Outpatient Anesthetic Safety Considerations for Obstructive Sleep Apnea

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KEYWORDS

• Obstructive sleep apnea • Outpatient anesthesia • STOP-BANG questionnaire
• Diagnosing obstructive sleep apnea • Patient safety

KEY POINTS

- Most patients with obstructive sleep apnea (OSA) are not diagnosed preoperatively.
- The STOP-BANG questionnaire may identify patients at risk of OSA, especially those with severe OSA.
- Patients with mild to moderate OSA, with optimized comorbidities, can usually safely undergo outpatient surgery.
- Patients with severe OSA, who are not optimized medically, should avoid outpatient surgery.

The perioperative management of patients with OSA is challenging, rewarding and is appropriate to be included in an issue dedicated to patient safety. OSA is a chronic condition in which intermittent and recurrent episodes of partial or complete obstruction of the upper airway occur during sleep. These episodes disrupt sleep architecture, causing fragmented sleep and daytime sleepiness, and result in recurrent oxyhemoglobin desaturations. Left untreated, these episodes may result in significant morbidity and mortality.[1–8] Up to 34% of men and 17% of women meet the polysomnographic criteria to diagnose OSA.[9] An obstructive apnea is defined as the absence of airflow for at least 10 seconds despite ventilatory efforts, whereas an obstructive hypopnea is defined as a 30% (or greater) reduction in airflow lasting for 10 seconds or longer and an associated 4% (or greater) oxyhemoglobin desaturation level or if it results in arousal or fragmentation of sleep. OSA is defined as an apnea-hypopnea index (AHI) greater than or equal to 5 with associated symptoms, such as daytime sleepiness, fatigue, or impaired cognition, or an AHI greater than or equal to 15 without associated symptoms. OSA severity is categorized as follows: 5 to 14 = mild, 15 to 29 = moderate, and greater than 30 = severe.

OSA is associated with significant comorbidities, as described in **Table 1**.[5–7,10] Moderate to severe OSA is associated with increases in hypertension, strokes, atrial fibrillation, sudden cardiac death, and reduced left ventricular function in heart failure. It is associated with hyperglycemia in diabetic patients, impaired cognitive function, and increased risk for automobile accidents,[1] all-cause mortality, and cancer.[11]

Recently, numerous studies[7,15,21] have shown that OSA patients have an increased risk of having perioperative complications, including pneumonia, hypoxemia, difficult intubation, pulmonary embolism, myocardial infarction, atelectasis, cardiac arrhythmias, and unanticipated admission to an intensive care unit. Most patients with OSA

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Table 1
Coexisting diseases/symptoms associated with obstructive sleep apnea

Cardiovascular	% of Patients with Obstructive Sleep Apnea	Endocrine/Other	% of Patients with Obstructive Sleep Apnea
Drug-resistant HTN[12]	83	Glucose intolerance/ diabetes[13]	48
Arrhythmias[14]	49	Obesity[15]	77
Coronary artery disease[16]	30	Gastroesophageal reflux disease[17]	46
Myocardial infarction[18]	6	Cancer[18]	3
Congestive heart failure[19]	36	—	—
COPD[18]	24	—	—
Peripheral vascular disease[18]	4	—	—
Pulmonary hypertension[18]	3	—	—
Pacemaker[20]	59	—	—

Data from Refs.[12,14,16,18–20]

are undiagnosed at the time of admission. Therefore, it is important to identify these patients preoperatively so that appropriate perioperative management protocols can be initiated.

PREOPERATIVE MANAGEMENT

Does the Patient Have Obstructive Sleep Apnea?

OSA is more prevalent in surgical patients than in the general population,[22] and the incidence of undiagnosed OSA in surgical patients has been reported as between 21% and 28%.[23,24] Unfortunately, 60% of anesthesia providers and 92% of surgeons fail to identify patients with preexisting or undiagnosed moderate to severe OSA.[2,25–29]

Three questionnaires (Berlin, American Society of Anesthesiologists [ASA], and STOP-BANG) have been validated for use in the surgical population. Of these, the STOP-BANG questionnaire was found to have the highest methodological validity.[23] It is a simple, self-administered, concise questionnaire that consists of 8 yes/no questions.[23]

The mnemonic STOP includes the following:

1. S: Do you snore loudly, loud enough to be heard through a closed door?
2. T: Do you feel tired or fatigued during the daytime almost every day?
3. O: Has anyone observed that you stop breathing during sleep?
4. P: Do you have a history of high blood pressure with or without treatment?

If a patient answers yes to more than 2 questions, the sensitivity of having an AHI greater than 5 is 66% and the sensitivity of having an AHI greater than 15 is 74%.

The mnemonic Bang is also useful, as follows:

- B: Body mass index (BMI) greater than 35
- A: Age older than 50 years
- N: Neck circumference greater than 43 cm (17 in)
- G: Gender, male

Patients are considered at high risk of OSA syndrome if they answer yes to 3 or more items (**Table 2**).

As a result, if a patient is deemed low risk for OSA using the STOP-BANG questionnaire, a clinician can be confident that the patient does not have moderate to severe OSA.

Overnight Versus Home Polysomnogram

Overnight polysomnography (PSG) is considered the gold standard for diagnosing OSA.[30,31] It is time consuming, however, and there are often long waiting periods at many centers. Consequently, unattended portable monitoring (PM) has been increasingly used for the diagnosis of OSA.[31] Unattended sleep studies have a higher failure rate (10%–20%) secondary to technical issues[32]; a negative PM study does not definitively rule out OSA[33]; and studies in broad populations comparing its effectiveness to PSG are lacking.[34] Most PM studies include a minimum of 4 parameters, including oxygen saturation, measurement of heart rate or an ECG, and at least 2 channels assessing respiration (eg, respiratory movement and airflow).[34] Recognizing the significant