Sleep Related Scratching: A Distinct Parasomnia?

Gaurav Nigam, MD; Muhammad Riaz, MD, MS; Shelley D. Hershner, MD; Cathy A. Goldstein, MD, MS; Ronald D. Chervin, MD, MS

Sleep Disorders Center and Department of Neurology, University of Michigan, Ann Arbor, MI

Pruritus (itching) during the sleep period can present as a symptom of dermatological or systemic disease, or as a parasomnia. Sleep related scratching as a primary parasomnia, exclusively confined to sleep in the absence of coexisting dermatological disorders, has not been well described. This case series describes three such patients, and discusses potentially relevant pathophysiology that can underlie itching or pain. Such cases of sleep related scratching may merit nosologic classification apart from previously defined parasomnias.

Keywords: excoriations, fibromyalgia, itch, obstructive sleep apnea, parasomnia, scratching, sleep-related scratching


INTRODUCTION

Episodic scratching during sleep has been reported to have consequences that can vary from no obvious sleep fragmentation or skin injury to intermittent awakenings, excoriations, bleeding, disfiguring scars, and keloid formation. Most reported cases represent a nocturnal worsening of scratching that occurs during the day as well and is associated with dermatological or systemic diseases. Isolated nocturnal scratching in the absence of dermatological disorders has not been described, to our knowledge, except once in a preliminary manner. Here we discuss three such patients, all of whom presented to an academic sleep disorders center, two for other sleep related concerns. The demographic and polysomnographic features of these patients are summarized in Table 1.

CASE 1

A 68-year-old man with fibromyalgia presented with loud snoring, excessive daytime sleepiness, and, as incidentally noted, scratching during sleep. Scratching was confined to his face and upper back. He denied daytime itching, scratching, or dermatological disorders. The patient had been using fluoxetine for 32 y, for fibromyalgia and myofascial pain. Episodes of scratching occurred about once per week, ongoing for 5 y prior to presentation. Scratching occurred during the middle third of the sleep period with some episodes resulting in awakenings. He did not recall any itching sensation preceding the scratching or any dream mentation related to the scratching episodes. He had been seen in a dermatology clinic but no treatment had been offered.

On skin examination, discrete 5-cm-long vertical linear excoriations were seen on his cheeks bilaterally (Figure 1). Well-healed scars were noted bilaterally on his upper back, without any active weeping, oozing, or discharge (Figure 2). A full-night, in-laboratory diagnostic polysomnogram (PSG) showed severe obstructive sleep apnea (OSA), with an apnea-hypopnea index (AHI) of 62 events per hour of sleep. On a subsequent night of positive airway pressure (PAP) titration, a bilevel PAP setting of 25/18 cm H₂O was found effective to treat his OSA. During both the diagnostic and titration studies, stage rapid eye movement (REM) sleep without atonia was noticed intermittently but no complex motor behaviors were observed. The computer-calculated, suprathreshold rapid eye movement electromyographic activity metric (STREAM), a validated measure of rapid eye movement sleep without atonia, was 20.8% at the titration study, with values greater than 10–15% suggestive of abnormal levels of muscle activity during stage REM sleep (Table 1).

The patient was advised to start using bilevel PAP consistently. Three months later, a continuous positive airway pressure (CPAP) machine download demonstrated excellent adherence. He reported resolution of snoring and excessive daytime sleepiness, but again demonstrated fresh excoriations on his face, and now on his upper back as well (Figure 2), suggesting continued sleep related scratching. Clonazepam 0.5 mg at bedtime was prescribed, and 1 mo later the patient reported resolution of his sleep related scratching.

CASE 2

A 40-year-old woman with a history of anxiety and depression presented for evaluation of snoring and daytime fatigue. These symptoms were present for more than 10 y. The patient also had noticed episodes of facial scratching during sleep. She denied awareness of any itching sensation prior to the scratching. She thought that her eyes are probably closed while she scratches her face. She believed that she could not stop this behavior volitionally, as she is asleep and unaware of the scratching episodes. However, she would notice fresh abrasions on her face the next morning when looking in the mirror. These episodes occurred about once per week. She denied any
daytime itching or scratching. She had been treated for depression with citalopram for 5 y, but in the past year she had switched to sertraline. She did report distinct pain in multiple body parts, daytime fatigue, and unrefreshing sleep for many years, but she had not been evaluated for fibromyalgia. On physical examination, a few punctate excoriations were seen on the helix of her left ear and on the left temporal aspect of her face.

Figure 1—Excoriations on bridge of nose, periorbital area, frontal and temporal aspects of forehead, and lower left mandibular aspect of cheek secondary to sleep related scratching.

Figure 2—Presumed scarring from years of scratching on upper back.

Hypopigmented macules and patches with discrete margins appear to represent scars from previous excoriations that occurred over years of scratching during sleep.
A 68-year-old woman with chronic back pain and osteopenia presented for evaluation of nocturnal scratching. She also reported mild though habitual snoring that would sometimes wake her up. Her main concern however was scratching, exclusively at night that would awaken her from sleep. Specifically, she denied any daytime itching sensations or episodes of scratching. When it started about 8 mo prior to presentation, the sleep related scratching targeted the dorsum of her left foot. The scratching had gradually spread to involve both feet and legs. She reported an itching sensation that preceded the scratching; both could occur any time during the night. The urge to scratch was not very intense and the patient said that she could temporarily suppress scratching. However, typically she would wake up sufficiently to become aware that she was scratching her feet, and would then fall back asleep in 15–20 min. She denied any dream mentation associated with the episodes, and denied any new stressors in her life. She had been evaluated by a dermatology clinic for her sleep related scratching but had not been found to have any cutaneous disorders that could explain the problem. Examination of her skin showed no visible abrasions or excoriation on the dorsum of feet or the legs.

Diagnostic, in-laboratory PSG revealed OSA with an AHI of 10, worst in the supine position. Atonia was preserved during REM sleep. The patient declined CPAP, but agreed to positional therapy for treatment of mild OSA. At the time of this writing, she has declined opportunities to improve her success with CPAP and has not been treated for sleep related scratching.

**CASE 3**

A 68-year-old woman with chronic back pain and osteopenia presented for evaluation of nocturnal scratching. She also reported mild though habitual snoring that would sometimes wake her up. The patient terminated her subsequent CPAP titration study prematurely due to inability to tolerate CPAP, claustrophobia, and an apparent panic attack during the study. At the time of this writing, she has declined opportunities to improve her success with CPAP and has not been treated for sleep related scratching.

**CONCLUSION**

The International Classification of Sleep Disorders, Third Edition defines parasomnias as undesirable physical events or experiences that occur during entry into sleep, within sleep, or during arousal from sleep. Parasomnias may be categorized as primary (disorders of sleep states per se) or secondary (disorders of other organ systems that manifest themselves during sleep). Sleep related scratching is repetitive scratching of the body surface during the sleep period, and this behavior may represent a primary or secondary parasomnia, depending on whether it is not, or is (respectively) triggered by a dermatological or systemic disorder. The three cases presented herein suggest that sleep related scratching can occur as a primary parasomnia, without known dermatologic or systemic precipitant, and without itching or scratching outside the sleep period. Possible mechanisms to explain development or worsening of nocturnal scratching in relation to sleep must at this time remain speculative. However, such mechanisms conceivably could involve the normal circadian rhythm of physiological changes in the stratum corneum that increase vulnerability to itch, or a circadian pattern of pain that influences itching, given the broad overlap between peripheral mediators or receptors for pain and itching.

Peripheral circadian clocks have been found in virtually every mammalian cell and tissue, including the skin. The circadian pattern of increased transepidermal water loss and decreased cortisol secretion at night may promote itch during the time coinciding with sleep. Indeed, many cutaneous disorders are associated with itch that is exacerbated at night. Apart from the normal changes that increase the tendency to itch at night, abnormality in the circadian rhythm of melatonin secretion may contribute as evidenced by the reduced or abolished nocturnal melatonin peak in individuals with atopic eczema. Like neuropathic pain that shows a circadian pattern with nocturnal worsening, a neuropathic itch could display a nocturnal predominance. Both itch and pain are transmitted along small, slowly conducting sensory axons to the spinal cord, an observation that could lend credibility to the association of chronic pain syndromes such as fibromyalgia with chronic itching. Although it is not known definitively whether the ‘gate control’ theory of pain also applies to itch, recent reports support a broad overlap between pain and itch-related peripheral mediators and receptors. This is well illustrated by the fact that opioids that mitigate pain can induce itch. Activation of central mu-opioid receptors facilitates the itch sensation, whereas kappa-opioid receptor agonists alleviate itching by antagonizing the activation of central mu-opioid receptors. Itch receptors are a plexus of free nerve endings closely related to the dermoepidermal junction zone. These receptors are stimulated by mediators, such as histamine, that are released by mast cell degranulation in inflamed, itchy skin. In at least one study, patients with fibromyalgia in comparison to control subjects showed increased skin mast cells. Pruritus without identified cause was found to be present in 3.3 % of the patients with fibromyalgia, and the findings of this study suggest an association between fibromyalgia and mast cell activation disorders.

Previous authors have postulated that most cases of sleep related scratching emerge from nonrapid eye movement (NREM) stage 1 (N1), NREM stage 2 (N2), and stage REM (R) sleep. Nocturnal itching in patients with preexisting dermatological disorders leads to bouts of scratching that appear to be more frequent in stage N1 than N2, and more frequent in N2 than N3. The frequency in stage REM appears close to that in stage N2. This pattern is thought to reflect the physiology of sleep stages themselves rather than the skin diseases. Two of the three patients (subjects #1 and #2) had depression and two of the three patients (subjects #1 and #3) had chronic pain disorder. Depressed mood is associated with heightened itch perception. Sleep could be perceived as a period of...
ennui and absence of stimuli by patients with depressed mood and chronic pain. In the absence of external distracting stimuli, the state of sleep could enhance pain and itch perception given the considerable overlap between pain and itch-related neuronal pathways leading to subconscious scratching.21

Sleep related scratching conceivably could be one of the manifestations of an unknown dermatological disorder, which has not yet been fully described or defined. We cannot exclude the possibility that a more obvious dermato logic diagnosis is likely to develop in our patients in the future. Due to the fluctuating course of some dermatological conditions, capturing a distinct episode on video-polysomnography may not be possible.21 If in the future, more robust clinical and polysomnographic evidence shows sleep related scratching to be part of a dermatological disorder, then sleep related scratching may be considered to fit within existing nosology most accurately under “Other Parasomnias,” specifically “Parasomnia Due to Medical Disorder.”6

ABBREVIATIONS

Bilevel PAP, bilevel positive airway pressure
ICSD, International Classification of Sleep Disorders
N1, Stage 1 NREM sleep
N2, Stage 2 NREM sleep
N3, Stage 3 NREM sleep
NREM, non rapid eye movements sleep
OSA, obstructive sleep apnea
PAP, positive airway pressure
PSG, polysomnogram
REM, rapid eye movements sleep
TEWL, trans-epidermal water loss

REFERENCES


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Address correspondence to: Gaurav Nigam MD, Michael S. Aldrich Sleep Disorders Laboratory, University of Michigan, C728 Med Inn Building, 1500 E. Medical Center Drive, Ann Arbor, MI 48109-5845; Tel: (612) 916-2993; Email: dr.nigamgaurav@gmail.com

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