

Preoperative Screening for Obstructive Sleep Apnea: Enhancing Perioperative Safety

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Abstract

Nearly 25 million people in the United States suffer from obstructive sleep apnea (OSA). This serious under-recognized, under-diagnosed medical disorder is associated with significant comorbidities as well as increased perioperative risks. Therefore, preoperative screening for OSA using a validated OSA screening tool such as the STOP-Bang OSA screening questionnaire is imperative. Using a quantitative methodology with a comparative design, this author observed for statistically significant differences in the proportion of postoperative hypoxemia between two sample groups. Group A (n=100) was comprised of adult (ages 18-75) general anesthesia elective surgery patients who were screened preoperatively for OSA on the STOP-Bang OSA screening instrument. Group B (n=100) was comprised of adult (ages 18-75) general anesthesia elective surgery patients who were not screened preoperatively for OSA on the STOP-Bang OSA screening instrument. A Chi-square analysis was conducted comparing the proportion of positive postoperative hypoxemia occurrences in the Post Anesthesia Care Unit (PACU). The proportion of patients who experienced hypoxemia in the PACU pre implementation of the STOP-Bang screening program was not equal to the proportion of patients who experienced hypoxemia in the PACU post implementation of the program, $\chi^2 (1, N = 94) = 2.085, p = .149$. This was statistically nonsignificant, but clinically relevant. Clinician awareness of the potential existence of OSA can guide the perioperative care plan to safely meet the special needs of surgical patients with OSA. Keywords: Obstructive sleep apnea, STOP-Bang questionnaire, Obstructive sleep apnea screening tool.

Materials and Methods

STOP-Bang Questionnaire

Using a quantitative methodology with a comparative design, this author observed for statistically significant differences in the proportion of postoperative hypoxemia between two sample groups. Group A (n=100) was comprised of adult (ages 18-75) general anesthesia elective surgery patients who were screened preoperatively for OSA on the STOP-Bang OSA screening instrument. Group B (n=100) was comprised of adult (ages 18-75) general anesthesia elective surgery patients who were not screened preoperatively for OSA on the STOP-Bang OSA screening instrument.

Objectives

The purpose of this project was to introduce a preoperative OSA screening protocol to the community hospital where this author is employed. The program was initially executed on a trial basis. It was the intention of this author to collect evidence to support permanent adoption of the OSA screening program to optimize the perioperative well-being of patients with occult OSA. A fundamental goal of this project was to amplify clinician cognizance of the impact of OSA in the perioperative period with the intention of promoting patient safety.

Background

An estimated 25 million people in the U. S. suffer from OSA (American Academy of Dental Sleep Medicine (2016).

Approximately 80% of moderate and severe sleep apnea cases are undiagnosed (American Sleep Apnea Association (2015).

There is a higher incidence of OSA among the surgical population as compared to the general population (Chung, Yuan, & Chung, 2008).

OSA is considered to be a major risk factor for the development of serious perioperative adverse events (Jain & Dhand, 2004).

OSA Perioperative Implications:

Increased incidence of difficult mask ventilation (Mentsoudis, Besculides, and Mazumdar, 2013).

Difficult endotracheal intubation is 8-times more likely in patients with OSA (Siyam & Benhamou, 2002).

Increased risk for cardiac arrhythmias, myocardial infarction, & cardiopulmonary arrest (Kaw, Pasupuleti, Walker, Ramaswamy, and Foldvary-Schafer, N. 2012).

Clinician awareness of the perioperative patients' increased risk for OSA, based on the STOP-Bang score, allows for pertinent modifications to the perioperative care plan designed to enhance the safety of this vulnerable population.

Results

A Chi-square analysis using SPSS version 18 software was conducted comparing the proportion of positive postoperative hypoxemia occurrences in the PACU. In support of this investigator's theory, the proportion of patients who experienced hypoxemia in the PACU pre implementation of the STOP-Bang screening program was not equal to the 72 proportion of patients who experienced hypoxemia in the PACU post implementation of the STOP-Bang screening program, $\chi^2 (1, N = 94) = 2.085, p = .149$. There was an observed frequency of 40 occurrences of postoperative hypoxemia in the PACU in the post STOP-Bang implementation group, compared to 54 occurrences of postoperative hypoxemia in the PACU in the pre STOP-Bang implementation group. Given an expected proportion of 47 patients to experience hypoxemia in the PACU for both pre and post implementation of the STOP-Bang screening program, there was a statistically nonsignificant shift toward fewer patients who experienced hypoxemia in the PACU post implementation of the STOP-Bang screening program.

Figure 1 STOP-Bang questionnaire Total Score Occurrence

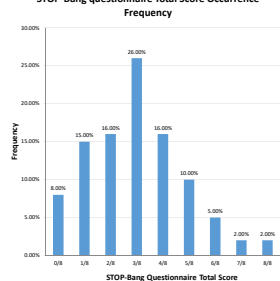
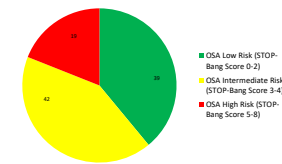


Figure 1 shows STOP-Bang frequencies, percentages, and total score breakdown. This figure reflects the STOP-Bang scores for the project population of the 100 patients who were screened preoperatively for OSA. It is striking that nearly one out of five adult (ages 18-75) general anesthesia elective surgery patients screened at high risk for OSA on the STOP-Bang questionnaire. These results underscore the importance of preoperative OSA screening.

Results

Figure 2 STOP-Bang Obstructive Sleep Apnea Level of Risk Percent



Low risk = SBQ 0-2; Intermediate risk = SBQ 3-4; High risk = SBQ 5-8.

Figure 2 shows the percentages of level of OSA risk in pie chart format. The prevalence of low risk for OSA within the project's STOP-Bang screened adult (ages 18-75) general anesthesia elective surgery patient population was 39%. The prevalence of intermediate risk for OSA within this population was 42%. The prevalence of high risk for OSA within this population was 19%. The level of intermediate-high risk classification for this population was 61%. These figures highlight the significance of preoperative OSA screening.

Figure 3 Hypoxemia Frequency Occurrence

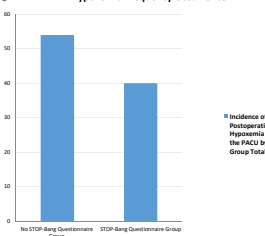


Figure 3 shows the incidence of postoperative hypoxemia in the PACU within the group who were screened preoperatively for OSA on the STOP-Bang screening questionnaire, compared to the group who were not screened preoperatively for OSA on the STOP-Bang screening questionnaire. There were 54/100 occurrences of hypoxemia in the group not screened for OSA, compared to 40/100 occurrences of hypoxemia in the group who were screened for OSA. Although not statistically significant, this is clinically significant. These results underline the value of preoperative OSA screening.

Conclusions

It is well-documented that the prevalence of OSA is greater in the surgical population than in general population (Mentsoudis et al., 2013). Patients with OSA are at greater risk for perioperative complications than patients who do not have OSA (Kaw et al., 2012). Consequently, the significance of preoperative OSA screening cannot be overstated. Hypoxemia is the most frequently encountered perioperative complication in patients who have OSA (Pereira et al., 2013). Hypoxemia, as well as other perioperative complications may be mitigated, or circumvented, when the perioperative care plan is aimed to meet the distinct needs of the patient with OSA. Preoperative screening for OSA by means of the STOP-Bang questionnaire intends to heighten clinician awareness 89 of patients at high risk for OSA and allows for appropriate perioperative care plan modifications to promote patient safety among this at risk population. Conducting this DPI project was worthwhile. The project heightened surgical services clinicians' and administrators' recognition of the unique perioperative considerations that pertain to patients with known or suspected OSA. When patients screen positive for OSA on the STOP-Bang tool, the importance of a referral to the primary care provider for possible definitive OSA testing by a polysomnography sleep study was underscored by this project. Based on the recommendation of the Chief of Anesthesia at the site facility, hospital administrators have unanimously decided to implement the OSA screening protocol introduced by this project on a permanent basis. That is a testimony to the success of this DPI project in leading to an important evidence-based clinical practice change designed to promote patient safety and well-being.

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