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Posttraumatic Stress Disorder, Sleep, and Breathing

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The clinical syndrome now known as posttraumatic stress disorder (PTSD) has a long history. Very similar conditions were called soldier's heart during the American Civil War, shell shock during the First World War, and combat fatigue during World War II. In nonmilitary contexts, the child abuse syndrome, battered woman syndrome, and railroad spine (among survivors of railroad accidents) presumably represent the same sort of reaction to traumatic events. It has been estimated that PTSD will affect 8% to 9% of the US population at some point in life. This condition may be manifest in a wide variety of victims of traumatic events, including children, as well as men and women of all ages. Survivors of critical illnesses may be at risk for manifestations of PTSD. PTSD is highly prevalent in veterans of the war in Vietnam, the Persian Gulf War, and recent military actions in Iraq and Afghanistan.

Clinical Manifestations: Criteria for Diagnosis

The term "posttraumatic stress disorder" emerged during the 1970s and was defined in the *Diagnostic and Statistical Manual of Mental Disorders-III* (American Psychiatric Association; 1981); it has remained in subsequent revisions in the nosology. Current diagnostic criteria require that symptoms in three clusters including intrusive recollection of events, avoidance/emotional numbing phenomena, and hyperarousal, be present following life-threatening exposures for more than 1 month and result in functional consequences. These criteria have defined unique features of PTSD, but the range of symptoms experienced by these patients is much broader, albeit nonspecific. Symptoms include vivid and intrusive memories, flashbacks, and intense emotional and physical reactions to reminders of the events. At the same time, it is often difficult to remember specific aspects of the events, and reminders can occur unpredictably. PTSD sufferers may lose interest in social and family life, feel emotionally detached, and have a sense of limited future happiness or success. These individuals are often irritable and subject to sudden outbursts of anger, hypervigilance, and difficulty concentrating. They may have feelings of guilt, self-blame, shame, mistrust, and betrayal. They typically feel depressed, hopeless, and alienated. Substance abuse and suicidal ideation and action are all too common.

The neuroendocrine, neurochemical, neuroanatomic, and genetic basis for development and expression of PTSD remain subject to much controversy. Clinical polysomnography may be insensitive to the neurobiological disease responsible for this condition. There is an urgent need for further investigations using more sophisticated technology. Treatment with a range of pharmacologic agents and behavioral techniques has been shown to be effective, but many therapeutic challenges remain. Sleep disturbances are very prominent in the morbidity of PTSD.

PTSD and Insomnia

The prevalence of insomnia is related to the nature of the traumatic exposure. As many as 70% to 91% of patients with PTSD report difficulty falling asleep or staying asleep. Many studies suggest that insomnia is frequently predictive of development of psychiatric and medical problems, as well as substance abuse.

PTSD and Nightmare Disorder

Repetitive dreaming with recall of traumatic events is considered to be part of the cluster of intrusive recollections. Disturbances in REM sleep mechanism are often cited as a hallmark of PTSD. These patients may "act out" their dreams, often violently, in a manner difficult to distinguish clinically from so-called REM sleep behavior disorder. This latter condition is characterized by dysfunction in REM-induced atonia and is often associated with subsequent development of degenerative neurologic disorders. Much of the literature related to management of nightmare disorder is based on PTSD-related nightmares; 19% to 71% of patients report nightmares, depending on the severity of PTSD and their exposure to physical aggression. An evidence-based review found that image rehearsal therapy could be recommended for treatment of nightmare disorder. In addition, treatment with adrenergic blocking agents, such as prazosin, has been shown to improve PTSD-related nightmares (Aurora et al. *J Clin Sleep Med.* 2010;6 [4]:389).

PTSD and Periodic Limb Movements

There are limited data that suggest a high prevalence of periodic limb movements during sleep in patients with PTSD. It has been suggested that these movements contribute to awakenings, insomnia, and daytime sleepiness. Unfortunately, these studies have not included adequate control groups. Furthermore, standards for diagnosis of clinically significant limb movements of sleep have become more rigorous, particularly with regard to the presence of restless legs symptoms. It may be that leg movements are a reflection of the lower threshold of arousal. Additional investigations in this area are needed.

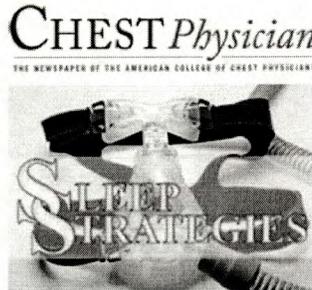
PTSD and Sleep Apnea

A background of hyperarousability in patients with PTSD creates instability of sleep continuity. This instability probably contributes to the development of both obstructive sleep apnea (OSA) and central sleep apnea. In a recent study of active duty servicemen, Dodson et al (*Chest.* 2010;138[4]:616A) found that 73% of randomly selected patients with PTSD demonstrated OSA on standard polysomnography. The mean age of these patients was 34 years. Many complained of daytime sleepiness, with a mean Epworth sleepiness score of 14, and tended to be overweight, with a mean BMI of 29 kg/m². At the other end of the age spectrum, Yesavage and colleagues (Sleep-disordered breathing in Vietnam veterans with posttraumatic stress disorder [published online ahead of print June 2010] *Am J Geriatr Psychiatry*) studied 105 Vietnam veterans with PTSD using unattended sleep studies and found that 69% had an apnea-hypopnea index greater than 10 events/h.

Poor Tolerance of CPAP for Sleep-Disordered Breathing

Some investigators have suggested that treatment of sleep-disordered breathing with continuous positive airway pressure (CPAP) may be helpful in the management of PTSD-related insomnia (Krakow et al. *J Trauma Stress.* 2001; 14[4]:647). More recent studies demonstrate that CPAP therapy may be very difficult for these patients. El-Soth and colleagues (*Sleep.* 2010;33[11]:1435) investigated response to CPAP in a population of 148 veterans with PTSD and OSA with control subjects matched for age, gender, BMI, and OSA severity. They found that the patients with PTSD were much less able to successfully utilize CPAP over a relatively short-term interval. Adherence was 41% compared with 70% in the control group. Of note, Vietnam veterans are particularly likely to develop problematic sleep-disordered breathing because of the cumulative effects of obesity, smoking, substance abuse, and the common development of metabolic syndrome. In addition, these veterans are approaching the age of onset of neurodegenerative disease that may also involve dream-enacting behavior as a feature of REM sleep behavior.

The pathophysiologic basis for the confluence of PTSD and sleep apnea syndrome is far from clear. It is possible that there is simply a coexistence of two rather common conditions. Nevertheless, this coincidence creates management difficulties that one suspects will be a challenge for the foreseeable future, particularly if it is unrecognized.



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