Perioperative Consideration of Obstructive Sleep Apnea in Ambulatory Surgery

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KEYWORDS

• Obstructive sleep apnea • Ambulatory surgery • Anesthetic management
• Perioperative outcome

KEY POINTS

- The prevalence of obstructive sleep apnea (OSA) is increasing and a significant number of patients with OSA are undiagnosed.
- The suitability of ambulatory surgery in patients with OSA remains controversial, and the evidence regarding the safety of ambulatory surgery for patients with OSA is limited.
- Preoperative screening and careful selection of patients for ambulatory surgery is the most important step.
- Patients diagnosed and suspected of having OSA should be managed with a systematic algorithm to improve outcomes.

INTRODUCTION

Obstructive sleep apnea (OSA) syndrome is the most common type of sleep disorder and is characterized by repetitive episodes of upper airway obstruction that occur during sleep, usually associated with a reduction in blood oxygen saturation. A significant number of patients with OSA are undiagnosed when they present for elective surgery.[1] Approximately 10% to 20% of surgical patients, of whom 81% had not been previously diagnosed with OSA,[2,3] were found to be at high risk based on screening. Increases in the prevalence of OSA and surgical procedures performed on an outpatient basis pose a challenge to anesthesiologists. The suitability of ambulatory surgery in patients with OSA remains controversial because of the concerns of increased perioperative complications, including postdischarge death. Currently, evidence regarding

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the safety of ambulatory surgery for patients with OSA is limited. To emphasize the importance of proper patient selection for ambulatory surgery, both the American Society of Anesthesiologists (ASA)[4] and the Society for Ambulatory Anesthesia (SAMBA)[5] have published guidelines in this area.

RISK FACTORS AND PATHOPHYSIOLOGY

The prevalence of OSA among the general population aged 30 to 70 years is 5% in women and 14% in men,[6] and is 78% in morbidly obese patients scheduled for bariatric surgery.[7] Various pathophysiologic, demographic, and lifestyle factors predispose individuals to OSA, including anatomic abnormalities that may cause a mechanical reduction in airway lumen (eg, craniofacial deformities, macroglossia, retrognathia), endocrine diseases (eg, Cushing disease, hypothyroidism), connective tissue diseases (eg, Marfan syndrome), male sex, age older than 50 years, neck circumference greater than 40 cm, and lifestyle factors, including smoking and alcohol consumption.[8] OSA is associated with multiple comorbidities, such as myocardial ischemia, heart failure, hypertension, arrhythmias, cerebrovascular disease, metabolic syndrome, insulin resistance, gastroesophageal reflux, and obesity.

DIAGNOSTIC CRITERIA OF OSA

The gold standard for the definitive diagnosis of OSA is an overnight polysomnography or sleep study. The apnea hypopnea index (AHI), defined as the average number of abnormal breathing events per hour of sleep, is used to determine the presence and severity of OSA. An apneic event refers to cessation of airflow for 10 seconds, whereas hypopnea occurs with reduced airflow with desaturation of 4% or greater. The American Academy of Sleep Medicine (AASM) diagnostic criteria for OSA require either an AHI of 15 or greater or an AHI of 5 or greater with symptoms such as daytime sleepiness, loud snoring, or observed obstruction during sleep.[9] OSA is considered to be mild for an AHI of 5 to 14, moderate for an AHI of 15 to 30, and severe for an AHI greater than 30.

METHODS FOR PERIOPERATIVE SCREENING FOR OSA

Because routine screening with polysomnography is costly and resource-intensive, several screening tools have been developed.[10] The SAMBA guidelines recommend using the STOP-Bang questionnaire as a first step because of its simplicity. The questionnaire was originally developed in the surgical population but has been validated in various patient populations (**Table 1**).[11–13] Patients with STOP-Bang scores of 0 to 2 may be considered at low risk of OSA; 3 to 4 as intermediate risk; and 5 to 8 as high risk.[12] The specificity of STOP-Bang can be improved by using a number greater than 3. The addition of a serum bicarbonate level can also help improve specificity. In those deemed at high risk of OSA via the STOP-Bang questionnaire, the oxygen desaturation index, which is derived from nocturnal oximetry, can then be used to further indicate OSA.[12,14,15] These screening tests do not differentiate OSA from other sleep disorders, such as obesity hypoventilation syndrome and central sleep apnea, and therefore a blood gas and polysomnography are indicated to diagnose hypercarbia and effortless apnea, respectively.

PREOPERATIVE EVALUATION OF THE PATIENT WITH SUSPECTED OR DIAGNOSED OSA FOR AMBULATORY SURGERY

In 2006, the ASA developed guidelines on the perioperative management of patients with OSA[4] based on the severity of OSA, the invasiveness of surgery, the type of