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Obstructive Sleep Apnea and the Impact on Surgical Outcomes in Gynecology

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Importance: Obstructive sleep apnea syndrome (OSAS) is a common medical condition in the United States and affects gynecologic surgical outcomes.

Objective: The aim of this review was to improve perioperative diagnosis and management of OSAS in patients presenting for gynecologic surgery and ultimately improve perioperative outcomes. The role of preoperative evaluation and screening is also addressed.

Evidence Acquisition: Medical databases were queried for publications pertaining to OSAS complications, risk factors, screening, and perioperative management. Pertinent articles were reviewed by the study authors.

Results: Obstructive sleep apnea syndrome is underdiagnosed in the preoperative surgical population. Obesity and other risk factors for OSAS are prevalent in patients with gynecologic issues but are not fully assessed with screening prior to surgery. Effective treatment modalities, such as continuous positive airway pressure, and perioperative management strategies are available to improve patient outcomes.

Conclusions and Relevance: Increased diagnosis and treatment for OSAS in the perioperative period can improve perioperative outcomes, surgical outcomes, and long-term patient outcomes. Strategies to increase effective management in patients presenting for gynecologic surgery are needed.

Target Audience: Obstetricians and gynecologists, family physicians.

Learning Objectives: After completing this activity, the learner should be better able to (1) list the diagnostic criteria, risk factors, and adverse outcomes associated with OSAS for gynecologic surgery patients; (2) compare available screening tools for OSAS; (3) evaluate effective treatments for OSAS; and (4) assess optimal preoperative, intraoperative, and postoperative management of OSAS in gynecologic patients.

Obstructive sleep apnea syndrome (OSAS), defined as partial or complete occlusion of the upper airway resulting in preserved but increased respiratory effort, is a pervasive problem in the United States.[1] The true prevalence of OSAS has been difficult to accurately ascertain because of inadequate screening. Overall population-based estimates of all persons in Western populations with OSAS range from 1% to 24% but are likely overly conservative.[2–6] However, approximately 82% of men and 92% of women with moderate to severe sleep apnea remain undiagnosed.[3,4,7,8] The obesity epidemic in the United States contributes significantly to the prevalence of obstructive sleep apnea (OSA). Among the severely obese, the prevalence of OSA ranges from 66% to 85%.[9] In a surgical population, 69% to 92% of patients who are screened will be found to have OSA.[6,10,11]

The first description of OSAS in the medical literature is attributed to Burwell et al, who described a "Pickwickian syndrome," named after a character from Charles Dickens's *The Pickwick Papers*.[12] Obstructive sleep apnea syndrome is strongly linked to medical conditions such as

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hypertension, coronary artery disease, and stroke. In addition, OSAS is recognized as a significant risk factor for perioperative morbidity and because of lack of sufficient screening is underdiagnosed and undertreated in operative patients. Women are often overlooked in screening, presenting significant risk to the gynecologic surgery population.[3] This review further describes the diagnosis and treatment of OSAS, discusses screening techniques for operative patients, highlights operative complications as a result of OSAS, and describes care aspects unique to gynecology patients.

DEFINITION OF TERMS

Obstructive sleep apnea syndrome is defined as partial or complete occlusion of the upper airway, resulting in increased respiratory effort. The American Academy of Sleep Medicine (AASM) Task Force further defines OSAS by the number of obstructive events per night. Obstructive events include apneas and hypopneas. Apnea is defined as cessation of airflow for at least 10 seconds, whereas hypopnea is defined as a reduction in airflow followed by arousal from sleep or decreased oxygen saturation.[4] The apnea-hypopnea index (AHI) is defined as the averaged frequency of apnea and hypopnea events per hour of sleep.[13] The respiratory disturbance index is defined as the averaged frequency of apnea, hypopnea, and reduction in airflow with resultant arousal events obtained using polysomnography.[13] The diagnosis of OSAS is confirmed when a patient has 15 or more events per hour or more than 5 events per hour and symptoms (Table 1). Obstructive sleep apnea syndrome can be further stratified into mild, moderate, or severe based on the number of respiratory disturbance index events (Table 2).[14]

TABLE 1
Diagnosis of OSA

Symptoms of OSA
Unintentional sleep episodes during wakefulness
Daytime sleepiness
Unrefreshing sleep
Fatigue
Insomnia
Waking up breath holding
Gasping or choking
Bed partner describing loud snoring, breath interruptions, or both during partner's sleep
Impaired cognition
Polysomnography diagnosis
AHI ≥15 OR
AHI ≥5 with associated symptoms

TABLE 2
Classification of Obstructive Sleep Apnea

Mild OSA
≥5 But <15 averaged apnea/hypopnea events per hour of sleep
Moderate OSA
≥15 But ≤30 averaged apnea/hypopnea events per hour of sleep
Severe OSA
>30 Averaged apnea/hypopnea events per hour of sleep

RISK FACTORS

Several risk factors and differences have been identified for OSAS. Age trends have been observed with a steady increase in OSAS in midlife.[2] For individuals older than 65 years, at least a 2-fold increase in incidence of OSAS has been observed compared with middle-aged individuals and a greater fold increase for severe OSAS.[2,5]

Sex differences have been noted in OSAS. Despite an increased incidence of obesity among women, males have a significantly higher incidence of OSAS. Men have an 8-fold increase in diagnosis and a 2-fold increase in undiagnosed OSAS. This discrepancy has suggested an alternative pathologic mechanism.[15] Women, however, are much less likely to be evaluated for OSAS, and subsequently, fewer are diagnosed.[2] Poorer survival has been seen in female OSAS patients, suggesting that OSAS is diagnosed later in women or is not as aggressively treated.[16] Postmenopausal women are 3 times more likely than premenopausal women to have moderate or worse OSAS, independent of age, body mass index (BMI), or other confounders.[16] These differences are relevant when considering the demographics of the gynecologic surgery patients.

Obesity has been recognized as a significant risk factor for the development of OSAS.[17] Obesity is defined as a BMI greater than 30 kg/m^2. Physiologic consequences of obesity increase the risk of OSA, as increased soft tissue density in the neck contributes to airway narrowing.[18] Peppard et al,[19] in a longitudinal analysis of the Wisconsin Sleep Cohort Study, showed that a 10% increase in weight was associated with a 6-fold increased risk of developing OSAS. Because of the incidence of OSAS in obese patients, it has been suggested that all patients with a BMI greater than 40 mg/m^2 be screened for OSAS.[20]

Significant differences in ethnic groups and races have been noted in OSAS. African American subjects have an increased incidence compared with white subjects.[21] Sleep-disordered breathing is more prevalent in Hispanic/Latino populations than whites as well.[22] Increased incidence among ethnic groups such as American Indian, Hispanic, Pacific Islanders, and Maoris is partially explained by an increased incidence of obesity.[23]

PERIOPERATIVE SCREENING FOR OSAS

Most patients presenting for surgery will not have been screened for OSAS, and as many as 24% of these patients will have undiagnosed OSAS.[24] Several screening modalities have been developed to assist the clinician in screening for OSAS. The Berlin Questionnaire was developed for preoperative screening and consists of 11 questions organized into 3 categories (Table 3 and Supplemental Digital Content 1, http://links.lww.com/OBGYNSURV/A30).[25] When validated in surgical patients, the Berlin Questionnaire had a sensitivity of 68.9% to 87.2% and slightly underperformed the ASA checklist and STOP questionnaire.[25]

The STOP screening tool was developed as a concise and easy-to-use screening tool for the clinical setting (Table 3). This screening test was validated in surgical patients with a sensitivity ranging from 65.6% to 79.5%.[26] The STOP-BANG questionnaire further incorporates BMI, age, neck circumference, and sex into an 8-question screening tool (Table 3).[27] Both the STOP and STOP-BANG questionnaires have been easily incorporated into the preoperative assessment in several studies.[27] The STOP-BANG questionnaire correlates well to polysomnographic measurements and severity of sleep apnea.[28] The STOP-BANG questionnaire has further been correlated with need for critical care admission, with scores greater than 6 having a 5 times' admission rate to critical care.[29] Other screening tools, including the 4-Variable and Epworth Sleepiness Scale, have been used in the primary care setting and operative setting.[30] Among these commonly used screening tools, the STOP-BANG questionnaire had the highest sensitivity (70.4%–87%), whereas the 4-Variable screening tool had the highest specificity (93.2%) in predicting moderate to severe OSAS.[31]

Screening modalities assist in making the diagnosis of OSAS; however, they do not select who should be screened. Experts have suggested that all patients with a BMI greater than 40 kg/m^2 be screened for OSAS.[32,33] However, nonobese patients, mildly obese patients, and older adults should not be overlooked, as OSAS also occurs in these populations.[34] In determining if the patient should be screened, the Adult Obstructive Sleep Apnea Task Force of the AASM recommends a series of questions that the clinician should answer: Is the patient obese? Is the patient retrognathic? Does the patient complain of daytime sleepiness? Does the patient snore? Does the patient have hypertension?[14] Any positive answer warrants further evaluation.

TABLE 3
Screening Questionnaires for OSA

Screening Tool	Key Characteristics
Berlin Questionnaire	11 Questions 3 Categories: snoring, fatigue, blood pressure Validated in surgical patients High risk if positive in ≥2 categories
STOP-BANG	8 Questions: snoring, tiredness, observed apnea, blood pressure, BMI, age, neck size, sex Validated in surgical patients Can be added to preoperative assessment
4-Variable	4 Questions: sex, BMI, blood pressure, and snoring Validated in surgical patients Calculate a risk score Most often utilized in primary care setting
Epworth Sleepiness Scale	8 Questions on degree of sleepiness with various activities: sitting/reading, watching TV, sitting in public, passenger in a car, lying to rest in the afternoon, sitting and talking, sitting after lunch, in a car stopped Most often utilized in primary care setting

DIAGNOSIS OF OSAS

The diagnosis of OSA is made by polysomnography in combination with clinical factors.[32,35] The AASM defines OSA as excessive daytime sleepiness not better explained by other factors and/or 2 or more of the following symptoms: choking/gasping during sleep, recurrent awakenings from sleep, unrefreshing sleep, daytime fatigue, and impaired concentration, all in conjunction with 5 or more obstructed sleep events demonstrated on an overnight sleep study. In addition, oxygen saturation monitoring will show recurrent episodes of desaturation with a classic "sawtooth" pattern. Sleep patterns will also vary with increased stage 1 sleep, reduced stages 3 and 4 sleep, reduced REM sleep, and recurrent arousals.[32]

Diagnosis of OSAS with polysomnography is traditionally performed in an overnight sleep clinic, but portable polysomnography may be used in select patients.[13] The portable method may underrepresent the severity of OSAS because of total recording time exceeding actual sleep time, and a negative result does not completely rule out OSAS.[36,37] Overnight oximetry has also been used as a diagnostic tool, but because of low specificity, it is currently recommended only as a screening tool or for treatment follow-up.[13,35] Treatment of symptoms with continuous positive airway pressure (CPAP) has been proposed as a novel method for diagnosis of OSAS, with a positive result indicated by (1) willingness to continue CPAP treatment and (2) average CPAP use of more than 2 hours per night. A positive response to both of these points was suggestive of OSAS. Continuous positive airway pressure as a diagnostic tool has a sensitivity of 80%, specificity of 97%, positive predictive value of 97%, and negative predictive value of 78%.[38] This may reduce the need for polysomnography.

TREATMENT OF OSAS: PREOPERATIVE OPTIMIZATION

Treatment of OSAS ideally will begin prior to surgery. If diagnosed prior to surgery, nasal CPAP should be initiated, as outlined by the American Society of Anesthesiologists guidelines.[39] Preoperative use for even 1 week improves pharyngeal collapsibility and increases pharyngeal cross-sectional area. It also allows for the patient to acclimate to the device that improves postoperative compliance.[32] For patients who used CPAP preoperatively, Goldman et al[40] showed reductions in systolic blood pressure, diastolic blood pressure, and mean blood pressure by 27.7%, 16%, and 25%, respectively.

Treatment options for OSAS have improved and been studied extensively over the past 20 years. At the foundation of treatment should be encouraging lifestyle changes, specifically weight loss and position changes.[41] Counseling patients to avoid the supine position may also improve symptoms and is easily achieved in patients who are noncompliant with positive airway pressure (PAP) treatment.[42] Significant change in baseline AHI and reduction in the incidence of progression of OSAS can be achieved with 5% body weight loss.[43]

The most extensively studied and utilized treatment for OSAS is PAP, administered as CPAP, bilevel positive airway pressure (BiPAP), or automated PAP. Continuous positive airway pressure applies pressure to give a pneumatic splint to maintain airway patency.[13] Bilevel positive airway pressure uses separate inspiratory and expiratory pressure settings and may be more comfortable for patients. Automated PAP automatically adjusts PAP based on respiratory events and is advocated for patients with altered sleeping positions. The most commonly utilized is CPAP. Continuous positive airway pressure has been shown to be effective for treatment, with reductions in daytime sleepiness in patients with moderate to severe OSAS but limited improvement in mild OSAS.[44–46] A Cochrane review of CPAP that included 36 trials and 1718 participants showed significant improvement in objective and subjective sleepiness, quality-of-life measures, and cognitive function, as well as decreases in blood pressure and AHI events.[47] Practice guidelines for the use of CPAP and BiPAP have been created by the AASM Standards of Practice Committee (Table 4).[48] Continuous positive airway pressure and BiPAP have been determined to be safe with minor adverse effects.

Adherence to PAP treatment may be challenging. Improvements in the administration have been made to improve compliance, including more than 100 different mask options, nasal pillows to reduce claustrophobia, addition of humidity, treatment of nasal congestion, and temporary adjustments to decrease pressure if the patient is struggling.[13] Patients are considered adherent if using CPAP for at least 4 hours of sleep and greater than 70% of all nights, which can be ascertained from the machine. Compliance, however, is often low, ranging from 51% to 74%.[49] Awareness of these strategies to improve compliance may aid the surgeon in addressing noncompliance in preoperative patients.

Oral appliances are also effective in the treatment of OSAS, especially for those with mild to moderate OSAS.[44] A Cochrane review of oral appliances showed reduction in daytime sleepiness and improved AHI compared with control devices.[50] Surgical management may also be an option for select patients with OSAS.[51] A systematic review of 39 studies showed maxillomandibular advancement to be the most successful surgical therapy, with results similar to CPAP.[52] A separate Cochrane review demonstrated that although surgical procedures reduced AHI, Epworth scores did not improve, nor was a difference in quality of life seen.

Drug therapy has been explored as a potential treatment for OSAS.[53] Intranasal fluticasone, pheostigmine, topical nasal lubricants, paroxetine, acetazolamide, protriptyline, and naltrexone have shown varying degrees of improvement in AHI, daytime alertness, and/or symptoms. Other medications have been evaluated with no improvement in AHI or symptoms.

TABLE 4
Indications and Other Features CPAP and BiPAP Use

CPAP
1. Diagnosis of moderate to severe OSAS
2. Improvement of self-reported sleepiness in OSAS with CPAP use
3. Improvement in quality of life in patients with OSAS with CPAP use
4. Adjunctive therapy to lower blood pressure in patients with hypertension and OSAS
5. Full-night, attended polysomnography preferred for titration, but split-night may be adequate
6. Usage should be objectively monitored
7. Close follow-up recommended
8. Heated humidification indicated to improve utilization
9. Systematic educational program indicated to improve utilization
10. Yearly follow-up indicated once appropriate titration was made
11. Therapy is safe, and adverse events are minor and reversible
BiPAP
1. Useful for cases where high pressure is needed and/or patient difficulty exhaling against a fixed pressure and/or coexisting central hypoventilation
2. Treatment of some forms of restriction lung disease or hypoventilation syndromes associated with daytime hypercapnea

SURGICAL IMPLICATIONS OF OSAS

Preoperative Assessment

The diagnosis of OSAS should be considered during the preoperative evaluation by the surgeon or anesthesiologist with a goal to identify patients with undiagnosed OSAS and improve overall operative outcomes and long-term outcomes.[54] The prevalence of OSAS is 21% to 24% in patients presenting for elective surgery and up to 78% for patients presenting for bariatric surgery, with up to 87% undiagnosed.[11,54] The preoperative evaluation should first include a thorough medical record review, patient interview, and physical examination.[55] The STOP-BANG questionnaire and Berlin Questionnaire have been successfully used in the preoperative setting to determine risk of OSAS and for critical care admission.[29,56] Sleep studies and preoperative x-rays to determine cephometric measurements should be performed for suspected OSAS or in those with a positive screen.[55,57] The anesthesiologist should focus on questions regarding a history of difficult airway, cardiovascular problems, snoring, and daytime somnolence in preparation for intraoperative airway management. The physical examination should focus on the evaluation of the airway, nasopharyngeal characteristics, neck circumference, tonsil size, and tongue volume.[55] When OSAS is diagnosed or strongly suspected preoperatively, a decision between the patient, surgeon, and anesthesiologists should be had regarding preoperative management and treatment of OSAS.[55,57] Continuous positive airway pressure, oral appliances, or weight loss may be considered preoperative if there is concern for severe OSAS. Initiation of treatment prior to surgery can provide further medical optimization.

For patients with known OSAS, the severity of OSAS should be assessed preoperatively.[57] If the oxygen saturation is less than 94% without another identifiable cause, this may be a red flag for severe, long-standing OSAS that has been undertreated.[57] For patients who have been lost to care, have had a recent exacerbation of OSAS, have had OSAS-related surgery, or have been noncompliant with PAP treatment, referral to a sleep specialist should be made. In the preoperative setting, PAP treatment should be continued for patients with known OSAS, and patients should bring their personal CPAP device to the hospital.[54,57] Difficult intubations should be anticipated. Preoperative anxiolytics should be given with caution as they predispose to airway collapse and respiratory depression.[54]

The location of surgery should be considered in regard to patients with OSAS. If an ambulatory surgery is being considered, patients with known OSAS should have all attempts made to optimize comorbid conditions.[56] If conditions are optimized, patients with OSAS could be considered for an ambulatory surgery if able to use CPAP.

Intraoperative Management

Alternatives to general anesthesia should be considered.[55] Regional anesthesia should be used when possible.[54] Use of short-acting anesthetics and limited use of opioids are general guidelines, with preference for propofol because of its short clinical duration, desflurane and sevoflurane because of their rapid elimination, and remifentanil because of its short duration of action. Multimodal anesthetic maintenance and analgesia should be employed with the use of ketamine, dexmedetomidine, clonidine, local infiltration, and nonsteroidal anti-inflammatory medications.[54] If sedation only is used, continuous monitoring with capnography or other automated method should be performed, although general anesthesia is preferable to deep sedation.

When general anesthesia is required, intraoperative management of patients with OSA should focus on airway management, choice of anesthetics, and immediate postoperative care. General anesthetics decrease upper airway dilator muscle activity in a dose-dependent manner, leading to increased collapsibility.[13,58] In addition, general anesthetics decrease arousal response and decrease minute ventilation, leading to decreased oxygenation. Morphine, specifically, reduces hypoxic and hypercapnic ventilation response in women.[58] General recommendations to reduce anesthetic adverse effects in patients with OSA include minimizing surgical stress and reducing length of surgery.

Patient with OSAS are at risk of difficult mask ventilation and tracheal intubation; furthermore, the degree of difficulty of the intubation is correlated with the severity of sleep apnea.[13,54,59] Anesthesiologists have advocated for the sniffing position for intubation, where the neck is flexed with upper cervical extension to improve pharyngeal airway patency.[54,59,60] Patients may also be intubated in the sitting or reverse Trendelenburg positions to increase functional residual capacity to prolong apnea tolerance. Respiratory complications can be decreased with sufficient preoxygenation, use of 2-hand mask ventilation technique with effective airway maneuvers, and use of appropriate ventilation settings while continuously assessing ventilation status with capnography. Awake intubation may be considered if highly concerned for a difficult airway. Rapid induction technique should be considered.[60] Slow induction, on the contrary, is not recommended because failure to maintain the airway may induce pulmonary edema.[59] Succinylcholine may be preferred over other muscle relaxants if mask ventilation is difficult as it increases tidal volume and dilates the pharyngeal isthmus.[60] Patients should be extubated while awake following full neuromuscular reversal.[55]

Postoperative Care

Patients with OSA have increased susceptibility to the respiratory adverse effects of sedatives, analgesics, and anesthetic agents. Patients with OSAS have increased risk of postoperative reintubation, cardiac dysrhythmias, and longer hospital stays.[13] Opioids may be especially harmful in patients with OSAS, as they decrease both hypoxic and hypercapnic ventilation response, causing delay in pharyngeal opening.[32]

There are significant sleep disturbances for surgical patients in the immediate postoperative period that are worse in patients with OSAS. Sleep restriction is common in the hospital and has shown adverse effects on metabolism, sleepiness, performance, inflammatory cytokines, immune function, and cardiac function.[61] Normal sleep includes non-REM sleep in 3 stages (N1, N2, and N3) and REM sleep. Hospitalized patients receive less than 2 hours of sleep per night. From postoperative days 1 to 2, there is a reduced REM sleep, reduced slow wave sleep, and increased stage 2 non-REM sleep due to increases in cortisol and other cytokine release and opioid use.[58,61] REM sleep rebound occurs on postoperative days 3 to 5. Hypoxemias and apneas are worse during REM sleep, and tachycardia, hypodynamic instability, and myocardial infarction may result.[58] Liao et al[62] reported a higher AHI and oxygen desaturation index among patients with OSAS on the third postoperative night, when REM sleep has resumed, compared with preoperatively.

Patients with OSAS have an increased risk of postoperative complications. Factors associated with postoperative complications in patients with OSAS include high preoperative AHI, increasing age, surgery near the diaphragm, general anesthesia, supine position, and 72-hour opioid use.[54,63] Higher postoperative hypoxemia (odds ratio [OR], 7.9), higher overall complications (OR, 6.9), higher intensive care unit transfer (OR, 4.43), and longer hospital stay (OR, 1.65) have been observed.[64] A meta-analysis of 13 studies including 3942 patients found higher odds of any cardiac event (OR, 2.07), acute renal failure (OR, 2.43), desaturation (OR, 2.27), and intensive care unit transfer (OR, 2.81).[65] From the Nationwide Inpatient Sample database including 1,058,710 patients undergoing elective abdominal surgery, sleep-disordered breathing was independently associated with an increased risk of emergent intubation (5.5% vs 3.3%), respiratory failure (5.1% vs 4.2%), noninvasive ventilation (4% vs 0.4%), and atrial fibrillation (9.2% vs 8.3%), but not in-hospital death (0.5% vs 1.5%).[66] Gupta et al[67] showed that if CPAP was administered prior to surgery, the rate of serious complications could be reduced from 33.3% to 9.1%, and the average length of hospital stay would be shortened by one day. Obstructive sleep apnea syndrome is also predictive of delirium in the elderly (OR, 4.3).[68]

Increased care and attention should be paid to the patient with OSAS in the immediate postoperative period. Patients warrant continuous postoperative pulse oximetry and more frequent vital signs.[54,58,69] Patients should be placed in the lateral or prone position or with the head of the bed elevated. Early ambulation should be encouraged. Nonnarcotic pain medications should be used whenever possible, and narcotics may be titrated to pain. Regional analgesic techniques should be considered to reduce opioid use in addition to peripheral nerve blocks.[54,55,59] If opioids are needed, basal infusion on patient-controlled analgesia should be avoided, and a multimodal pain management plan should be utilized. Supplemental oxygen may be used until baseline O_2 saturation is met, but excess should be avoided because it may mask OSA and increases risk of CO_2 retention. If the patient is not ambulating, CPAP may be considered and may be applied immediately in the postanesthesia care unit. If the patient refuses, a nasopharyngeal airway may be used.

IMPACT OF OSAS ON GYNECOLOGIC SURGICAL PATIENTS

Few studies have explored the risks and complications of OSAS and gynecologic surgery. A recent study from Bamgbade et al[70] prospectively evaluated gynecologic oncology patients undergoing abdominal surgery. All 160 patients underwent perioperative sleep oximetry to diagnose OSAS if present; 45% of all patients were obese, and 50% of all patients were diagnosed with OSAS. Although 36.3% experienced complications, complications were not associated with OSAS in this study.

Gynecologic patients may be obese or have other medical comorbidities or risk factors for OSAS but like many other women may be overlooked for screening, diagnosis, and treatment. Postmenopausal women are at increased risk of developing OSAS, independent of BMI and neck circumference.[71] Short-term hormone replacement therapy has a mild reductive effect on AHI during REM sleep in postmenopausal women, but withdrawal of hormones in otherwise healthy women has shown no effect.[71,72] Obstructive sleep apnea syndrome, specifically nocturnal hypoxia, has been linked to female sexual dysfunction.[73] A better understanding of sex differences in respect to clinical presentation, management, and outcomes of OSAS is required.[39]

Despite the minimal literature in gynecology patients, many of these patients meet criteria for screening but are not screened. Clinicians should have a high index of suspicion for OSAS when evaluating patients preoperatively who are obese, have hypertension, are elderly, complain of daytime sleepiness, or report snoring. Interventions such as preoperative CPAP, alterations in postoperative pain management, postoperative CPAP, and continued CPAP have positive clinical impact. As improvements in gynecologic care continue, treatment plans will include plans for overall improvements in health; treatment of OSAS is one such area.

SUMMARY

Obstructive sleep apnea is a growing problem among surgical patients and presents unique challenges in the perioperative management. Gynecology patients are overlooked for screening and may be undertreated, exposing patients to increased surgical and postsurgical risks and complications. Gynecologists should make a concentrated effort to identify patients with OSA and to refer them appropriately for treatment. Further investigations should focus on targeted screening strategies for women, treatment modality effects on women, and the specific surgical issues related to gynecology including mode of anesthesia, postoperative narcotic use, recovery room management, and discharge planning.

PRACTICE PEARLS

- Diagnosis of OSAS is made by polysomnography in combination with clinical factors.
- Obstructive sleep apnea syndrome is prevalent in patients presenting for gynecologic surgery and up to 24% of patients undergoing elective surgery.
- Up to 87% patients with OSAS presenting for surgery are undiagnosed.
- Women who are obese and of African American or Pacific Islander ethnicities have increased risk of OSAS. Menopausal changes may affect OSAS.
- Screening modalities for OSAS include the Berlin Questionnaire, STOP questionnaire, STOP-BANG questionnaire, ASA checklist, and the Epworth Sleepiness Scale. The STOP-BANG questionnaire is most commonly used in the perioperative setting.
- Treatment of OSAS includes behavioral and lifestyle changes, CPAP, surgical management, and medical management.
- Perioperative management is focused first on preoperative diagnosis and treatment.
- Appropriate surgical location and anesthesia induction are critical for intraoperative management of OSAS.
- Minimization of opioid pain control postoperatively can improve postoperative outcomes in patients with OSAS.

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