



ELSEVIER

Contents lists available at ScienceDirect

Pediatric Neurology

journal homepage: www.elsevier.com/locate/pnu

Topical Review

Sleep Disorders Associated With Traumatic Brain Injury—A Review



Kanwaljit Singh MD, MPH^a, Anne Marie Morse DO^b, Nataliya Tkachenko MD^c,
Sanjeev V. Kothare MD^{a,d,*}

^a Department of Pediatrics, University of Massachusetts Medical School, Worcester, Massachusetts

^b Sleep Center, Department of Neurology, New York University Langone Medical Center, New York, New York

^c Department of Pediatrics, Dnipropetrovsk State Medical Academy, Dnepropetrovsk, Dnipropetrovsk Oblast, Ukraine

^d Department of Neurology, New York University Langone Medical Center, New York, New York

ABSTRACT

BACKGROUND: Sleep disorders are common following traumatic brain injury. **METHODS:** In this article we review the spectrum and proposed mechanisms of traumatic brain injury associated sleep disorders and discuss the clinical approach to diagnosis and management of these disorders. **RESULT:** Disordered sleep and wakefulness after traumatic brain injury is common. Sleep disruption contributes to morbidity, such as the development of neurocognitive and neurobehavioral deficits, and prolongs the recovery phase after injury. Early recognition and correction of these problems may limit the secondary effects of traumatic brain injury and improve patient outcomes. **CONCLUSION:** Evaluating sleep disorders in traumatic brain injury should be an important component of post-traumatic brain injury assessment and management.

Keywords: traumatic brain injury, sleep disorders, circadian rhythm, neurocognitive, concussion

Pediatr Neurol 2016; 60: 30-36

© 2016 Elsevier Inc. All rights reserved.

Introduction

Traumatic brain injury is defined as “an alteration in brain function, or other evidence of brain pathology, caused by an external force” and is a leading cause of death and disability in adults and children throughout the world. The primary causes of traumatic brain injuries are falls (35.2%), motor vehicle accidents (17.3%), hit by objects (16.5%), and assaults (10%).¹ Data from the Centers for Disease Control revealed that, of the 1.6 to 3.2 million traumatic brain injuries in the United States each year, most are classified as mild traumatic brain injury or concussion.² Concussion is recognized as a clinical syndrome of biomechanically induced alteration of brain function, typically affecting memory and orientation, which may involve loss of consciousness.³ A concussive injury to the brain follows a

blow to the skull or an action that generates abrupt acceleration and deceleration of the brain within the skull. The acceleration/deceleration forces may lead to linear and/or rotational movement of the brain, whereby brain tissue moves against itself inside the skull, increasing the risk for neurocognitive and neurobehavioral deficits.⁴ A wide array of symptoms and signs can occur after a concussion, including behavioral alterations, balance disturbance, altered sleep, and altered cognition.⁵

Sports-related mild traumatic brain injury (mTBI) occurs in an estimated 1.6 to 3.8 million individuals annually in the United States. Many of these individuals do not obtain immediate medical attention.² The most common symptoms of sports-related concussion include headache, dizziness, confusion, nausea, memory difficulties, “mental fogginess,” fatigue, balance problems, attention and concentration difficulties, sleep disturbances, and “nervousness.”^{6,7}

Sleep disorders with traumatic brain injury

The sleep and wakefulness cycles often become disturbed with brain injury, irrespective of the severity.^{8,9} Brain regions and systems regulating arousal, alertness,

Article History:

Received September 22, 2015; Accepted in final form February 23, 2016

* Communications should be addressed to: Dr. Kothare; New York University; School of Medicine; NYU Langone Medical Center; 223 East 34th Street; New York, NY 10016.

E-mail address: Sanjeev.Kothare@nyumc.org

attention, and sleep are vulnerable to traumatic brain injury. The prevalence of sleep disorders in individuals with traumatic brain injury is very high, yet mostly unrecognized. Recent research suggests that 30% to 70% of patients experience sleep problems and fatigue after traumatic brain injury.^{10–12} The large variability in these estimates limits their clinical utility and likely reflects the differences in definitions (i.e., broad versus specific), criteria (e.g., formal diagnosis or not), types of measures (e.g., subjective versus objective), and sources of information (e.g., self-report versus observation) that are used to identify sleep disturbances in combination with the differences of samples that are studied (e.g., nonselected versus symptomatic samples; mild versus severe traumatic brain injury).⁸

Sleep disturbances associated with traumatic brain injury are broad (Table 1)¹³ and may include formally diagnosed sleep disorders (e.g., insomnia, hypersomnia, obstructive sleep apnea, periodic limb movements, and narcolepsy) and specific complaints (such as snoring, nightmares, poor sleep efficiency, delayed sleep onset, early awakenings, and excessive daytime sleepiness (EDS) and poorer sleep quality).⁸ Sleep disruption can be related to the traumatic brain injury itself but may also be secondary to neuropsychiatric (e.g., depression, anxiety) or neuromuscular (e.g., pain) conditions associated with traumatic brain injury or to the pharmacologic management of the injury and its consequences. Sleep disturbances in traumatic brain injury may cause or intensify a variety of comorbidities, such as depression, anxiety, irritability, fatigue, cognitive deficits, pain, and functional impairments.¹⁴ In addition, disrupted sleep may compromise a person's recovery and return to preinjury activities, thereby compromising quality of life.¹⁵

Spectrum of sleep disorders in traumatic brain injury

The most common sleep disorders associated with traumatic brain injury include sleep apnea (23% of all traumatic brain injury patients), post-traumatic hypersomnia (11%), narcolepsy (6%), and periodic limb movements of sleep (7%).¹⁶ Multiple studies suggest that EDS is common after traumatic brain injury.^{17,18} However, it is important to exclude all other causes of hypersomnia in patients with traumatic brain injury, including the sedative effects of medications, such as antiepileptic drugs frequently used in this population.¹⁵

In a prospective, multicenter study, EDS was found in 25% of traumatic brain injury patients.¹⁷ In a case series of 71 patients with traumatic brain injury, 47% of subjects had EDS and 18.3% of those patients had pathologic sleepiness as measured by the multiple sleep latency test score.¹⁹ In another retrospective study evaluating sleep disorders in chronic traumatic brain injury, EDS was reported by 52% of all patients as documented by an Epworth Sleepiness Scale score greater than 11.²⁰ Another prospective study on 76 patients revealed that sleep–wake disturbances, particularly EDS, fatigue, and hypersomnia are common after traumatic brain injury and significantly impair quality of life.¹¹

It is estimated that 23% to 70% of patients with traumatic brain injury have sleep disordered breathing,^{17,20} which is significantly higher than the expected prevalence in the

TABLE 1.

Differential Diagnosis of Sleep Disturbances After Traumatic Brain Injury¹³

Primary sleep disorders
Obstructive sleep apnea
Central sleep apnea
Complex sleep apnea
Hypersomnia due to medical condition
Circadian rhythm sleep disorder
Narcolepsy
Insomnia
Parasomnias
Periodic limb movement disorder/restless leg syndrome
Secondary causes of sleep disruption
Post-traumatic stress disorder
Pain
Depression/anxiety fatigue
Medications

general population.²¹ It is also well established that cognitive impairment is associated with traumatic brain injury and is worse with increasing severity of injury.²² Patients with traumatic brain injury and obstructive sleep apnea have a greater impairment of neurocognitive functions, especially of memory and sustained attention, as compared with traumatic brain injury patients without sleep disordered breathing.¹⁸

Although EDS is a very important chronic symptom after traumatic brain injury, hospitalized patients with a recent traumatic brain injury are more likely to complain of difficulty in initiating or maintaining sleep and that can persist after the hospital discharge.²³ Even minor head injury can be associated with decreased sleep quality and increased sleep fragmentation, as compared with the preinjury state.^{24,25} At least 30% to 50% of patients with traumatic brain injury in the setting of outpatient rehabilitation centers have difficulty sleeping; of whom, 64% complain of early morning awakenings, and around 45% have problems initiating sleep.¹⁴ Ayalon et al.²⁶ found that 36% of patients with minor traumatic brain injury who were referred for evaluation of insomnia experienced a circadian rhythm disorder. Of these individuals, 52% had delayed sleep phase syndrome, and the rest had an irregular sleep–wake pattern.

The proportion of institutionalized traumatic brain injury patients with periodic limb movement of sleep is as high as 25.4%,¹⁹ while in a multicentered study, the prevalence of periodic limb movement of sleep was estimated at 17% among both institutionalized and ambulatory traumatic brain injury patients.¹⁷ In another study, parasomnias were the presenting complaint in 25% of patients with traumatic brain injury; of which, clinical or subclinical rapid eye movement (REM) behavior disorder was the most common (13%) in patients with sleep complaints.²⁰

Thus the variety of sleep disorders after traumatic brain injury is highly diverse, and inclusive approach needs to be implemented to address the issues.

Mechanism of sleep disturbance after traumatic brain injury

The cause of sleep disturbances in individuals with traumatic brain injury is likely multifactorial, which highlights the difficulty of elucidating the exact mechanism behind EDS

Download English Version:

<https://daneshyari.com/en/article/3084278>

Download Persian Version:

<https://daneshyari.com/article/3084278>

[Daneshyari.com](https://daneshyari.com)