up with long-term effects of concussion."

Wickwire, who is also director of the Insomnia Program at the University of Maryland Medical Center, says investors from industry and government have called for increased effort to see if mTBI outcomes can be improved. "Leaders in TBI identified four topical areas that may be potential pathways to improve outcomes in mTBI: neuroinflammation, neuropsychiatric disease, chronic pain, and of course, disturbed sleep."

Wickwire says sleep and brain injury appear to share several overlapping brain circuits. "Structures damaged in brain injury may cause alterations in sleep/wake cycles. At the same time, sleep disturbances, which are reported by roughly half of people with brain injury, worsen quality of life, make treatment more difficult, and may well change the way the brain heals itself," he says.

Given the shared neurophysiologic underpinnings of sleep and mTBI, Wickwire says disturbed sleep and clinical sleep disorders represent treatment targets that can be modified to improve outcomes and quality of life in mTBI.

Traumatic brain injury, resulting from any force applied to the head or body, is generally categorized as either mild or moderate to severe, based on factors assessed at the time of injury, including level of responsiveness, duration of loss of consciousness, length of post-traumatic amnesia and findings from neuroimaging. Mild TBI is the primary focus of this publication.

The group has developed several recommendations to improve sleep outcomes in patients with mild TBI. They include: data repositories where sleep-specific information could be incorporated into existing TBI repositories and aggregated across multiple centers; serial assessment of mild TBI patients at various time intervals post-injury to help identify those who may develop long-term sleep disorders; research targeting treatments for mTBI-specific sleep disorders; sleep-specific education for head injury medical professionals; and increased access to sleep treatment services at head trauma centers.

Regarding treatment, Wickwire says there are many questions to be answered. "On the one hand, is sleep in and of itself therapeutic and can we manipulate sleep through pharmacologic or other means, in a way that will improve healing and recovery following brain injury?"

A second group of questions deals with clinical sleep disorders—insomnia, obstructive sleep apnea, circadian rhythm disorders, which affect sleep scheduling, parasomnias, such as sleep walking, and fatigue that develops following brain injury. "We have effective treatments for these sleep disorders in non-brain-injured patients, but we need to adapt these treatments to patients with mTBI, who might have unique needs," says Wickwire. "There may also be sleep problems that are unique to patients with mTBI for which there are no currently effective treatments."

"Success at improving outcomes in patients with mild traumatic brain

injury will require sustained effort on many fronts, and from a variety of disciplines," says E. Albert Reece, MD, PhD, MBA, vice president for medical affairs at the University of Maryland and the John Z. and Akiko K. Bowers Distinguished Professor and dean of the University of Maryland School of Medicine. "The recommendations in this paper set forth a clear pathway to reach that goal."

Approximately 1.7 million Americans sustain a TBI each year, according to data from the Centers for Disease Control and Prevention, cited in the paper. About 70 percent (1.2 million) are considered mild. Wickwire says that number is likely much higher, as many cases go undiagnosed, unreported and thus uncounted. Estimated costs of traumatic brain injury exceed $21.5 billion per year for mild TBI.

More information: Emerson M. Wickwire et al. Sleep, Sleep Disorders, and Mild Traumatic Brain Injury. What We Know and What We Need to Know: Findings from a National Working Group, *Neurotherapeutics* (2016). DOI: 10.1007/s13311-016-0429-3

Provided by University of Maryland