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Sleep apnea and surgical complications

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Sleep disorders, including obstructive sleep apnea (OSA), have become a significant health issue in the United States. When left untreated, OSA can lead to high blood pressure, chronic heart failure, atrial fibrillation, stroke, and other cardiovascular problems. OSA is associated with type 2 diabetes and depression, and it is a factor in many traffic accidents. OSA has also been associated with increased perioperative risk and postoperative complications. [1]

This article will provide a brief overview of sleep apnea, describe two closed claim studies that feature sleep apnea, and discuss ways to reduce liability when treating patients with sleep apnea.

Introduction

OSA is the most common sleep disorder in the U.S. An estimated 26 percent of U.S. adults are at high risk for OSA. "The prevalence of OSA in the general population is approximately 20 percent if defined as an apnea hypopnea index (AHI) greater than five events per hour (the AHI is the number of apneas and hypopneas per hour of sleep). In contrast, it is 2 to 9 percent if defined as an AHI greater than five events per hour, accompanied by at least one symptom that is known to respond to treatment (eg, daytime sleepiness)." [2]

It has been estimated that more than 80% of men and 90% of women with OSA do not have a documented diagnosis. [1]

The main symptoms of OSA are loud snoring, fatigue, and daytime sleepiness. Other symptoms include:

- restless sleep;
- awakening with choking, gasping, or smothering;
- morning headaches, dry mouth, or sore throat;
- waking frequently to urinate;
- awakening unrested, groggy; and
- memory impairment, difficulty concentrating, low energy. [2]

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Risk factors for OSA include:

- increasing age — OSA is more common in middle-age and older adults;
- male sex;
- obesity;
- increased neck circumference (greater than 17 inches in men or 16 inches in women); and
- abnormality of the airway. [2]

Types of apnea

"Obstructive sleep apnea is caused by a blockage of the airway, usually when the tongue collapses against the soft palate and the soft palate collapses against the back of the throat during sleep, and the airway is closed. In central sleep apnea, the airway is not blocked, but the brain fails to signal the muscles to breathe. Complex sleep apnea, as the name implies, is a combination of the two conditions." [3]

Patients are classified as having mild, moderate, or severe disease based on the following AHI:

Mild — an AHI between 5 and 15 respiratory events per hour of sleep.

Moderate — an AHI between 15 and 30 respiratory events per hour of sleep.

Severe — an AHI greater than 30 respiratory events per hour of sleep and/or an oxyhemoglobin saturation below 90 percent for more than 20 percent of the total sleep time. [2]

Diagnosis and treatment

The diagnosis of sleep apnea begins with taking a careful history about symptoms of snoring or daytime sleepiness and an evaluation for the presence of other risk factors for OSA (obesity, increased neck circumference, abnormality of the airway). [4] Positive screening results should lead to a more comprehensive sleep history and examination.

"Those patients deemed high risk should have the diagnosis confirmed and severity determined with objective testing in an expedited manner in order to initiate treatment. For other patients, the time of further testing is determined by the risk of OSA and the presence of daytime impairment or associated morbidity." [4]

Polysomnography (PSG) is the definitive tool for diagnosing sleep apnea. "PSG is considered the gold standard diagnostic test when it is performed overnight in a sleep laboratory with a technologist in attendance. In some patients, the diagnostic evaluation may be performed at home without a technician in attendance." [2]

"OSA should be approached as a chronic disease requiring long-term, multidisciplinary management. There are medical, behavioral, and surgical options for the treatment of OSA." [2] These include behavioral modifications, weight loss, and OSA-specific therapies, such as positive airway pressure, oral appliances, and surgery.

Closed claim studies

Patients with OSA are at a greater risk for complications during the perioperative period, including difficult airways, sensitivity to anesthetic agents, and postoperative adverse events, as the following closed claim studies illustrate.

Case 1

Presentation

Following a sleep study that confirmed she had sleep apnea, a 41-year-old woman was referred to an otorhinolaryngologist (ENT). The patient weighed 200 pounds and was 5'2". She had 3+ enlarged tonsils, bilateral inferior turbinate hypertrophy, 90% bilateral nasal obstruction, and an S-shaped deviation of her nasal septum.

Physician action

The ENT discussed treatment options, including continuing CPAP or surgery. The patient opted for surgery.

Several weeks later, the ENT performed a uvulopalatopharyngoplasty (UPPP); tonsillectomy; a nasal septoplasty; and a bilateral partial inferior turbinectomy. The procedures were performed in an outpatient surgery center.

The patient did well postoperatively. In the PACU, her initial O2 saturation was 96%. It went up to 100% after an oxygen tent was placed. The patient was given promethazine and 12.5 mg of meperidine. The anesthesiologist ordered labetalol for increased blood pressure. A second 12.5 mg dose of meperidine was administered.

After 90 minutes in the PACU, the patient was discharged home. Her vital signs at discharge were documented as blood pressure 153/99 mm Hg; pulse 78; respirations 16; and O2 saturations of 91% on room air. Her post-anesthesia recovery score was 10/10.

Two hours after her discharge, the patient's brother called a nurse at the surgery center asking if the patient should use her continuous positive airway pressure (CPAP) machine. The nurse re-emphasized that the patient should use the CPAP machine and told the patient's brother to contact the ENT with any further questions.

Later that evening, the patient's mother checked on her. The patient was snoring and not using her CPAP. Her mother checked her once again in the early morning and found that the patient was unresponsive and was not breathing. EMS was called and the patient was taken to a local hospital. She was pronounced dead at the hospital.

An autopsy listed the cause of death as cardiomegaly associated with hypertensive cardiovascular disease, obesity, and sleep apnea, recent surgical treatment with multiple sedative medications. The medications listed in the pathology report were hydrocodone, venlafaxine, and meperidine.

Allegations

Lawsuits were filed against the ENT and the anesthesiologist, alleging that the surgery should not have been performed in the outpatient setting and that the patient was not properly managed after the surgery.

Legal implications

The defense had a difficult time finding expert support for the ENT's decision to perform surgery in the outpatient setting. One ENT who reviewed the case stated that the outpatient setting was reasonable, but the patient required more extensive postoperative monitoring. The patient's discharge with a 91% O2 saturation was inappropriate.

An anesthesiologist who reviewed this case indicated that the surgery should have been performed in a hospital due to the patient's ASA 3 classification. He agreed the discharge was inappropriate and stated the patient required 23- to 24-hour observation at the surgery center or transfer to a hospital.

The defendant stated he would not have discharged the patient if he had been aware of the 91% O2 saturation. A nurse testified that the O2 saturations were fluctuating between 91% and 94%, but only the 91% was documented.

Disposition

This case was settled on behalf of the anesthesiologist and the ENT.

Case 2

Presentation

A 37-year-old man was referred to a pulmonologist for a polysomnogram. He was found to have an AHI of 129.5 and was diagnosed with severe sleep apnea. The patient reported that he used tobacco products and drank beer daily. He also reported using a CPAP machine during sleep. The pulmonologist referred the patient to an ENT.

The ENT examined the patient and performed a laryngoscopy that showed floppy, redundant tissue in the arytenoid cartilage and medial aryepiglottic fold that collapsed with inspiration. He diagnosed the patient with severe obstructive sleep apnea and adult laryngomalacia. The ENT recommended UPP and laryngoplasty.

On October 1, the patient was admitted to a local hospital. The procedures were performed without complication. The patient was taken to the ICU where he was kept intubated due to airway edema. He was extubated on October 2, and his vital signs were stable. He was placed on BiPAP for respiratory support.

The pulmonologist saw the patient on October 2. A chest x-ray showed a left lobe infiltrate concerning for pneumonia, and the pulmonologist prescribed an antibiotic.

Throughout the early morning hours of October 3, the nurses documented that the patient continued to have a productive cough and thick, blood-tinged secretions.

At 5:40 a.m., the nurse contacted the ENT to report the bleeding. No respiratory distress was noted until 7 a.m. when it was documented that the patient had coarse crackles and rhonchi in the lungs.

The ENT saw the patient at 8:30 a.m. and noted that he was hypertensive and slightly tachycardic. The physician noted some mild bleeding from trauma to the palate as a result of suctioning. The patient was told to gently suction his mouth.

The ENT gave an order to start the patient on lorazepem for his history of alcohol use. The first dose of lorazepem was given at 10 a.m.

At 10 a.m. the patient's blood pressure increased to 168/122 mm Hg. The pulmonologist was paged and he ordered labetalol. At 10:06 a.m., the patient received 1 mg of morphine and at 10:15 he received labetalol. His oxygen saturations dropped to 82% on 4L NC. A respiratory therapist was called. The ENT was paged and while the nurse was speaking to him on the phone, the patient stopped breathing and went into cardiac arrest. A code was called. Initially an ambubag was used until the patient was intubated, approximately seven minutes after the code was called.

The patient suffered an anoxic brain injury as a result of the cardiac arrest. He underwent a tracheostomy on October 6 and a PEG tube placement on October 17. He was transferred to a nursing home for further custodial care in November.

Allegations

A lawsuit was filed against the ENT, alleging:

- failure to properly determine whether the patient was a proper surgical candidate;
- failure to consider non-operative treatment methods; and
- failure to educate the patient about the risks associated with the procedure.

The pulmonologist was also sued. The allegations included failure to monitor the patient and failure to order appropriate medication during the postoperative period.

Legal implications

The plaintiff's expert criticized the pulmonologist for not recognizing the potential side effects the prescribed drugs would have on the patient's respiratory status. He stated the administration of morphine shortly after the lorazepam was a "critical" mistake and caused the patient's respiratory distress.

Regarding the actions of the ENT, the plaintiff's expert believed the UPP was overly aggressive. He stated that UPP is only used when a patient declines oral airway pressure or an oral appliance, or the therapy has been ineffective for three months. He was also critical of the ENT for not investigating and repairing the opened suture line in the patient's pharynx. This expert believed the patient aspirated blood from the open suture contributing to the acute respiratory failure.

Defense experts reviewing this case had concerns about sedatives given to the patient. When the patient developed postoperative delirium, the assumption was made that it was due to his alcohol withdrawal. This led to the administration of sedatives that exacerbated his condition. The combination of sedatives in a compromised patient soon after extubation can cause respiratory distress and may have been a factor in the patient's cardiopulmonary arrest.

Regarding the decision to proceed with the UPP rather than treat the patient with CPAP or bi-level positive airway pressure (BiPAP), the ENT testified that he discussed the options of CPAP and BiPAP and surgery with the patient. The patient wanted surgery so he would not have to be on CPAP for the rest of his life.

Disposition

During the investigation of this claim, it was discovered that a nurse used her judgment in giving the patient lorazepam and 8 mg of morphine at the same time. In light of this information, the cases against the ENT and the pulmonologist were dismissed.

Risk management considerations

Physicians can consider the following guidelines to help reduce liability when treating patients with sleep apnea.

Screening for sleep apnea

Patients with OSA may present significant problems in the perioperative and postoperative period. Because a significant proportion of OSA patients remain undiagnosed when they present for surgery, proposed guidelines from the American Academy of Sleep Medicine suggest that questions regarding OSA should be included in routine health screenings. If OSA is suspected, the patient should undergo a comprehensive sleep evaluation. [1]

If a patient is found to have OSA, ensure that everyone involved in the patient's treatment is aware of the diagnosis of OSA.

Preoperative

According to the American Society of Anesthesiologists, "Patients with known or suspected OSA may have difficult airways and therefore should be managed according to the 'Practice Guidelines for Management of the Difficult Airway.' In patients at risk for perioperative complications from OSA, a preoperative determination must be made regarding whether surgery should be performed on an inpatient or outpatient basis." [5]

Postoperative

Because episodes of critical obstruction may occur unpredictably — only minutes after a normal respiratory rate has been observed — the Anesthesia Patient Safety Foundation urges health care professionals to "give consideration to the potential safety value of continuous monitoring of oxygenation (pulse oximetry) and ventilation in patients receiving PCA or neuraxial opioids in the postoperative periods." [5]

Patients who use CPAP devices at home should be advised to bring the mask to the hospital and to use it while in the hospital.

Postoperative instructions should clearly indicate whether or not the patient should continue use of CPAP once discharged from the hospital.

Narcotics

Narcotics may profoundly impair respiration in the postoperative period in patients with OSA.[1] Therefore, the administration of narcotic pain medication in patients with OSA should be closely monitored, according to recommendations from the American Society of Anesthesiologists. [5]

One issue is that multiple physicians may write pain medication orders for a single patient and they may not be aware of the diagnosis of OSA. One suggestion is to flag the records of these patients to warn of the risks of narcotics usage.

Conclusion

"While there may not be a consensus regarding the best and most cost effective methods to ensuring fewer perioperative complications from OSA, there continues to be a need for informed clinicians, as patients are typically presenting with undiagnosed or misdiagnosed cases." [1] Awareness of the risk factors and complications associated with OSA, along with adherence to applicable guidelines, can help enhance patient safety when treating patients with OSA.

Sources

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