Creating a Safer Perioperative Environment With an Obstructive Sleep Apnea Screening Tool

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Obstructive sleep apnea (OSA) is a common condition that increases the risk of complications for patients undergoing sedation and/or general anesthesia. The purpose of this quality improvement project was to promote evidence-based practice for nurses to screen patients with OSA in the perioperative setting. A step-by-step team process was implemented using the Iowa Model of Evidence-Based Practice in a shared leadership environment at an acute care facility to educate staff and evaluate the practice change. A pilot project reviewed patient data pre- and post-implementation of an OSA screening tool, which revealed evidence of safer patient care. As a result of incorporating an OSA assessment, patient advocacy and a safer perioperative environment was created.

Keywords: *obstructive sleep apnea, screening tool, perioperative, evidence-based practice, shared leadership, best practice.*

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OBSTRUCTIVE SLEEP APNEA (OSA) is a syndrome that increases the risk of complications to patients requiring general anesthesia, sedation, or intravenous (IV) analgesia/opioids. To create a safer perioperative environment for the OSA patient, the focus of this quality improvement project was to promote best practice for nurses when screening patients with OSA. This project implemented an EBP change to validate the use of an OSA screening tool within a shared leadership environment.

Background and Significance

OSA is a common condition caused by a decrease in upper airway size and patency during sleep.[1] Individuals with OSA are aroused repeatedly from deep sleep by hypoxemia and hypercapnia, which occur during episodes of apnea. These arousal events are protective because they permit breathing to resume. Residual effects of general anesthesia, opioid analgesics, and sedative agents may blunt the arousal cycle mechanism, resulting in a potential for respiratory arrest.[2]

The term *apnea* is defined as a cessation of airflow for 10 seconds or longer. Hypopnea is a decrease in airflow lasting more than 10 seconds, with a 30% reduction in airflow and at least a 4% oxygen desaturation. The Apnea Hypopnea Index (AHI) score is determined during a sleep study and is defined as the number of apnea and hypopnea episodes that occur per hour of sleep. This score reflects the severity of OSA. An AHI of 5 to 14 events per hour is considered mild, 15 to 30 events is considered moderate, and more than 30 events per hour is considered severe.[3]

Much of the preoperative assessment is focused on the patient's heart and lung history, but little emphasis is placed on sleep disorders. Patients with an unremarkable medical history have developed unexpected postoperative respiratory complications. Considering that an estimated 2% to 26% of the U.S. adult population is afflicted with OSA and 80% to 90% are unaware that they have it or have not

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yet been diagnosed, it is important that the patient be screened for OSA preoperatively.[3-5]

The preoperative interview typically includes a question about sleep apnea; however, patients often respond by saying that they don't have a sleeping problem. The nurse should be aware that many patients do not fully understand the true meaning of OSA. Additional questions should be added to assess for OSA. It is important for nurses to recognize that not all OSA patients are male, obese, sleepy, snoring, and middle-aged.[6]

OSA patients who are exposed to anesthesia and/or opioid analgesia are at a vulnerable state, and patient safety is a priority. The first 24 hours after surgery is considered the most critical phase, although complications could occur up to five days post-procedure.[7] Opioid administration should be monitored with extreme caution in patients with OSA. Policies and guidelines for assessment are helpful tools to aid in identification of the presence of OSA.[7]

The Pennsylvania Patient Safety Authority reported more than 250 cases from acute care facilities and ambulatory surgery centers in which OSA was a factor in a poor patient outcome, "sentinel events noting respiratory arrests."[6] These facilities did not have a specific guideline or policy to assess the patient for OSA. The development of standards to assess and care for the sleep apnea patient was supported by the Joint Commission (TJC) as a Direct Impact issue.[8,9] Recommendations from TJC included using a sleep apnea screening tool for the perioperative area.

Evidence Used for the Practice Change

There is no universal approach to diagnosing OSA, which continues to be a problem today. Most patients with OSA are undiagnosed; symptomatic patients can be assessed for OSA in a sleep laboratory. The gold standard for sleep apnea diagnosis is a sleep laboratory study called *polysomnography*, which requires an overnight analysis.[10] The method is time consuming and often the patient does not follow through with the procedure. A simpler method, but not proven as the gold standard in diagnosis, is the apnea risk evaluation system (ARES) unicorder. The device is operated through an internal computer chip and stores continuous data of the patient's oxygen saturation, pulse rate, airflow, head position, and snoring decibel level.[10] Polysomnography and the ARES unicorder tests must be preplanned, making the diagnosis of OSA time-consuming and inconvenient.

Comparison of Clinical Guidelines

Clinical guidelines for assessing and managing perioperative OSA–susceptible patients have been designed by scholars and task force members. Such tools are significant and imperative for discovery of the undiagnosed OSA patient. Currently, no screening tool has been validated for preoperative assessment.[7] In 2008, Dr. F. Chung published a simple and effective screening tool.[11] The STOP questionnaire was given to 2,467 patients in the preoperative clinics of Toronto Western Hospital and Mount Sinai Hospital, Ontario, Canada. The four questions were related to *S*noring, *T*iredness during the daytime, *O*bserved apnea, and high blood *P*ressure (STOP). For validation, the score from the STOP questionnaire was evaluated versus the apnea-hypopnea index (AHI) from monitored polysomnography. When combined with *B*ody mass index (BMI), *a*ge, *n*eck circumference, and *g*ender (Bang), the STOP questionnaire sensitivities were increased from 65.6% to 83.6% and 79.5% to 100%. When incorporating Bang into the STOP scoring (STOP-Bang), the sensitivity significantly increased (Table 1).[11]

Chung et al[11] have conducted systematic reviews to evaluate and compare additional OSA screening tools since 2008. In 2009, The STOP-Bang scoring model was compared with the Berlin screening tool (Table 2) and the American Society of Anesthesiologists (ASA) screening tool (Table 3).[12]

The Berlin questionnaire is a widely used OSA screening tool, validated in studies in various populations including sleep clinic patients, and the general and surgical populations.[12] The Berlin tool consists of 10 questions organized into three categories (Table 2).

The Epworth Sleepiness Scale (ESS) was used in one study to clinically screen for behavioral morbidity associated with OSA (Table 4).[13,14] The purpose of the study was to assess the sensitivity of the ESS to diagnose OSA. Daytime sleepiness occurred in one of five individuals and was not the single determining factor of OSA.[13,14]

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