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Review article

Obstructive sleep apnea in outpatient care – What to do with?

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ABSTRACT

Obstructive sleep apnea is a relatively common sleep disorder, which is on the increase in the last decades. It significantly contributes to morbidity and mortality in all countries worldwide. Obstructive sleep apnea is one of the most common causes of daytime sleepiness. Typical risk factors for obstructive sleep apnea in the normal adult population are male gender, obesity (preferentially central obesity), and increased neck circumference, presence of manifest cardiovascular disease, diabetes mellitus, and anomalies in the upper respiratory tract. Early diagnosis and treatment improves not only the quality of life, but also significantly decreases patient morbidity and mortality. Nowadays screening can be performed in outpatient settings using simple and readily available devices. Such screening can contribute to early diagnosis and treatment of obstructive sleep apnea.

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Introduction

Obstructive sleep apnea is a relatively common disease with potential neurocognitive, cardiovascular and metabolic consequences [1]. According to the American Academy of Sleep Medicine (AASM) 2017 guideline, obstructive sleep apnea belongs, together with central sleep apnea and sleep related hypoventilation, to sleep-disordered breathing [2].

Definition and pathophysiology

Obstructive sleep apnea is the most common type of the sleep-disordered breathing (SDB) characterized by episodes of upper airway collapse during sleep. These episodes cause cessation or significant reduction of airflow despite of ongoing respiratory efforts. In patients suffering from obstructive sleep apnea, airway dilating muscles can no more resist the negative pressure in airways during inspiration. The muscle tone is reduced during sleep and airways become contracted [3]. These episodes are typically accompanied by repeated oxyhemoglobin desaturation and terminated by short micro-arousals when the airway patency is restored. Sleep is fragmented and sympathetic nervous system is activated. Airway patency restoration is followed by hypercapnia, hypoxemia and subsequent compensatory hyperventilation. These events lead to fragmented sleep as the patient oscillates between wakefulness and sleep. In severe cases respiratory events can occur more than 100 times per hour; each event typically lasts 20–40 s [4]. Patients suffer from reduced deep NREM 3 and REM sleep [5,6]. In patients with obstructive sleep apnea, anatomic airway constrictions (enlarged tonsils, extended soft palate, and macroglossia) are often found.

Obstructive sleep apnea severity is expressed by the apnea-hypopnea index (AHI), which is defined as the number of apnea and hypopnea events per hour of monitored sleep. Apnea is defined by complete obstruction of the upper airways lasting for at least 10 s (i.e. airflow restriction by more than 90% (according to AASM criteria)) (Table 1). Hypopnea is defined as

airflow restriction more than 30% (according to AASM criteria) lasting for more than 10 s. According to AHI, obstructive sleep apnea is categorized as mild (AHI 5–15 episodes/h), moderate (AHI 15–30 episodes/h), and severe (AHI ≥ 30 episodes/h). The oxygen desaturation index (ODI) is defined as the number of desaturations per 1 h of monitored sleep when oxygen saturation is reduced as compared to the baseline standard level. The respiratory effort related arousal (RERA) can also be used. RERA is defined as an episode characterized by an increased respiratory effort caused by upper airway airflow reduction resolved with arousal and accompanied in most cases with hypoxemia. The respiratory disturbance index (RDI) is the sum of RERA and AHI.

According to the third edition of the International Classification of Sleep Disorders (ICSD-3), obstructive sleep apnea (OSA) is defined as polysomnography derived obstructive respiratory disturbance index (RDI) ≥ 5 events/h associated with typical OSA symptoms, or an obstructive RDI ≥ 15 /h in the absence of clinical OSA symptoms. The American Academy of Sleep Medicine (AASM) defines obstructive sleep apnea as AHI (apnea-hypopnea index – see below) more than 15, or AHI larger than 5 in presence of symptoms [2].

Prevalence

Prevalence of obstructive sleep apnea depends on the population studied (see Table 2). It is estimated to be 14% in men and 5% in women (OSA being defined as AHI ≥ 5 associated with clinical symptoms) (3). In some populations, prevalence of OSA can be higher (e.g. the estimated prevalence in patients undergoing bariatric surgery is 70–80%; prevalence is also higher in stroke patients) [7–9]. Higher prevalence is found in patients with ischemic heart disease [10], heart failure, resistant hypertension [11] (screening to exclude sleep apnea should be performed in all patients with resistant hypertension), in patients suffering from obesity [12], type 2 diabetes mellitus and arrhythmias like atrial fibrillation [13,14]. Studies have revealed that 82% and 93% of women with moderate and severe sleep apnea, respectively, remain undiagnosed [15].

Table 1 – Basic terms and definitions.

	Definitions
Hypopnea	Airflow restriction more than 30% (according to AASM criteria) lasting for more than 10 s
Apnea	Full airway closure lasting for at least 10 s (i.e. airflow restriction by more than 90% (according to AASM criteria))
Apnea-hypopnea index (AHI)	Number of apnea and hypopnea events per hour of monitored sleep AHI 5–15 – mild sleep apnea syndrome AHI 15–30 – moderate sleep apnea syndrome AHI >30 – severe sleep apnea syndrome
Respiratory disturbance index (RDI)	Sum of RERA and AHI
Desaturation index (ODI)	Number of desaturations per hour of monitored sleep
Respiratory effort related arousal (RERA)	An episode characterized by an increased respiratory effort caused by upper airway airflow reduction resolved with arousal and accompanied in most cases with hypoxemia
Obstructive sleep apnea syndrome	At least 5 episodes per 1 h of sleep (apnea or hypopnea) accompanied with some of the following symptoms: (1) excessive daytime sleepiness that cannot be explained by any other reason; (2) two and more of the following symptoms: choking or gasping, repeating arousals, daytime sleepiness, inability to concentrate, unrefreshing sleep

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