

Obstructive sleep apnea in adults

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1 Introduction

Sleep apnea syndrome (SAS) or obstructive sleep apnea (OSA) is a disorder characterized by episodes of complete or partial upper airway obstruction during sleep. This results in frequent episodes of apnea and hypopnea associated with symptoms such as excessive daytime and cardiovascular morbidity and mortality

Main characteristics:

1. Obstructive sleep apnea syndrome is a condition in which there is a dynamic collapse of upper airway tissues during sleep.
2. The general characteristic of SAS/OSA is the increased collapsibility of the upper airway during sleep resulting in markedly reduced (hypopnea) or absent (apnea) airflow at the nose and/or mouth.
3. Episodic airway obstruction is usually associated with oxygen desaturations and arousals from sleep.
4. The symptoms of sleep apnoea include chronic snoring, insomnia, gasping and breath holding, unrefreshing sleep, and daytime sleepiness.
5. Repeated episodes of apnea lead to sleep fragmentation.

Terms:

- Apnea is defined as the cessation of airflow for ten or more seconds.

- Hypopnea is defined as a recognizable, transient reduction of 30 percent or more (not a complete cessation) of breathing for ten or more seconds.
- Apnea–hypopnea index (AHI) is the most commonly reported polysomnographic parameter describing SDB severity.

2 Epidemiology

In North America, the prevalence of OSA is between 15 and 30%, and in Spain between 3 and 6% of the population.

3 Etiology

The major predisposing factor for sleep apnea is excess body weight. It has been estimated that 58% of moderate to severe OSA is attributable to obesity. There are also structural factors related to anatomy that predisposes patients with OSA to pharyngeal collapse during sleep, due to upper airway narrowing, such as adenotonsillar hypertrophy, particularly in children and young adults.

There are also neurological, pharmacologic and muscular factors: obesity, male, age, alcohol, use of sedatives and hypnotics, smoking, hypothyroidism, and stroke.

4 Pathophysiology

Muscle tone decrease throughout body during normal sleep and relaxation of upper airway dilator muscles results in relative narrowing of air passage. The normal persons will not develop any significant symptoms due to this physiological phenomenon.

Upper airway obstruction during sleep is often due to negative collapsing pressure during inspiration. Obstruction during sleep can occur at various sites within the upper airway. These include the nasal cavity, the nasopharynx, the oropharynx, the base of the tongue, and the laryngeal complex. The magnitude of upper airway narrowing during sleep is often related to body mass index, indicating that anatomical and neuromuscular factors contribute to airway obstruction. To understand the mechanisms of OSA, it is helpful to use the concept of the pressure-flow relationship through collapsible tubes.

Hypoxaemia, and arousals may be related to the higher prevalence of cardiovascular, metabolic, and neurocognitive dysfunction in OSA patients. Rates of hypertension, stroke, myocardial infarction, heart failure, cardiac dysrhythmias, cognitive dysfunction, depression, metabolic syndrome, oxidative stress, pulmonary hypertension, cor pulmonale and motor vehicle accidents are all higher in patients with OSA.

5 Clinical presentation

- Frequent loud snoring, witnessed apneas, restless sleep, mouth breathing
- Nonrestorative sleep (e.g., “waking up as tired as when they went to bed”)
- Morning headache, dry or a sore throat
- Excessive daytime sleepiness that usually begins during quiet activities
- Daytime fatigue/tiredness
- Cognitive deficits; memory and intellectual impairment

- Changes in mood and lack of concentration.
- Sexual dysfunction, including impotence and decreased libido.
- Disruptive snoring and witnessed apneas

6 Diagnosis

The diagnosis of OSA may be confirmed if the **Apnea-Hypopnea Index** or **AHI** (the sum per hour of episodes of apneas and hypopneas).

Several **questionnaires** have been designed to identify patients at risk for OSA: the Berlin Questionnaire, Epworth Sleepiness Scale, or the STOP-Bang questionnaire.

Polysomnography is the gold standard for OSA diagnosis but is expensive and time-consuming. Polysomnography involves simultaneous recording of physiologic variables during sleep like Electroencephalogram, Electrooculogram, electromyogram, electrocardiogram, respiratory effort, airflow, oxygenation, ventilation, snoring. A polysomnography is necessary to diagnose OSA accurately and to assess treatment benefit. The duration of the diagnostic study should be at least six hours. Airflow throughout the mouth and nose, thoracic and abdominal movements, snoring and oxyhemoglobin saturation are recorded.

7 Treatment

Education and Behavior

General and behavioral measures, such as weight loss, avoidance of alcohol for four to six hours before bedtime, and sleeping on one's side rather than on the stomach or back, are elements of conservative nonsurgical treatment. Because obesity is a major predictive factor for OSA, weight reduction reduces the risk of OSA. Patients with sleep-disordered breathing should be advised to have a sufficient sleep and appropriate sleep hygiene.

Positive Airway Pressure Therapy

In positive pressure therapy, the positive transmural pharyngeal pressure so that the upper airway remains patent as the intraluminal pressure exceeds the surrounding pressure. In most patients with OSA, this is delivered via continuous positive airway pressure (CPAP). Positive airway pressure is the initial treatment for nearly all patients with OSA and remains the mainstay of treatment.

Alternative and Adjunctive Therapies

Surgery Intervention is generally not considered first-line therapy for OSA and instead is considered when therapy from positive pressure therapy and/or oral appliance therapy is either ineffective or declines over time. In these patients, identification of the most likely contributing site or sites of obstruction is assessed in a comprehensive exam. Surgery involves upper airway surgery and bariatric surgery for weight loss. Depending on the sites of obstruction, numerous surgical alternatives exist, including tonsillectomy, uvulopalatopharyngoplasty, adenoidectomy, surgical correction for nasal obstruction including septoplasty.