

Case Report: Severe Sequelae of Sleep Disorders

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Importance of submission

We report 2 cases of severe injuries in patients with sleep disorders. The first patient sustained multiple orthopedic traumas as sequelae of REM sleep behavior disorders (RBD). The second patient sustained a severe TBI as a result of restless legs syndrome (RLS). To our knowledge, there are only 2 reported cases of severe orthopedic traumas (cervical spine fractures) as a result of RBD and no reported cases of severe TBI from RLS.

Clinicians should be aware that appropriate management of sleep disorders and patient education could reduce the incidence of severe injuries.

Prior presentation

This information was originally presented as an abstract/poster, "Unusual Causes of Traumatic Brain Injuries" at the Association of Academic Physiatrists 2012 Annual Meeting in Las Vegas, NV.

Abstract

Parasomnias are disorders of sleep that result in abnormal movements and behaviors. They have the potential to cause injury to both the person with the parasomnia and to his/her bed partner. Severe injuries as a result of parasomnias are uncommon. Sleep-related movement disorders are distinct from parasomnias, in that they are simple body movements that can cause sleep disturbance. Classic sleep related movement disorders include restless legs syndrome (RLS) and periodic limb movement disorder. We present a patient who sustained a severe spine injury due to a REM sleep behavior disorder (RBD) and another who sustained a severe traumatic brain injury (TBI) due to RLS. Clinicians should educate their patients with parasomnias, strongly encourage modification of the sleep area for safety, and treat sleep disorders aggressively to minimize subsequent injuries.

Keywords: Sleep Disorders; Parasomnia; Restless Legs Syndrome; Rem Sleep Behavior Disorders; Traumatic Brain Injury; Concussion; Cervical Fracture; Violent Behavior of Sleep; Multiple Trauma

Background

Parasomnias are a category of sleep disorders that involve abnormal movements, behaviors, emotions, perceptions, and dreams that occur while falling asleep, sleeping, between sleep stages, or when waking from sleep [1]. Common non-rapid eye movement parasomnias are sleep terrors and sleep walking. The behaviors exhibited may be complex and appear purposeful. Patients may or may not have conscious awareness of the behavior. Parasomnias have the potential to cause injury to both the person with the parasomnia and to his/her bed partner although serious injury is uncommon.

Sleep-related movement disorders are distinct from parasomnias, in that they are simple body movements that can cause sleep disturbance. Classic sleep related movement disorders include restless legs syndrome (RLS) and periodic limb movement disorder. RLS is characterized by unpleasant, deep-seated paresthesias in the legs (sometimes in the arms), usually occur at rest and, are usually relieved by movement. Again, severe injury from RLS is uncommon.

Case presentation

Case 1

A 62-year-old man with a known RBD (loss of muscle atonia with resulting vigorous movement during REM sleep) and atrial fibrillation anticoagulated with warfarin presented to the emergency department (ED). He and his wife suspected that he left the bed during sleep once per week but had not previously sustained any significant injuries.

On this occasion, the patient did not remember getting out of bed; his wife was witness to this event. He jumped out of bed during sleep in an apparent dream episode. He struck the hardwood floor and nearby wall, hitting his head and neck. He suffered multiple injuries including: a left scapula fracture, left 3rd and 4th rib fractures, left acromioclavicular joint separation, and left C7 facet joint fracture. In addition, he sustained a mild traumatic brain injury with posttraumatic amnesia and large scalp hematoma. The patient's wife believed that he was still asleep until he struck the floor/wall. Because of these injuries, he required admission to a skilled nursing facility for rehabilitation after acute management.

Case 2

A 56-year-old man with a known case of severe RLS and past medical history of glaucoma and depression presented to the ED. The patient's wife reported that he frequently would wake from sleep because of the abnormal sensations in his legs and that he would walk in order to alleviate his symptoms. On this occasion, he apparently got out of bed because of RLS symptoms and subsequently fell down a poorly-lit staircase while ambulating. It was unclear if he had taken any medications to induce sleep or RLS that evening although he had trailed numerous medications prior to this fall and was currently prescribed gabapentin. He sustained a severe traumatic brain injury (TBI) including a subdural hematoma, subarachnoid hemorrhage, and skull fracture. The patient required an emergent craniotomy. During his recovery, he developed pneumonia, respiratory failure, and posttraumatic seizures. He completed a long course of acute inpatient rehabilitation afterwards. Currently, he resides at a residential TBI facility because of his significant cognitive impairment; he has not been able to return to home or his job as a university professor.

Discussion

RBD was first reported in 1986 and is noted to result in loss of normal skeletal muscle atonia during REM sleep [2]. The prevalence is at least 0.38% in the general population [3]. Some studies of patients with RBD have identified specific brain lesions as a possible etiology [4], and some data suggest that diffuse lesions of the hemispheres, bilateral thalamic abnormalities, or primary brain-stem lesions may result in RBD [5]. Pronounced muscle activity during dreaming is often a result- patients may be "acting

out their dreams." Movements may include violent vocalizations, single limb jerks, punching, pulling hair, jumping out of bed, and running [6]. Hence, patients with RBD are at risk of injuring themselves or their bed partners. Good sleep hygiene is recommended as the disorder may be exacerbated by sleep deprivation [7]. Modifying the sleep environment for safety is strongly recommended for all patients with RBD [7,8].

Pharmacological treatment should be considered. No large, randomized controlled trials for RBD treatment have been published. However, clonazepam is believed to be the best medication for patients with RBD [5,7-10] and melatonin is a viable second-line agent [9]. Additional treatments have been investigated including pramipexole, zopiclone, and gabapentin with varying success [8,11-20].

Sleep-related movement disorders are simple, abnormal movements that occur during and that may disturb sleep (e.g. RLS). RLS is characterized by unpleasant, deep-seated paresthesias in the legs and sometimes the arms and are often relieved by movement; mild symptoms of restless legs occur in up to 5% of the population [12,13]. While an exact cause is not known, studies suggest a dominant inheritance is present in more than 40% of patients with idiopathic RLS [14]. An executive committee of the International Restless Legs Syndrome Study Group approved diagnostic criteria which is largely related to patient history [15]. Nonpharmacological treatments include mental alerting activities, avoiding substances (e.g. caffeine, nicotine, and alcohol) that may exacerbate RLS, and addressing the possibility of iron deficiency. Pharmacological treatments include: carbidopa/levodopa, dopamine agonists, opioids, benzodiazepines, and gabaergics [16].

In the general population, little is known about incidence or associated co-morbidities of violent sleep behavior during sleep (VBS). Ohayon et al conducted a large-scale study with approximately 20,000 subjects across six European countries and found the prevalence of VBS to be 1.6% (313 out of 19,961 participants interviewed) [17]. Ohayon noted that harm or injuries to themselves or someone else occurred in almost one-third of cases of VBS (98 of 313). The most frequently reported injuries were bruises, nose bleeding, fractures, abrasions, and head contusions [17]. In another investigation, Schenck and Mahowald studied over 200 adults with sleep-related injuries. They found two admissions to intensive care units resulting from parasomnia-induced, traumatic injuries: a patient with C2 odontoid process fracture and another with a C3 spinous process fracture and severe concussion [18].

Kuzniar and Silber reported a case of a 73-year-old woman with uncontrolled RLS who spent most of the night standing and walking. Because of her attempts to alleviate symptoms, she fell several times and sustained, on several separate occasions, fractures of forearms, ribs, and nose [19]. No other reports of injuries from RLS were found.

We present two cases of patients who sustained multiple injuries including TBI and fractures from falls resulting from their histories of sleep disorders. The first patient sustained a concussion, cervical fractures, and numerous orthopedic injuries from his active RBD, presumably while acting out a dream. To date, there are few reports of this severity of injury. The second patient sustained a severe TBI after falling while attempting to relieve his RLS symptoms. Similarly, we believe that we are reporting the first case of severe TBI from RLS.

Conclusion

Physicians should screen for sleep disorders in all of their patients. If a sleep disorder is suspected, it should be more thoroughly investigated, monitored, and treated if necessary. Both pharmacological and non-pharmacological treatment methods can be employed. Physicians should stress the importance of modifying the sleep environment for safety. If the symptoms are refractory to treatment, referral to a Sleep Medicine specialist should be considered. Active treatment and safety modifications may reduce the incidence of injuries to patients and their bed partners. Further investigation regarding the incidence, etiology, treatment efficacy, and injury prevention is needed.

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