Sleep Disordered Breathing in the Elderly

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ABSTRACT

Sleep-disordered breathing, especially obstructive sleep apnea (OSA), has a high prevalence among the elderly, where it may present with atypical symptoms. Untreated OSA can reduce quality of life and have adverse health consequences. Effective treatment is available, so all physicians treating the elderly should be aware of the clinical presentation, diagnostic methods, and treatment options for OSA.

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Sleep-disordered breathing includes snoring, obstructive sleep apnea (OSA), central sleep apnea (CSA), and sleep-related hypoventilation. OSA is the entity most likely to be encountered in the outpatient setting and will be the focus of this review. OSA is recognized as a potentially serious medical disorder resulting in decreased quality of life, adverse health consequences, and public health risks. Among the general population, OSA has a prevalence of 9%-24% when defined as >5 abnormal breathing events per hour, and a prevalence of 2%-4% when the abnormal breathing events are associated with daytime sleepiness.1 The prevalence of sleep apnea in an older population ranges from 30%-80%.2 The severity of sleep apnea, based on frequency of events, appears to increase with each decade.3 Because of the high prevalence and the potential adverse consequences, familiarity with this disorder is essential for all physicians who care for elderly individuals. Although the diagnosis and treatment of OSA in the elderly is similar to that of younger adults, there are significant differences in the risk factors, clinical presentation, and health consequences in the elderly.

TERMINOLOGY AND PATHOPHYSIOLOGY

Apneas occur when there is cessation of airflow. If there is continued respiratory effort, the event is an obstructive apnea. If there is no respiratory effort, it is a central apnea. A hypopnea has at least a 30% diminution in airflow associated with at least a 4% oxygen desaturation. Respiratory effort-related arousals are characterized by increasing respiratory effort leading to an arousal from sleep. All respiratory events must last at least 10 seconds. Sleep-related hypoventilation is associated with increased carbon dioxide levels during sleep. The apnea-hypopnea index (AHI) is the number of apneas and hypopneas per hour of sleep, while the respiratory disturbance index is the AHI plus the number of respiratory effort-related arousals per hour of sleep. Sleep apnea is diagnosed if a patient has a respiratory disturbance index >5, although some insurance plans also require an elevated AHI for treatment coverage.

OSA is caused by obstruction of the upper airway during sleep. With aging, there is increased collapsibility of the upper airway. Crowding of the posterior oropharynx due to obesity, macroglossia, micrognathia, retrognathia, tonsillar hypertrophy, or craniofacial abnormalities predisposes to OSA. Central nervous system depressants, especially alcohol, may reduce pharyngeal dilator muscle activity.

CSA can be related to increased sensitivity to changes in carbon dioxide levels and is classically seen in the setting of severe congestive heart failure. Neurological conditions, such as stroke, also can cause central apneas. The emergence of CSA can be seen during the treatment of OSA with positive airway pressure (PAP). Sleep-related hypoventilation can be seen in morbidly obese patients but also can...
occur with underlying severe obstructive lung disease or neuromuscular disease.

**RISK FACTORS AND CLINICAL PRESENTATION**

Obesity, increasing age, male sex, family history, and craniofacial abnormalities are risk factors for OSA. However, obesity is not as strong a risk factor in the elderly. After menopause, OSA is nearly as common in women as men.

The classic symptoms of OSA include snoring and daytime sleepiness. Patients also may report witnessed apneas, awakening gasping, and morning headaches. Many studies outlining the symptoms and health risks associated with OSA have included mainly middle-aged populations. Available data in the elderly suggest significant differences in presentation. Snoring becomes less common. The frequency of central events increases, although obstructive events still predominate.3 The elderly may complain of symptoms such as falls, confusion, and nocturia or enuresis, which might be attributed to causes other than sleep apnea.4,5 Sleep disruption also may occur due to other sleep disorders, such as restless legs syndrome, comorbid medical conditions, or medication side effects.

In the general population, OSA is associated with increased risk of automobile accidents, hypertension, cardiovascular disease, stroke, and increased mortality rates.5-9 The risk of diabetes mellitus, depression, and perioperative complications may be increased, while quality of life is decreased. Many studies suggest a decreased cardiovascular impact of OSA in the elderly, and unlike younger adults, an increased risk of mortality has not been consistently demonstrated.

**EVALUATION**

Elderly patients should be questioned about possible OSA symptoms. Screening tools, such as the Berlin Questionnaire10 to estimate OSA risk or the Epworth Sleepiness Scale11 to document sleepiness, may be used, but have not been validated in the elderly. A physical examination should note the presence of obesity and upper airway crowding. Patients with increased neck circumference (>17” in men, >16” in females) are at higher risk of OSA. Formal evaluation for OSA should be considered in elderly patients who exhibit typical symptoms, but also should be considered in patients with comorbid cardiovascular risk factors or atypical symptoms such as nocturia, unexplained falls, automobile accidents, or cognitive decline.

Sleep-disordered breathing is diagnosed by a polysomnogram, which is performed in a specialized facility and monitored by a technician. A polysomnogram is often done as a “split study” in which the first part of the night is used for diagnosis and the second part is used for titration of PAP if the OSA is severe. If the OSA is mild to moderate during the initial portion of the study, a full night of diagnostic polysomnography is recommended. A variety of portable monitoring units designed for home use are available and approved by the Centers for Medicare and Medicaid Services for diagnosing OSA. These units are best reserved for patients without significant comorbid conditions and should be used only when the diagnostic question is clear and device limitations are fully understood. Screening should be considered for other medical conditions that could contribute to sleep-disordered breathing, such as hypothyroidism.

### Treatment Options for Obstructive Sleep Apnea

| AHI ≤5 | No therapy needed unless fragmented sleep due to snoring. |
| AHI 5-15 | CPAP Auto-titrating PAP UPPP Oral appliance Positional appliance (if supine dependent) Weight loss Nasal expiratory resistance device |
| AHI >15 | CPAP BiPAP Auto-titrating PAP UPPP Oral therapy Positional therapy Weight loss Nasal expiratory resistance device |

AHI = apnea-hypopnea index; BiPAP = bi-level positive airway pressure; CPAP = continuous positive airway pressure; PAP = positive airway pressure; UPPP = uvulopalatopharyngoplasty.

**TREATMENT**

Treatment should be initiated for any elderly patient diagnosed with OSA who has clinical symptoms. The Centers for Medicare and Medicaid Services currently covers treatment for individuals with an AHI ≥5 and symptoms such as sleepiness or comorbid medical conditions such as hypertension. Individuals with an AHI ≥15 are covered regardless of symptoms.

Treatment options for sleep-disordered breathing are outlined in Table 1. Conservative measures are recommended for everyone, including treating nasal congestion, obtaining adequate sleep time, and limiting central nervous system depressants. Weight loss is encouraged in obese patients, although the impact of weight loss on OSA is difficult to predict.

Continuous positive airway pressure (CPAP) is the first-line therapy for moderate to severe OSA. Other options include auto-titrating PAP (APAP), which allows for a range of pressures to be used. APAP may improve tolerance of CPAP if patients require higher pressures only during
certain periods of sleep. APAP should be utilized cautiously in patients with significant comorbid conditions or with very severe OSA due to concerns the APAP machine may not respond quickly enough to changing pressure requirements. Bi-level positive airway pressure may be used in patients who require higher pressures than offered by CPAP or who have a component of hypoventilation. Newer modalities of bi-level positive airway pressure may be useful in patients with a component of CSA.

Other treatments for OSA include surgery, oral appliances, and positional therapy. The benefit of these therapies is more limited for severe OSA. Surgery most commonly involves an uvulopalatopharyngoplasty with soft tissue removal in the posterior oropharynx. Laser-assisted uvuloplasty is a treatment for snoring, not OSA. There are a wide variety of oral appliances available on the market, but it is best to seek the expertise of a dentist specializing in sleep medicine. There are sleep shirts available to facilitate lateral positional therapy. A repeat evaluation is recommended after initiation of one of these therapies to ensure adequate treatment.

OSA should be considered a chronic condition that is monitored long term. Early follow-up after initiation of treatment is the best way to address any barriers to compliance and improve the chances of long-term use of therapy. Compliance may be improved by educating patients on the health risks of untreated OSA, as well as the way in which the various treatment modalities work. Barriers to compliance with therapy that may be more prevalent in the elderly are listed in Table 2. Side effects from PAP and interventions to reduce these side effects are listed in Table 3.

### CONCLUSION

Sleep-disordered breathing, especially OSA, is common among the general population and increases in prevalence among the elderly. Elderly patients do not always present with the classic symptoms of OSA, and traditional risk factors assume less importance, requiring diligence on the part of physicians in recognizing the symptoms of OSA in this population. Because the sleep problems of the elderly are often multifactorial, referral to a sleep specialist should be considered for all patients who present with significant clinical complaints.

### References


