American Academy of Nurse Practitioners

CASE STUDY

Obtaining a thorough sleep history and routinely screening for obstructive sleep apnea

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Keywords
Obstructive sleep apnea; sleep history; routine screening.

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Received: December 2006;
accepted: May 2007

doi:10.1111/j.1745-7599.2008.00308.x

Abstract

Purpose: To present a clinical case study of obstructive sleep apnea (OSA) and discuss a potential correlation between OSA, unexplained distal pain symptoms, and pyschoemotional concerns.
Data sources: A review of the scientific literature was performed on OSA using the Cumulative Index of Nursing and Allied Health Literature and MEDLINE.
Conclusions: OSA is potentially life threatening and can have serious consequences to a patient's health. Many of the obvious signs of OSA occur at night, and the symptoms of OSA may correspond to a variety of other diseases. Clinicians should recognize a possible correlation between OSA and unexplained distal pain symptoms as well as psychoemotional concerns. These clinically associated conditions may be less apparent but may dramatically affect quality of life. By improving recognition and treatment of OSA, morbidity and mortality can be reduced and quality of life can be improved for patients and their families.
Implications for practice: It is imperative that clinicians are attentive and take detailed histories to recognize the clinical signs and symptoms of OSA, paying more attention to the less obvious symptomatology that may be significantly impacting quality of life.

Case presentation

James is a 35-year-old hardworking, physically fit dairy farmer who presents to the clinic with a chief complaint of "I just hurt all over." James has been feeling stiff and achy for quite some time. He often has a hard time getting out of bed in the morning and getting going for the day. He typically has to spend several minutes stretching his ankles and feet before attempting to walk. He would often relate this to the physical demands of owning and operating his family dairy farm. However, the soreness and stiffness recently became so severe that it started to impede James's ability to farm and provide for his family. He has become short tempered with his family and is losing his passion for farming. His other responsibilities have become drudgery, and he feels as if he is losing connection with key components of his life. He complains of feeling exhausted and thinks the pain is just "wiping him out."

Several series of blood tests were ordered for James. His rheumatoid factors were normal, which was not surprising because there is no family history of rheumatoid arthritis. His test for Lyme disease was negative. Anti-inflammatory and autoimmune profiles were also within normal limits. His build was tall, muscular, and lean, consistent with a physically demanding job as a farmer. The rest of his physical exam was unremarkable. Because of his complaints of soreness and stiffness in his ankles, he was referred from his primary care provider to orthopedics. Magnetic resonance imaging was ordered and revealed that his tendons were severely enlarged to about three times the size of normal. He denied any prior lower extremity injury, recent or remote. Upon orthopedic

examination, other than the soreness and stiffness in his joints, he was neurologically and vascularly intact.

After ruling out many differential diagnoses, he was placed on indomethacin, an anti-inflammatory, and received cortisone injections into his feet and ankles. After a couple of months, the cortisone wore off and the indomethacin was not working. He was tried on ibuprofen and diclofenac. Nothing seemed to cure the problem, and James felt he was becoming more and more exhausted.

He was referred to rheumatology where he was diagnosed with a rheumatoid syndrome. Blood tests were repeated but still failed to reveal systemic disease. James began to say, "The key to life is sleep and I am not getting enough." He thought perhaps his pain was keeping him from resting well. His wife then began to observe his sleep pattern and noted that there were breaks in his incessant snoring. She found that during those times he would actually stop breathing. After sharing her observation with him, he returned to his primary care provider. After further investigation into his symptoms, a sleep study was ordered. His final diagnosis was obstructive sleep apnea (OSA) as well as a severe and ongoing rheumatoid syndrome.

James presently uses continuous positive airway pressure (CPAP) and is on methotrexate, folic acid, and celecoxib, which are improving his symptoms. Within 2 weeks of the CPAP use, James started to feel remarkably improved. He feels rested, his pain is controlled, and his inflammation is diminished and nearly resolved. His wife has noticed he is much less moody, less irritable, and has his sense of humor back. He has a renewed sense of passion for his job and his family.

This real case example depicts how hidden and complicated OSA can be. Unfortunately, James is not an isolated case. Many patients with similar unexplained chronic pain and mood concerns are seen in clinical practice. This article will heighten clinical awareness by identifying the clinical significance of OSA, the potential correlation between OSA and unexplained distal pain and pyschoemotional concerns, the importance of obtaining a thorough sleep history, what constitutes a thorough sleep history, and diagnostic and treatment options for OSA.

Clinical significance

OSA is characterized by either a complete cessation of breathing or diminished breathing efforts, usually lasting for 10 or more seconds and occurring repeatedly during sleep (Willard & Dreher, 2005). This results in episodes of apnea with subsequent hypoxia and sleep arousal (Holman, 2005), which may occur anywhere from 5 to 30 times an hour (Stefanski, 2005). When breathing stops either partially or completely, hypoxia and hypercapnia occur, triggering the sympathetic nervous system to increase heart rate, cardiac output, peripheral vascular resistance, and renal sodium reabsorption (Holman).

It is estimated that OSA affects 2% of women and 4% of men (Gupta & Reiter, 2004) with an even higher prevalence in the elderly (Stefanski, 2005). Holman (2005) reports that this is equivalent to 12–18 million Americans. These staggering numbers make sleep apnea nearly as common as diabetes or asthma (Stefanski). Clinical features of OSA include insomnia, hypersomnia, morning headaches, memory and judgment problems, irritability, and difficulty concentrating. Witnessed episodes (by a bed partner) of loud snoring are common, as well as snorting, gasping, or cessation of breathing. Obesity, hypertension, thick neck, and nasopharyngeal or upper airway narrowing are frequently present (Holman). Other less obvious clinical indicators may include depression, nocturia, morning sore throat and dry mouth, and impotence (Holman). All these features of OSA can have devastating and detrimental effects on the individual.

Woodson and Han (2005) state that excessive and abnormal sleepiness is considered the "primary behavioral morbidity of OSA" (p. 762), as fatigue and irritability create quality-of-life disturbances (Holman, 2005). However, OSA can also lead to more profound physiologic consequences and morbidities/mortalities such as hypertension, dysrhythmias, pulmonary hypertension, cardiovascular disease, myocardial infarctions, cerebrovascular disease, job-related injuries, and motor vehicle accidents (Holman). There is also evidence linking OSA and elevated fasting insulin levels, suggesting OSA may be related to the development of diabetes mellitus (Holman). Clinicians in practice are also recently seeing a possible connection to unexplained chronic distal pain symptoms, as illustrated in the case study.

The characteristic clinical signs and symptoms of OSA are well documented in the literature. However, it is the less obvious signs and symptoms that spark an interest such as the unexplained pain that clinicians need to be aware of. A review of the literature was performed in an attempt to find a correlation between OSA and chronic distal pain symptoms. Many searches revealed no evidence in the literature that speaks to this issue. There are a multitude of articles on OSA; however, none of them clearly related or correlated OSA with chronic distal pain symptoms.

One study (Imadojemu, Gleeson, Gray, Sinoway, & Leuenberger, 2002) was found, however, that possibly explains this clinical correlation. It is recognized that OSA causes periods of hypoxia that can lead to tissue ischemia, potentially affecting all body systems (Stefanski, 2005). Imadojemu et al. examined the mechanism of the transient pressor responses associated with OSA during sleep. Blood pressure, sympathetic nerve activity, and limb

blood velocity were measured as an index of limb blood flow. The main outcome was that despite a slight increase in arterial pressure and heart rate immediately following the apneic period, there was no resulting increase in limb blood velocity. Therefore, the study indicated that OSA is associated with transient vasoconstriction (Imadojemu et al.). This suggests that OSA may cause peripheral vasoconstriction affecting the distal extremities. Perhaps, this is why distal pain symptoms could result. Cognitive function, concentration, short-term memory, and attention are impaired as a result of impaired sleep. Impaired sleep may also cause irritability, depression, malaise, and apathy (Butler, 2006). These may all be less obvious signs of OSA; however, they are equally important to recognize and may improve with adequate treatment of OSA.

Little data are available demonstrating a definitive relationship between sleep apnea and mood. However, a recent study (Stepnowsky, Bardwell, Moore, Ancoli-Israel, & Dimsdale, 2002) examined psychological variables and their association with CPAP compliance. CPAP is a therapeutic mechanism that delivers steady air pressure through a mask that covers either the mouth and nose or just the nose, to maintain a patent airway (Holman, 2005). It was concluded that with consistent CPAP use, coping strategies increased (as assessed by the Ways of Coping Scale), including increased use of social supports, problem solving, assertiveness, and positive reappraisal (Stepnowsky et al.).

Uvulopalatopharyngoplasty (UPPP) is a surgical treatment option for OSA that consists of removing the uvula, tonsils, and part of the soft palate (Butler, 2006). A recent study concluded that not only did UPPP significantly reduce sleep apnea events and level of daytime sleepiness, but it also improved mood. This suggests that UPPP can reduce OSA-associated major depression (Dahlof, Ejnell, Hallstrom, & Hedner, 2000). This outcome reinforces the suggested relationship between sleep apnea and mood, and healthcare providers should have an increased awareness about this possible correlation when acquiring sleep history information.

Importance of obtaining a thorough sleep history

Routinely screening for OSA by being aware of both the obvious and the not so obvious clinical symptoms can help clinicians more accurately diagnose OSA or sleep-related disorders. Because the obvious signs of OSA occur at night and the principal symptoms may correspond to a variety of other diseases, clinicians need to be aware of and take detailed histories from patients whose body type or symptoms might suggest OSA (Holman, 2005).

This should include patients with obvious OSA symptoms (daytime sleepiness, snoring, and witnessed apnea) as well as patients with more ambiguous symptoms and treatment-resistant concerns (distal pain, mood changes, and cardiovascular symptoms). In terms of the case presented in this article, James was young and physically fit with no underlying medical conditions. However, he did snore, he never felt rested, and he had changes in his mood, all of which are red flags for OSA. More importantly, he hurt all over, particularly in his lower extremities.

OSA is more typically thought to occur among older, overweight/obese men. However, it may also be present in young, otherwise healthy adults in whom it has gone undetected (Stefanski, 2005), but who present with seemingly unrelated concerns such as pain syndromes or mental health difficulties. Common findings with OSA that healthcare providers need to be aware of are loud snoring, witnessed apnea, increased daytime sleepiness, and morning headaches (Butler, 2006). Patients may also present with reflux or heartburn that awakens them from sleep, nocturia, dry mouth, or the inability to stay asleep (Butler).

Many patients may self-treat their fatigue with caffeine use and may present with persistent cardiovascular symptoms, including arrhythmias, hypertension, or congestive heart failure (Butler, 2006). These are all classic signs that would warrant further evaluation of sleep. However, it is the patient who presents with depression, anxiety, mood changes, unexplained fatigue, or unsolved pain symptoms that clinicians might not relate to disordered sleep. Often times, other diagnoses are made when the true culprit may be OSA.

What constitutes a thorough sleep history?

Because time is a factor in primary care, barriers might exist in implementing routine screening for OSA. Nonetheless, starting to screen for OSA can be as simple as asking the patients if they snore, if they ever stop breathing when they snore, if they feel rested, if they feel achy or have unexplained pain, or if they have noticed any changes in their moods.

Healthcare providers can also administer sleep scale tools such as the Epworth Sleepiness Scale (ESS) (see Table 1). The ESS is a validated questionnaire that consists of eight items to measure daytime sleepiness. Higher scores represent greater levels of sleepiness. The ESS can discriminate the sleepiness level of OSA patients from non-OSA patients (Johns, 1991).

There are many sleep assessment tools available. Although they do not necessarily correlate with OSA, they can be used to evaluate individual signs and symptoms of sleep quality (Stefanski, 2005). If the patient's responses to a screening tool indicate disordered sleep, it would be appropriate to have them return for further evaluation. It is important to explain to the patient the value of a whole

Table 1 Epworth Sleepiness Scale

Use the following scale to choose the most appropriate number for each situation:

0 = *no* chance of dozing or sleeping.
1 = *slight* chance of dozing or sleeping
2 = *moderate* chance of dozing or sleeping
3 = *high* chance of dozing or sleeping

Situation	***Chance of Dozing or Sleeping***
Sitting and reading	—
Watching television	—
Sitting inactive in a public place	—
Being a passenger in a car for an hour or more	—
Lying down in the afternoon to rest	—
Sitting and talking to someone	—
Sitting quietly after lunch	—
Stopped for a few minutes in traffic while driving	—
Total score (add the scores up)	
(This is your Epworth score)	—

Score Results

1-6: You are getting enough sleep.
7-8: Your score is within the average range, however you tend to be sleepy.
≥9: You are very sleepy and should see your primary healthcare provider or a sleep specialist as soon as possible.

appointment dedicated to OSA evaluation. There are also sleep specialists who can aid in diagnosing and managing sleep disorders.

Diagnostics and treatment

OSA can often be diagnosed with a detailed history, thorough assessment, and witnessed apnea periods by a bed partner. It is important for patients to undergo a polysomnogram, also known as sleep study, for a final diagnosis and to quantify the OSA (Butler, 2006). The results are reported by the number of apneic or hypopneic episodes per hour, expressed as the apnea/hypopnea index (AHI) (Holman, 2005).

An AHI of less than five is considered normal. An AHI of five or greater and at least one comorbid condition qualifies for CPAP therapy under Medicare guidelines (Butler, 2006, Holman, 2005). History of stroke, cardiovascular disease, metabolic issues, hypertension, hyperlipidemia, and excessive daytime sleepiness are all considered comorbid conditions. If no comorbidities are present, Medicare requires an AHI of 15; however, almost all patients will be found to have comorbidities (Butler). The degree of OSA is rated and scored (see Table 2).

Several treatment options exist for sleep apnea; unfortunately, none of them come in a pill bottle. In fact, sleep medications can often make OSA worse. Conservative treatment at home begins with simply sleeping on one's side rather than on the back. Elevating the head of the bed may eliminate OSA in some patients (Butler, 2006). Also, improving sleep hygiene through consistent bedtime and wake times, avoiding daytime naps, not drinking caffeinated beverages before bedtime, and avoiding heavy meals before sleep are all changes that may improve sleep and reduce OSA (Stefanski, 2005). Patients should definitely be advised to lose weight, stop smoking, and reduce alcohol intake (Butler). If the patient is obese, weight loss is vital, and it is imperative for clinicians to educate about the relationship between obesity and OSA (Stefanski). The gold standard of treatment for OSA remains CPAP therapy. This can be used in patients who have any degree of OSA severity. The degree of airway pressure can be regulated for each patient (Stefanski). Surgical options also exist for treatment of OSA.

Conclusion and case resolution

OSA is a potentially life-threatening condition that is associated with substantial morbidity and mortality that may be difficult to recognize and treat (Stefanski, 2005). Because the obvious signs occur at night and the principal symptoms of OSA may correspond to a variety of other

Table 2 AHI scoring

Degree of OSA	*AHI*
Normal	0–4
Mild	5–15
Moderate	15–30
Severe	>30

diseases, clinicians need to maintain a high index of suspicion and take detailed histories from patients whose body type or symptoms might suggest OSA (Holman, 2005). By promoting health and taking a proactive approach to identifying OSA, morbidity and mortality can be reduced and quality of life can be improved for patients and their families.

James's OSA was diagnosed 5 years ago. As of today, he has not developed any of the comorbidities of cardiovascular disease, hypertension, cerebrovascular disease, or diabetes. His affect difficulties resolved early in treatment and have not returned. Perhaps if James's OSA had been detected earlier, he would not have developed persistent arthritic changes. Today, James continues to treat his sleep apnea and arthritis pain with CPAP, methotrexate, folic acid, and celecoxcib. He has not required any additional cortisone injections into his joints or escalating doses of medication. He follows up with his rheumatologist and pulmonologist yearly. Interestingly, his rheumatoid factors continue to be negative. He continues to own and operate his family dairy farm, often working 16-h days. He happily enjoys partaking in his family's activities.

References

Butler, D. (2006). An underdiagnosed cause of daytime fatigue. *Clinical Advisor: A Forum for Nurse Practitioners*, **9**(9), 48–52.

Dahlof, P., Ejnell, H., Hallstrom, T., & Hedner, J. (2000). Surgical treatment of sleep apnea syndrome reduces associated major depression. *International Journal of Behavioral Medicine*, **7**, 77–88.

Gupta, V. K., & Reiter, E. R. (2004). Current treatment practices in obstructive sleep apnea and snoring. *American Journal of Otolaryngology*, **25**, 18–25.

Holman, M. L. (2005). Obstructive sleep apnea syndrome: Implications for primary care. *Nurse Practitioner: The American Journal of Primary Health Care*, **30**(9), 38–43.

Imadojemu, V. A., Gleeson, K., Gray, K. S., Sinoway, L. I., & Leuenberger, U. A. (2002). Obstructive apnea during sleep is associated with peripheral vasoconstriction. *American Journal of Respiratory and Critical Care Medicine*, **165**, 61–66.

Johns, M. W. (1991). A new method for measuring daytime sleepiness: The Epworth sleepiness scale. *Sleep*, **14**, 540–545.

Stefanski, A. M. (2005). Obstructive sleep apnea: A primary care approach. *American Journal for Nurse Practitioners*, **9**(10), 21–28.

Stepnowsky, C. J., Bardwell, W. A., Moore, P. J., Ancoli-Israel, S., & Dimsdale, J. E. (2002). Psychologic correlates of compliance with continuous positive airway pressure. *Sleep*, **25**, 758–762.

Willard, R. M., & Dreher, H. M. (2005). Treating obstructive sleep apnea can significantly reduce a patient's risk of cardiovascular complications, including stroke. Here's how to intervene. *Nursing*, **35**(3), 46–49.

Woodson, B. T., & Han, J. K. (2005). Relationship of snoring and sleepiness as presenting symptoms in a sleep clinic population. *Annals of Otology, Rhinology, and Laryngology*, **114**(10), 762–767.

Conflict of interest disclosure statements

There is noexisting relationship between any of the authors and any commercial entity or product mentioned in this article that might signify a conflict of interest. No incentives have been given by any commercial entity to submit this manuscript for publication.