

Obstructive Sleep Apnea: The Not-So-Silent Killer

As the prevalence of obesity in the general population is rapidly increasing, so too is the incidence of obstructive sleep apnea. Anesthesiologists face significant challenges and risks when treating patients with diagnosed obstructive sleep apnea or patients who exhibit all the signs and symptoms of obstructive sleep apnea. Concurrent with the increase in obesity and obstructive sleep apnea, PPM's loss data reflect an increase in allegations of medical negligence involving obstructive sleep apnea patients. These cases often involve catastrophic brain damage or death. In light of the increased risks presented by obstructive sleep apnea patients, policyholders frequently seek risk management advice for managing these challenging patients.

Obstructive Sleep Apnea Defined

Obstructive sleep apnea (OSA) and obstructive sleep apnea-hypopnea (OSH) represent two forms of the same disorder: upper airway collapse during sleep that may be accompanied by sleep disruption, hypoxemia and arterial oxygen desaturation. OSA is common in obese patients due to the propensity of fat deposition in the pharynx causing the upper airway to close. However, non-obese patients can have OSA from tonsillar hypertrophy or craniofacial abnormalities, especially in pediatric patients.

OSA is defined by no airflow for 10 seconds in the face of continued ventilatory effort for at least five times per hour of sleep. OSH is defined as a decrease of more than 50% in airflow, without a complete absence of airflow, for 10 seconds or more at least 15 times per hour of sleep. Both OSA and OSH disrupt the normal patterns of sleep and result in arousal events that may lead to other symptoms including, but not limited to, hypertension, coronary artery disease, congestive heart failure, fatal arrhythmias, myocardial infarction, daytime somnolence, diabetes, and restrictive pulmonary disease.

Clinical diagnosis of OSA is made when frequency of apnea and/or hypopnea per hour of sleep (apnea hypopnea index - AHI) is greater than five in adults. Severity of OSA is determined by the AHI: mild OSA = AHI 6-20 per hour, moderate OSA = AHI 21-40 per hour and severe OSA = AHI > 40 per hour. The diagnosis of OSA and OSH are based on criteria established from sleep studies. The diagnosis of OSA is distinct from central sleep apnea, although the two disorders may occur in the same patient.

Preoperative Assessment

Preoperative assessment of patients for potential identification of OSA includes: 1) medical record review, 2) patient and/or family interview, 3) physical examination, 4) sleep studies, and 5) preoperative x-rays for cephalometric measurement in selected cases. All obese patients, BMI ≥ 30 , undergoing surgery should be suspected of having OSA preoperatively. There are several screening tools and scoring systems available to assist anesthesiologists in evaluating whether a patient might have OSA. However, it should be noted these screening tools and scoring systems have not been clinically validated and should be used as a guide in evaluating patients for OSA. In the absence of a sleep study, a presumptive diagnosis of OSA may be made using the STOP-BANG scoring model (see Figure 1).

Other physical characteristics such as enlarged tonsils, prominent tonsillar pillars, enlarged nasal turbinates, narrowed maxilla or mandible, pronounced tongue and enlarged adenoids are often

S	• Snoring. Do you snore loudly - louder than talking or loud enough to be heard through closed doors?
T	• Tiredness. Do you often feel tired, fatigued, or sleepy during daytime?
O	• Observed apnea. Has anyone observed you stop breathing during your sleep?
P	• Pressure. Do you have or are you being treated for high blood pressure?
B	• BMI > 35 kg/m ²
A	• Age > 50 years
N	• Neck circumference > 40 cm
G	• Gender – Male
High Risk of OSA ≥ 3 yes answers	
Low Risk of OSA < 3 yes answers	

Figure 1

reflected by a high Mallampati score used by anesthesiologists to predict difficulty with intubation. A high Mallampati score, with anticipated intubation difficulty, should alert the anesthesiologist and perioperative team to the high potential for OSA and OSH.

Perioperative Management

Prescribing sedatives preoperatively may be problematic for OSA patients, as they are often sensitive to sedatives, especially if the OSA is untreated. Even minimal sedation can cause airway obstruction and ventilatory arrest. Therefore, many anesthesiologists do not give preoperative sedatives to patients with OSA, unless the patient can be carefully monitored.

The most serious perioperative complication is the loss of airway control after induction of general anesthesia. Because of reduced oxygen reserve due to decrease in lung volume in the morbidly obese patient, these patients cannot tolerate a lack of ventilation for appreciable periods before hypoxemia results. It is for that reason anesthesiologists should be prepared for a difficult intubation and have all of the necessary resources and equipment, including supraglottic devices, to follow the ASA difficult airway algorithm. It may also be prudent under certain circumstances to have an experienced surgeon available at the time of induction of general anesthesia in case tracheostomy becomes necessary. An alternative to general anesthesia for OSA patients is regional anesthesia (epidural, intravenous regional or peripheral nerve block). Regardless of the primary anesthetic technique chosen for OSA patients, airway maintenance, especially with sedation, remains a fundamental concern to the anesthesiologist.

Postoperative Care

The period of awakening from anesthesia can be problematic for patients with OSA. In patients who have undergone surgery for treatment of their OSA, the airway can be narrowed from swelling and inflammation. Also, the lingering sedative and ventilatory depressant effects of the anesthetic can pose difficulty. Perioperative vigilance should continue into the postoperative period. Some patients require postoperative intubation and mechanical ventilation until fully awake. A CPAP machine can be used in some patients postoperatively to reduce obstruction, especially if a patient has been on a CPAP preoperatively. For some patients, it may be prudent to admit them to an intermediate care or intensive care area postoperatively to facilitate close monitoring and airway support measures. Narcotics can precipitate or potentiate apnea that may result in ventilatory arrest. If narcotics are deemed necessary in the postoperative period, appropriate monitoring of oxygenation, ventilation and cardiac rhythm should be provided.

Summary

Patients with OSA and OSH present many challenges to anesthesiologists. Obese and morbidly obese patients are particularly prone to these sleep disorders. Anesthesiologists frequently elicit the symptoms and suspect OSA/OSH during examination of the airway and sleep history. Special care must be taken in the management of anesthetic induction, intubation and maintenance of these patients with particular attention to titration of neuromuscular relaxation and analgesic use. Perioperative and postoperative management should ideally include CPAP therapy for those patients with diagnosed OSA/OSH.

Outpatient procedures must be approached with caution and should include clinical judgment and patient selection criteria based on the severity of OSA, presence of coexisting co-morbidities, invasiveness of surgery, type of anesthesia, anticipated postoperative opioid requirements, and adequacy of post-discharge observation. Anesthesiologists should make their own independent evaluation as to whether a patient is an appropriate candidate for anesthesia in an outpatient surgery facility and admit those patients who do not meet that criteria.

References:

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Risk Management Tips

Due to the high prevalence of undiagnosed OSA and OSH in the surgical patient population, anesthesiologists should be aware of the clinical presentation. If OSA is diagnosed or suspected, many guidelines and clinical recommendations include:

- Ask patient if a sleep study has been ordered, document if ordered and refused.
- Communicate the patient's OSA high risk status to the surgeon and recommend SpO2 with monitoring.
- Document the OSA conversation with the patient and surgeon on the anesthesia record.
- Notify PACU staff about patients with OSA high risk status.
- If formal diagnosis of OSA with CPAP, have patients bring CPAP machine and use postoperatively.
- Consider preoperative testing of arterial blood gases to document the severity of OSA and the baseline PaCO2.
- Airway issues – consider awake intubation, have alternate means to secure airway available, pay attention to positioning (“ramped” position may be indicated).
- Use lowest effective dose of opiate analgesics or sedating drugs and tailor analgesic doses with regional anesthesia, antagonists should be readily available.
- Administer opioids according to ideal body weight, NOT actual body weight.
- Monitor OSA patients a median of 3 hours longer than non-OSA patients and 7 hours after last episode of airway obstruction.
- Educate patients and caregivers about the risks of OSA and the need for caregivers to monitor patients more closely, have caregiver sign discharge instructions.
- If patient is admitted, orders and monitoring must be reviewed, use of CPAP should continue.

Defending Obstructive Sleep Apnea Litigation

PPM's loss data reflect an increase in allegations of medical negligence involving obstructive sleep apnea (OSA) patients. Common allegations involving OSA patients include:

- Failure to take into account the patient's risk of an adverse cardiac and/or respiratory event after anesthesia given history of obesity, diabetes, hypertension and obstructive sleep apnea.
- Failure to utilize CPAP after transfer from PACU to floor.
- Permitting transfer of patient from PACU to floor without appropriate monitoring in light of history of sleep apnea.
- Failure to examine or re-assess the patient prior to transfer to floor.
- Failure to order nursing staff to perform close monitoring of the patient's oxygenation, respiratory rate, heart rate and blood pressure.
- Failure to appreciate the lingering effects of anesthesia in a morbidly obese patient with a past medical history of obstructive sleep apnea.
- Failure to order continual pulse oximetry monitoring even if the obstructive sleep apnea was not under current treatment.

PPM has seen an increase in these and similar allegations involving obstructive sleep apnea patients in both the in-patient and out-patient settings. Each of those settings pose specific risks and challenges to anesthesiologists treating OSA patients, as illustrated by the following case summaries:

- A 38 year-old female presented for bilateral endoscopic sinus surgery. Prior to the sinus surgery, the PPM insured anesthesiologist performed a preoperative history and physical and noted the patient was morbidly obese, had severe obstructive sleep apnea, chronic obstructive pulmonary disease and was utilizing continuous positive airway pressure (CPAP). The PPM insured suspected the patient was at increased risk of airway difficulties. The PPM insured discussed his preoperative evaluation findings with the patient and told her about the increased risks of anesthesia due to her co-morbidities.

Due to the patient's morbid obesity, she had tissue in the posterior oropharynx that rolled over the epiglottis. However, the PPM insured had no difficulty visualizing the vocal cords and successfully intubated the patient on his first attempt. The surgery was completed uneventfully.

The PPM insured's custom and practice in the majority of ear, nose and throat cases was to extubate patients when they are still under deep anesthesia. However, because of this patient's potential for airway problems, he decided to extubate the patient after she had recovered from the effects of anesthesia. In order to accomplish the extubation, he transferred the patient to a bed used in the Intensive Care Unit (ICU) and elevated the head of the bed. The PPM insured kept the patient in the operating room suite and waited approximately 15 minutes following the surgery in order for her to recover. Once the patient had recovered from the effects of anesthesia, he extubated her. For a short period of time, the patient was breathing without any difficulties. She then coughed and began having difficulties breathing. The PPM insured believed a small blood clot had partially obstructed her airway. He lowered the head of the bed, administered additional medications and reintubated the patient.

Following reintubation, the PPM insured raised the head of the bed to the upright position. He waited another 20 minutes, during which time the patient was breathing spontaneously and was allowed to awaken. The surgeon and several nurses were also in the operating room with the PPM insured during this time. The surgeon spoke with the patient before the PPM insured extubated her the second time. The patient responded appropriately to the surgeon and had purposeful movements. When the PPM insured was satisfied the patient had sufficiently recovered, he again extubated her. Approximately 5-10 minutes following the second extubation, the patient began moving around in the bed a lot. The PPM insured cautioned the nurse standing on the left side where the intravenous line was located to be careful not to let the patient pull out the intravenous line. The patient became more agitated and had trouble breathing. The PPM insured decided to reintubate the patient again and transfer her to the ICU in order to permit her to fully awaken from the anesthesia before again being extubated.

As the PPM insured was administering one of the medications, the patient jerked her arm and pulled out the intravenous line. He handed the syringe with the succinylcholine to one of the nurses and instructed her to administer the drug intramuscularly into the patient's leg. The patient then relaxed and the PPM insured was able to open her mouth to insert a laryngoscope to reintubate her. On the first intubation attempt, the endotracheal tube was inserted into the esophagus. The PPM insured immediately recognized the esophageal intubation, removed the endotracheal tube and successfully reintubated the patient.

Because the patient had been moving around in bed so much, the ECG electrodes were no longer making contact. The PPM insured believed the patient had experienced a cardiopulmonary arrest; therefore, he administered epinephrine through the endotracheal tube and chest compressions were started. However, the chest compressions were less effective due to the patient's morbid obesity and chronic obstructive pulmonary disease. Approximately 10-13 minutes after the administration of medications and cardiopulmonary resuscitation, the patient's heart rate responded.

The patient was transferred to ICU and was hemodynamically stable at that point, but the physicians were concerned about her neurological status. The patient developed seizures and was subsequently diagnosed with anoxic encephalopathy. Several days following the surgery, the family decided to end life-support and the patient expired.

The patient's surviving spouse, individually and on behalf of the couple's three minor children, sued the PPM insured and his anesthesia practice group.

Plaintiffs' anesthesiology expert, Peter Kane, MD, from Syracuse, New York, testified the PPM insured was negligent by: 1) failing to protect the patient's airway and ventilation when he knew or should have known the patient had a high probability of developing airway obstructions, 2) failing to learn from his earlier mistake and extubated the patient a second time without assuring the airway's patency, and 3) failing to recognize hypoxemia and progressive airway obstruction in a patient with known airway problems.

The defense anesthesiology expert testified the PPM insured took several steps to deal with potential airway obstruction, including keeping the patient in the operating room suite and not leaving her side. He also had the necessary medications and equipment readily available. He testified further the PPM insured allowed the patient to fully awaken before he extubated her each time. The patient responded

appropriately to all commands and met extubation criteria. The defense expert conceded the decision to extubate on both occasions was a judgment call, but the PPM insured was an experienced anesthesiologist who had extubated patients with similar medical conditions and surgical procedures.

Prior to trial, plaintiffs made a \$1,000,000 settlement demand. In consultation with defense counsel and with the PPM insured's consent to settlement, we agreed to mediate this case. Following mediation, the case was settled on behalf of the PPM insured anesthesiologist and his anesthesia practice group for \$400,000.

- A 2 year-old male presented for tonsillectomy and adenoidectomy under general anesthesia at a same-day surgery center. The procedure was performed because the patient suffered from obstructive sleep apnea due to the size of his tonsils. The patient received morphine perioperatively and two small doses shortly after arriving in PACU. The PPM insured anesthesiologist saw the patient once before discharge and noted the patient was sleepy, but otherwise appeared normal. The PPM insured left orders for the child to be discharged when he met the surgery center's discharge criteria. The patient was subsequently discharged by the nursing staff.

Approximately 3 ½ hours post discharge, the patient was found in respiratory arrest. When the paramedics arrived, he was in full arrest and could not be resuscitated. The grandparents who were caring for the patient testified he never really woke up following discharge.

The patient's mother sued the PPM insured, the surgeon and the surgery center. Plaintiff alleged generally the patient was not ready to be discharged from the surgery center. As a result of the premature discharge, the respiratory difficulties were not recognized eventually leading to an obstructed airway from edema.

Specifically, plaintiff's anesthesiology expert, Charles Cote, MD, from Chicago, Illinois, testified the Otolaryngology Society has two criteria for overnight stays following tonsillectomy. Under the age of 3 and sleep apnea, both of which the patient met. Dr. Cote testified further the American Academy of Pediatrics guidelines state that for a two year-old undergoing a tonsillectomy and adenoidectomy the child should be admitted for a minimum of a 23 hour stay and closely monitored. He also testified the PPM insured spent an inadequate amount of time with the patient and the family prior to surgery, conducted a substandard evaluation and physical examination and obtained a poor history regarding the airway obstruction and prematurity. He testified further it was below the standard of care for a two year-old child to undergo surgery at 7:35 a.m. and be discharged at 9:15 a.m. without regaining consciousness. Consciousness and airway patency should have been evaluated by the anesthesiologist and the surgeon prior to discharge.

The defense anesthesiology expert testified it was reasonable for this surgery to be performed in an outpatient ambulatory surgery center and the history and physical obtained was appropriate. He testified further the intra-operative management of the patient was reasonable, including the choice of morphine for pain relief. He also testified it was reasonable for the PPM insured to rely upon the PACU nurses to discharge the patient when he met the discharge criteria.

Plaintiff's initial settlement demand was \$2,100,000. All parties entered into court-ordered mediation prior to trial. In consultation with defense counsel and with the PPM insured's consent to settlement, PPM settled this case for \$200,000. The surgeon and surgery center each contributed \$200,000 for a global settlement in the amount of \$600,000. ❖

PPM Earns A- Rating from A.M. Best

PPM has earned an upgraded rating of A- (Excellent) with a stable outlook from A.M. Best, the industry's leading independent insurance rating organization. In its rating announcement, A.M. Best explains that "recent underwriting gains have been driven by the company's focused underwriting strategy, extensive risk management program and geographic diversification." PPM's President and Chief Operating Officer, Steve Sanford, notes "this rating upgrade confirms PPM's strong operating results, the company's growing financial strength and further validates the financial stability PPM delivers to our policyholders." According to Brent Hodges, PPM's Vice President of Underwriting, "The upgraded rating is truly a testament to the quality of care provided by our insured clinicians, and a confirmation of the positive results of their clinical abilities coupled with the effects of our stringent underwriting standards." ❖

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Note: The purpose of this newsletter is to provide information to policyholders and defense counsel regarding professional liability issues. Risk management analysis is offered for general guidance and is not intended to establish a standard of care or to provide legal advice.

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