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Respiratory Sleep Disorders

by David P. White, M. D.

Sleep disorders run the gamut from the inability to sleep (insomnia) to sleeping too much (hypersomnolence) and also include parasomnias (such as sleepwalking and movement disorders).

Sleep disorders associated with respiratory problems are one of the primary interests at National Jewish. The most common of these is sleep apnea (cessation of breathing). Discrete apneas (cessation of ventilation for more than 10 seconds) are frequent occurrences in otherwise normal individuals (without underlying lung disease) and may have an important impact on their general health and well-being. However, this condition often goes unrecognized or misdiagnosed.

Classification & Etiology

Apneas generally are classified into three types: obstructive, mixed and central.

Obstructive apneas are the most common and are caused by a sleep-induced collapse of the pharyngeal airway. Although the explanation for this phenomenon is subject to debate, the obstruction probably results from a sleep-induced decrease in upper airway muscle

While most pulmonary diseases, e.g., asthma and COPD, worsen at night, this by itself is not a indication of a sleep disorder.

tone in an individual with a small pharyngeal airway. This condition afflicts men much more frequently than it does women, which some believe may be due to hormonal influences.



Central apneas are far less common and are characterized by simultaneous cessation of respiratory effort and airflow. These usually result from an instability in the mechanisms controlling ventilation. The two most frequent causes of this kind of ventilatory instability are a variety of neurologic disorders and congestive heart failure.

Mixed apneas, as the name indicates, are a combination of obstructive and central apnea phenomena. They begin as a central pause and are followed by inspiratory effort against an occluded airway.

Consequences

Two apnea-related events produce the consequences of sleep-disordered breathing. First, the afflicted individual generally has to wake up to resume breathing at the end of an apnea. If apneas occur regularly, the sleep pattern can be disrupted, causing chronic sleep deprivation and hypersomnolence during the day. The latter is the most common complaint of patients with sleep apnea. (Hypersomnolence also can result from not spending enough time in bed, dis-

rupted sleep due to periodic leg movements, narcolepsy — recurrent, uncontrollable episodes of sleep — and a variety of other causes.)

Hypersomnolence can be mild and manifested only by falling asleep while watching television or reading. However, it can be severe and cause a person to fall asleep during activities such as driving, eating, working, talking, etc. These consequences can range from annoying to life-threatening. Most are seriously disruptive of daily functions.

Sleep apnea patients frequently experience intellectual deterioration (impaired memory and concentration), personality changes (somatic-depressive patterns) and sexual dysfunction (impotence) that is most likely explained by the sleep disruption described above.

The second group of consequences results from recurrent hypoxemia and hypercapnia caused by sleep-induced apnea. These blood gas abnormalities can result in serious effects, including arrhythmia, systemic and pulmonary hypertension, cor pulmonale and even modest lung disease. Sleep apnea also has been associated with increased mortality.

Recognition & Diagnosis

The most common respiratory sleep disorder by far is obstructive sleep apnea (OSA). OSA affects between 2% and 5% of the adult male population (a figure seven times the incidence in women). The physician therefore must have a high clinical suspicion and carefully question the patient to recognize this disorder, as most sufferers breathe quite normally when awake.

The onset of sleep apnea is often subtle and gradual, such that many patients fail to recognize the symptoms. People with this disorder often think they're just tired from overwork and stress or that it's just a function of getting older. Most patients with OSA are not aware that they stop breathing hundreds of

times during the night and rarely recognize the brief arousal that occurs at the end of an apnea.

Warning signs include: (1) reports by a bed partner that the patient stopped breathing (apnea), (2) loud, frequent snoring of long duration, and (3) hypersomnolence or irresistible sleepiness during the day. Other indications include male gender, obesity, systemic hypertension and increasing age.

To summarize, the typical sufferer of sleep apnea is an obese male, about 45 years of age, with high blood pressure who snores loudly at night and is sleepy during the day.

A single one of these variables should not strongly suggest the presence of this disorder. However, the presence of several of these signs or symptoms indicates the need for further evaluation.

Patients with central sleep apnea can differ from those described above. These individuals rarely snore and often complain of insomnia, with frequent arousals during the night.

It's important for the physician to distinguish between a patient who is always sleepy and one who complains of excessive fatigue, lack of energy and low motivation. Chronic fatigue can originate from a host of other conditions, including depression, cardiovascular disease, etc. Hypersomnolence should

Reports from a bed partner are extremely valuable in diagnosing sleep apnea.

suggest a sleep problem, with sleep apnea being the most common.

Sleep evaluation

A full polysomnographic evaluation is probably indicated if the presence of several of the above signs and symptoms create a reasonable clinical suspicion that sleep apnea is present. Less expensive screening procedures are actively being investigated, but currently are not generally accepted in diagnosing sleep apnea syndromes.

A formal sleep study consists of an all-night sleep evaluation that monitors sleep stages, nasal and oral airflow, chest-abdominal wall motion and arterial oxygen saturation, as well as cardiac electrical activity. Sleep is staged, apneas and hypopneas (reductions in ventilation for more than 10 seconds) quantitated, the severity of associated arterial oxygen desaturation recorded and any arrhythmias noted.

Treatment

Therapy should be initiated if the polysomnogram demonstrates frequent apneas (probably greater



than 15 or 20 events per hour of sleep) and the patient is clearly symptomatic. In the absence of clear symptoms when fewer apneas are observed, the decision is less clear-cut.

Unfortunately, the upper limit of normal for apneic frequency is poorly defined. There are no absolute "cutoffs" in apnea frequency or severity of arterial oxygen desaturation that indicate a need for treatment. Therefore, treatment is usually aimed at symptoms (primarily hypersomnolence) and the physiologic sequelae of recurrent hypoxia and hypercapnia. Each patient's therapy must be individualized based on symptoms, polysomnographic information and the risk or discomfort of the contemplated treatment.

Patients with minimal disease can benefit from simple therapies, while more severely afflicted individuals may require more drastic approaches. It is also frequently appropriate to simply follow patients with relatively mild disease and few symptoms.

The first step in treatment should be to seek reversible causes of nocturnal pharyngeal collapse. Surgically remediable abnormalities of the upper airway, such as tonsillar hypertrophy, severe nasal obstruction or a pharyngeal tumor fall into this group. Such pathology is rare, but it should be carefully excluded. Hypothyroidism should also be considered.

Once these possibilities are eliminated, simple forms of therapy can be instituted when applicable. One step is to discontinue alcohol or sedative use near bedtime. Avoiding sleeping on the back also can help. Another effective way to reduce or eliminate obstructive apnea is weight reduction if the patient is obese. Substantial weight loss is often required, but moderate weight reduction may be helpful in some patients.

Aggressive therapy

If these initial remedies are inapplicable or ineffective, more



aggressive therapy may be indicated.

Medication for OSA (protriptyline or progesterone) has generally proved unsatisfactory. The most widely used form of therapy for OSA is nasal continuous positive airway pressure (CPAP). Currently in widespread use, nasal CPAP utilizes a sealed nasal mask combined with a high-flow blower. The mechanism is believed to work by pneumatically splinting the airway open during sleep. Although this treatment works very well, some patients consider the CPAP equipment too cumbersome and inconvenient to wear to bed each night. However, as technology steadily improves, so does patient compliance and satisfaction.

Signs & Symptoms of Obstructive Sleep Apnea

- Reported respiratory cessation by bed partner
- Snoring (loud, long-standing and frequent)
- Hypersomnolence or irresistible sleepiness
- Male gender
- Obesity
- Systemic hypertension
- Increasing age

Another option for OSA therapy is uvulopalatopharyngoplasty (UPPP). UPPP is a procedure designed to increase airway size by removing the uvula, a portion of the soft palate and other redundant tissue in the pharyngeal airway. A success rate of only about 50% and inability to predict who will respond successfully has recently made this alternative less popular.

Tracheostomy also remains a viable and definitive form of therapy for OSA and should be considered in extreme cases. However, many patients prefer less invasive approaches.

Treatment of central sleep apnea has been less satisfactory than that of OSA. The most commonly used modalities include acetazolamide, low flow oxygen administration and nasal CPAP.

Recognition of the signs that characterize an apneic sufferer can help the office practitioner focus on the problem, make necessary distinctions and recommend appropriate evaluation and treatment. By reducing or eliminating symptoms, the physician can improve the quality of life for many patients and possibly prolong life for some.

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