Snoring and Obstructive Sleep Apnea

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KEYWORDS

• Snoring • Obstructive sleep apnea
• Sleep-disordered breathing • Positive airway pressure

Sleep is an essential aspect of the health and well-being of adults and children. Sleep disorders including, but not limited to, insomnia, narcolepsy, restless leg syndrome, and sleep apnea, lead to reduced quality of life and productivity as well as increased use of health care services.[1] It is estimated that 50 to 70 million individuals in United States are affected by sleep problems.[1] Symptoms of sleep disruption are reported in 30% of the general population.[2] In the primary care setting more than 50% of patients have sleep complaints.[2] Primary care physicians are critical in early recognition, treatment, and long-term management of individuals with sleep disorders. The complex nature of sleep-related medical and behavioral problems requires multidisciplinary assessment and management.

Otolaryngologists are commonly asked to evaluate adults and children with snoring and obstructive sleep apnea (OSA). Snoring is estimated to occur in 3% to 12% of children[3–5] and up to 59% of adults.[6,7] Snoring is associated with OSA. OSA is a reduction or complete cessation in breathing due to obstruction of the upper airway after the initiation of sleep, which disrupts normal ventilation and sleep patterns.[8,9] Patients with OSA present with a variety of symptoms including excessive daytime sleepiness, snoring, unrefreshing sleep, fatigue, insomnia, episodes of gasping for air, or choking. OSA may be associated with myriad clinical consequences such as increased risk of systemic hypertension, coronary vascular disease, congestive heart failure, cerebrovascular disease, glucose intolerance, impotence, obesity, pulmonary hypertension, gastroesophageal reflux, and impaired concentration.[1,10–16] OSA is estimated to occur in between 5% and 10% of the United States population.[17,18] The prevalence of high risk of OSA in the Unites States is 26%.[7] Despite the relatively high prevalence of OSA, diagnosis and treatment may be delayed. Nonetheless, OSA remains undiagnosed in 82% of men and 93% of women with the condition.[19] Early identification and treatment of OSA provides significant relief for individuals, prevents complications of OSA, and reduces overall health care costs.[20,21] Better understanding of the pathogenesis, risk factors, diagnosis and treatment of OSA has the potential to improve

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early recognition of OSA and prevention of adverse effects on the individual and society.

PATHOGENESIS

OSA is a common disorder resulting from collapse of the upper airway. Air flow is affected by size, compliance, and shape of the upper airway. The framework of the upper airway consists of bones including the nasal turbinates, maxilla, mandible, hyoid, cervical vertebrae, and soft tissues including the adenoid, soft palate, tonsillar pillars, tonsils, uvula, soft palate, pharyngeal fat pad and mucosa, pharyngeal muscles, and epiglottis. Upper airway patency is accomplished by complex interactions among anatomic structures, neuromuscular tone, ventilatory control mechanisms, level of consciousness, upper airway reflexes, peripheral nervous system mechanisms, body position, vascular tone, surface tension forces, lung volume effects, and expiratory collapse.[22]

Obstructive apnea or hypopnea occurs due to intermittent complete and partial obstruction of the nose and the pharynx. Nasal obstruction has been implicated in the pathogenesis of OSA by increasing airway resistance that predisposes pharyngeal collapse, reducing nasal afferent reflexes maintaining muscular tone, reducing humidification leading to increased surface tension, and increasing the tendency for breathing through the mouth, destabilizing the lower pharyngeal airway by displacing the hyoid.[23–26]

Soft tissues, skeletal morphology, and obesity influence the upper airway configuration. The pharyngeal lumen appears to be circular or elliptical, with the long axis in the anterior-posterior dimension due to medial displacement of the lateral pharyngeal walls in OSA.[27] Micrognathia and retrognathia are common structural abnormalities that cause displacement of the tongue, soft palate, and soft tissues, leading to impingement of the airway.[28,29] Inferior displacement of the hyoid bone with associated inferior displacement of the tongue into the hypopharyngeal area is suggested to reduce the size of the pharyngeal lumen in patients with OSA.[30,31] Larger volumes of the adenoid, tonsil, lateral pharyngeal wall, tongue, and soft palate, and thickening of the lateral pharyngeal walls are reported in OSA.[32–38] Obesity contributes to the pathogenesis of OSA by increasing the fat distribution around the neck and airway and by altering the metabolism and ventilation via leptin and other cytokines, which increase carbon dioxide response thus causing central ventilatory sensitivity.[39,40]

The airway size is changed with body positioning. Patients with OSA have a greater decrease in airway size following positioning from sitting to supine.[41] In addition to the change in size of the airway, airway collapsibility is altered in OSA. Patients with OSA are reported to have a more collapsible pharyngeal airway than control subjects.[42,43] The role of pharyngeal muscles such as the tensor veli palatini and genioglossus in maintaining a patent airway has been studied in normal individuals and in patients with OSA. The tensor palatini tenses the soft palate and the genioglossus protrudes and depresses the tongue. During apneic events, genioglossus activity increases in response to an increase in carbon dioxide pressure until the patient awakens.[44]

DIAGNOSIS

Early identification of OSA relies on a high level of suspicion of the primary care physician. A careful sleep history is a critical part of the evaluation of patients with OSA. During a routine health maintenance evaluation, screening for OSA can be performed by inquiring about snoring, daytime sleepiness, obesity, hypertension, or retrognathia.[45] More comprehensive sleep history and physical examination are necessary