Sleep

Important Considerations in Management of Pain

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KEYWORDS

• Sleep • Pain • Fragmentation • Nociception • Mood • Circadian rhythm • Insomnia

KEY POINTS

- Sleep patterns share common pathways with nociceptive stimuli.
- Causes for sleep fragmentation include (1) sleep disordered breathing; (2) abnormal leg movements, including restless legs syndrome, occurring while the patient is awake, and periodic limb movements that occur while the patient is asleep; (3) underlying mood disorder, which may be exacerbated by physical symptoms; (4) hormonal changes.

SUMMARY AND OBJECTIVES

1. Sleep patterns share common pathways with nociceptive stimuli. Several important factors are reviewed in considering connections between sleep and pain.
2. Causes for sleep fragmentation include:
   a. Sleep disordered breathing, which may present with snoring, witnessed apneas, daytime sleepiness, and also with more subtle symptoms like morning headache and anxiety. Home sleep testing or more extensive in-laboratory polysomnography may be used for diagnosis of this condition. Treatment options include use of continuous positive airway pressure (CPAP); oral advancement devices (OAD); weight loss; surgical interventions; and, most recently, US Food and Drug Administration (FDA)–approved upper airway stimulation devices.
   b. Abnormal leg movements, including restless legs syndrome (RLS), occurring while the patient is awake and periodic limb movements that occur while the patient is asleep.
   c. Underlying mood disorder, which may be exacerbated by physical symptoms.
3. Identification and management of insomnia includes the definition of the condition, pharmacologic interventions, the role of circadian rhythms and clock adjustments, and the use of cognitive behavior therapy (CBT) for insomnia.

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Pain and sleep disorders share a reciprocal relationship: pain interferes with sleep quality and, in turn, poor and truncated sleep perpetuates pain symptoms. Furthermore, nociceptive pathways and sleep-wake pathways may share common central serotonergic transmission. A survey of 18,980 individuals from 5 European countries showed that significantly more participants with chronic painful conditions (eg, limb or joint pain, backache, gastrointestinal pain, and headache) than those without pain experienced insomnia. Compared with individuals without chronic pain conditions, those with pain were 3 times more likely to report difficulties with initiating sleep, maintaining sleep, early morning awakenings, and nonrestorative sleep.[1] There may be confounding factors, such as underlying mental illness and the onset of menopause. These confounding factors are often important and need to be considered when addressing sleep difficulties in patients with pain. Menopause is an important physiologic change in women that has both physiologic and psychological implications. As **Fig. 1**shows, sleep difficulties arise during this period that may layer on the nocturnal symptoms associated with pain.

Average adults require 7 to 8 hours sleep, with less than 6 and more than 9 hours correlating with adverse health outcomes. Insomnia encompasses the inability to initiate sleep, maintain sleep, or reach a state of restfulness and refreshment on awakening. It may be associated with daytime symptoms of fatigue, memory deficits, social/vocational/academic performance deficits, mood changes, daytime sleepiness, lack of motivation, vulnerability to accidents, somatic symptoms, and a preoccupation with sleep that perpetuates the cycle of insomnia. Thirty percent of the working population in the United States sleeps for less than 6 hours a day. Sleep deprivation may lead to a one-third reduction in glucose metabolism[2] and increase in C-reactive protein and interleukin-6 levels.[3] Sleep for longer than 9 hours seems to have similar effects. Onen and colleagues[4] found that men showed hyperalgesia to mechanical stimuli following 40 hours of total sleep deprivation and a robust analgesic effect after selective slow wave sleep recovery.

Sleep deprivation may be dictated by the individual's lifestyle and habits, but several identifiable sleep conditions may magnify pain symptoms and trigger awakenings. When assessing an individual who has sleep difficulties it is helpful to have a checklist of potential conditions that need to be ruled out or addressed. The first important step in such assessment is to evaluate the patient for sleep disordered breathing. Snoring, awakenings with gasping, palpitations, panic, and dry mouth/sore throat are common symptoms of sleep apnea syndrome. In addition, there are often more subtle symptoms, such as morning headache, anxiety, and poor daytime concentration, that point to potential sleep disordered breathing (**Table 1**).

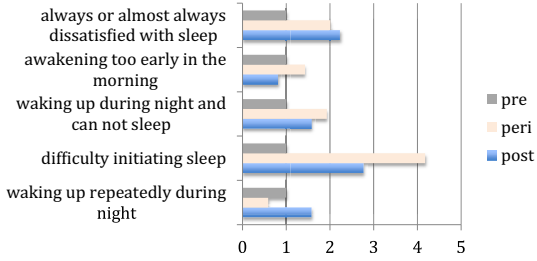

Fig. 1. Odds ratios for self-reported sleep problems among premenopausal, perimenopausal, and postmenopausal women (n = 589). (*Data from* Young T, Rabago D, Zgierska A, et al. Objective and subjective sleep quality in premenopausal, perimenopausal, and postmenopausal women in the Wisconsin Sleep Cohort Study. Sleep 2003;26(6):670. Available at: http://www.ncbi.nlm.nih.gov/pubmed/14572118.)