Testing the Best Time to Administer a Screening Test for Sleep Apnea Prior to Outpatient Procedures Center in Central Ohio

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Obstructive sleep apnea is a sleep disorder that causes abnormal pauses in breathing or periods of extremely low breathing. Sleep apnea is often a problem with anesthesia during surgery as the anesthesia brings added risk factors to the patient with the conditions. Questionnaires exist to determine risk factors for sleep apnea in patients to undergo surgeries, but it is not know when is the best time to administer these questionnaires to make the most difference to the patient by reducing his or her complications. To determine when is the best time to administer the questionnaires, a survey was created to poll the opinions of various physicians. Due to a low return rate on surveys, the data collected was not statistically significant but can be used to make recommendations. Based on the surveys returned, it is recommended that pre-screening questionnaires be given during annual physical exams or as early in the surgery process as possible.

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Introduction

Obstructive sleep apnea is a sleep disorder characterized by the repetitive collapse and reopening of the upper airway of the throat during sleep (Kapur, 2010). This causes abnormal pauses in breathing or periods of extremely low breathing (Kapur, 2010). Each pause in breathing is known as an apnea, and each period or low breathing is known as a hypopnea (Kapur, 2010).

Symptoms of sleep apnea are high blood pressure, high body mass index (height-to- weight ratio), large neck circumference (greater than 40 centimeters), and those who are overweight, especially males, are at risk for having sleep apnea (Frances et al., 2008). Other symptoms of sleep apnea are frequent snoring while sleeping, feeling tired throughout the daytime, and observed apneic episodes (Frances et al., 2008). Because of the obstructed airway prohibiting breathing, the blood gets less oxygen and links sleep apnea with various heart problems, such as coronary artery disease, congestive heart failure, arrhythmias (abnormal heart beats), and stroke (Budhiraja, Budhiraja, & Quan, 2010).

Sleep apnea is an increasingly important topic in healthcare as more American citizens are becoming obese and therefore at a greater risk of having sleep apnea (Cantlupe, 2011). Sleep apnea is a growing problem in the United States, especially with surgical patients, as the prevalence of sleep apnea is higher in the surgical population than the general population (Chung et al., 2008).

Sleep apnea can cause major problems with anesthesia for patients undergoing surgical procedures (Candiotti, Sharma, & Shankar, 2009). For example, patients with sleep apnea tend to be more sensitive to the sedatives that are part of the anesthesia (Ogan & Plevak, 1998). Even mild sedation can cause patients with sleep apnea to have an airway collapse or cause ventilatory arrest (Ogan & Plevak, 1998). A major concern with sleep apnea patients and anesthesia is loss of airway control after the induction of general anesthesia (Ogan & Plevak, 1998). This is because the (typically obese) sleep apnea patients' bodies cannot tolerate a lack of air for long periods of time before hypoxemia (abnormally low concentration of oxygen in blood) occurs (Ogan & Plevak, 1998). Lack of oxygen in the bloodstream can also add strain on sleep apnea patients' hearts, often already weakened (Budhiraja, Budhiraja, & Quan, 2010). Recovery time is also slower in sleep apnea patients and re-intubation is often necessary post-surgery to maintain an open airway (Gupta, Parvizi, Hanssen, & Gay, 2001).

If an anesthesiologist knows about a patient's diagnosis of sleep apnea prior to surgery, he or she can make many adjustments to the anesthesia procedure in order to reduce some of the aforementioned complications (Budhiraja, Budhiraja, & Quan, 2010). Anesthesia can be changed to avoid general anesthesia and favor more localized anesthetics and a CPAP (continuous positive airway pressure) machine can be used during and after surgery to maintain pressure in the airway (Budhiraja, Budhiraja, & Quan, 2010). Close management of a patient's pulse oximetry (monitor of oxygen in blood) is also helpful in reducing anesthesia complications (Shafazand, 2009).

Unfortunately, most of the time, patients are unaware that they even have sleep apnea unless they had previously undergone a polysomnography, an overnight sleep study (Cantlupe, 2011).

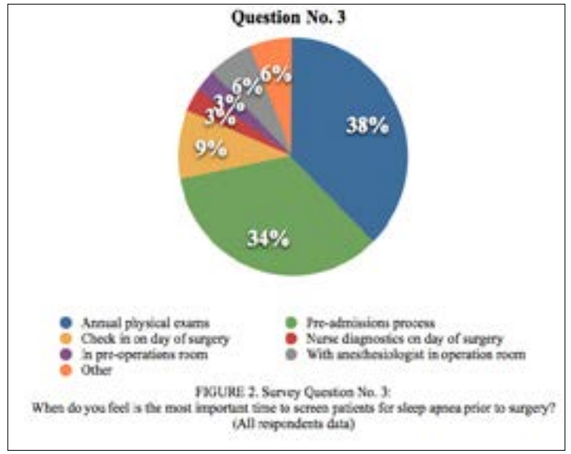

FIGURE 2. Survey Question No. 3:
When do you feel is the most important time to screen patients for sleep apnea prior to surgery?
(All respondents data)

According to the American Association for Respiratory Care, an estimated 10 million people in the United States could have undiagnosed sleep apnea (Cantlupe, 2011). It is not be feasible to recommend all patients to undergo a polysomnography prior to surgery, as a polysomnography is expensive and time-consuming, and not suitable to be used for general screening purposes (Candiotti, Sharma, & Shankar, 2009).

Because of this, various surveys have been created to ask patients questions to identify possible risk factors for sleep apnea before they undergo surgery so anesthesiologists can make proper adjustments to the anesthesia without a patient needing a sleep study (Cantlupe, 2011). Examples of these types of pre-operative questionnaires are the Berlin questionnaire, the American Society for Anesthesiologists checklist, and the STOP-BANG questionnaire (Chung et al., 2008). Past research has validated each of these surveys as adequate ways to discover patients' outstanding risks for sleep apnea, with the STOP-BANG questionnaire being the most effective (Chung et al., 2008).

The letters in STOP-BANG stand indicators (Snoring, Tiredness, Observed stop in breathing, high blood Pressure, high BMI, Age over 50 years, large Neck circumference, and Gender male) that, if found in a patient, can show his or her risk for sleep apnea (Chung et al., 2008). The Ohio Health system of hospitals currently utilizes a survey called the "Obstructive Sleep Apnea Screening Questionnaire" which contains questions fairly similar to that of the STOP-BANG.

Although an effective questionnaire exists for Ohio Health to screen patients for sleep apnea before surgery, it is not known when is the best time to administer this questionnaire to be most beneficial for patients, anesthesiologists, and surgeons. This study aims to determine when is the best time

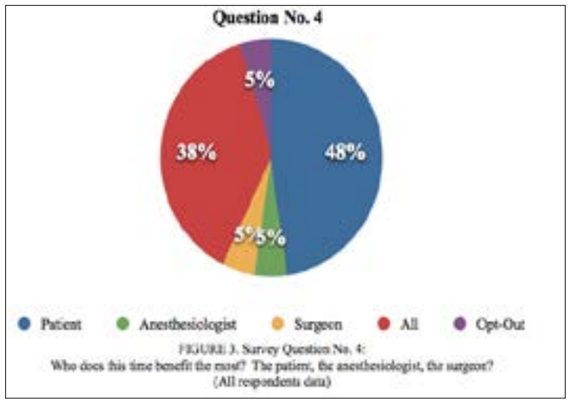

FIGURE 3. Survey Question No. 4:
Who does this time benefit the most? The patient, the anesthesiologist, the surgeon?
(All respondents data)

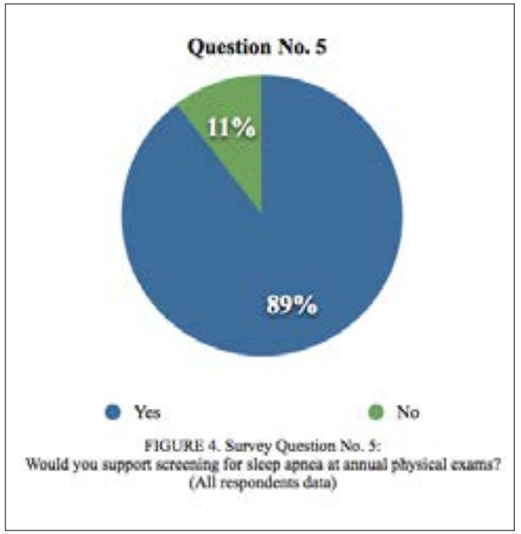

FIGURE 4. Survey Question No. 5:
Would you support screening for sleep apnea at annual physical exams?
(All respondents data)

to administer a questionnaire before surgery at Ohio Health hospitals to detect risk factors for sleep apnea in patients. This study aims to find the best time to administer the questionnaire to reduce the amount of potential post-operative complications and to better serve the patients, anesthesiologists, and surgeons.

Methods

A survey was created and administered using the website and online tool "Zoomerang" (http://www.zoomerang.com/). The survey contained questions regarding when is the best time to administer a sleep apnea screening questionnaire and was designed to poll the opinions of physicians and nurses. The survey consisted of seven open-response questions, a multiple-choice question, and a comments box (located in appendix, Fig. 1). To determine what questions to ask in the survey, a list of possible questions was given to Dr. Herwig, Dr. Rothacker, and Mrs. Halpin for review. The best questions were selected after the review.

After undergoing an approval process through Ohio Health medical staff office, the survey was sent out via email to 53 physicians and 7 nurses within the Ohio Health Westerville hospital. With permission from Mrs. Halpin, director of operations at Ohio Health Westerville, the survey was also sent out to two doctor contacts within The Ohio State University Medical Center and Nationwide Children's Hospital. In total, 62 surveys were sent out.

Of the 62 surveys sent out, 19 completed surveys were returned through the Zoomerang system. The data gathered from the surveys was synthesized into a single table and then analyzed. The data was analyzed with all respondents together and was also broken up into subgroups. The subgroups were surgeons (including orthopedic surgeons, general surgeons, a colon and rectal surgeon, a vascular surgeon, and a foot and ankle surgeon), physicians, and other specialists (including orthopedics, neurology, and obstetrics and gynecology). When data was analyzed within subgroups, there were no significant points to be found. The data was made into pie charts based on all respondent's results.

Results

Fig. 2 (below) is a compilation of data collected from all respondents without being broken into subgroups. The question, "When do you feel is the most important time to screen patients for sleep apnea prior to surgery?" had six multiple choice options along with an "other" alternative. 38% of the total respondents to the survey question selected that the most important time to screen patients for sleep apnea prior to surgery is during annual physical exams; 34% responded that during the pre-admissions process was the most important time to screen. Nine percent of respondents selected that the most important time for screening to occur is during check in on the day of surgery. Both the option of screening with the anesthesiologist in the operation room and option of "other" received 6% of the respondent vote. The choice of "other" also had an option of specifying in writing. Respondents wrote in that other important times (not included on the survey) to screen for sleep apnea were during a pre-operation office visit or prior to coming to the surgery center. Finally, screening for sleep apnea in the pre-operations room and screening with the nurse diagnostics on the day of surgery gained 3% each.

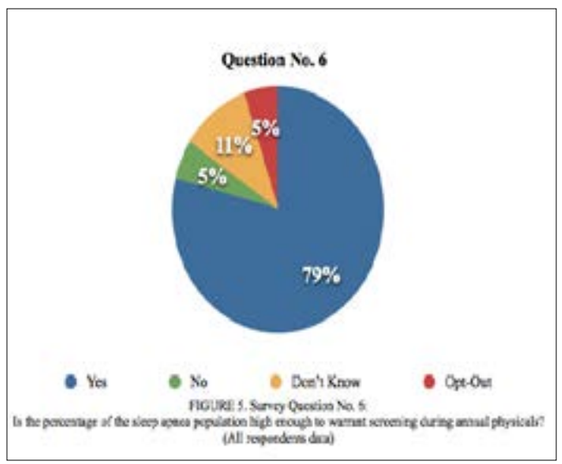

FIGURE 5. Survey Question No. 6:
Is the percentage of the sleep apnea population high enough to warrant screening during annual physicals?
(All respondents data)

Fig. 3 (below) is a compilation of data collected from all respondents without being broken into subgroups. When asked who would benefit the most from the screening time they had selected in the previous question (No. 3), 48% of the respondents of the survey said it would most benefit the patient; 38% said the time would benefit the patient, the anesthesiologist, and the surgeon equally. Five percent responded that the anesthesiologist or the surgeon would benefit most from this time, while another 5% opted out of the question.

Fig. 4 (below) is a compilation of data collected from all respondents without being broken into subgroups. When asked in the survey if they would support screening for sleep apnea at annual physical exams, 89% of respondents said that, yes, they would support screening at this time. 11% said they would not support this, citing reasons such as cost benefit and low instances of people actually attending annual physicals.

Fig. 5 (below) is a compilation of data collected from all respondents without being broken into subgroups. 79% of respondents said they felt the percentage of people within the population who have sleep apnea is high enough to warrant screening for it during annual physicals. 11% of those responding stated they didn't know whether the population was high enough. 5% of the survey respondents said they didn't think the population was large enough and another 5% opted out of answering the question.

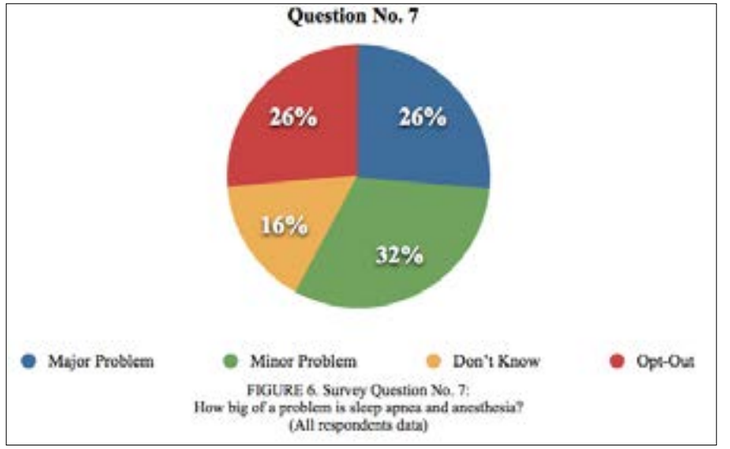

FIGURE 6. Survey Question No. 7:
How big of a problem is sleep apnea and anesthesia?
(All respondents data)

Conclusions

Although not statistically significant because of the size of the sample, the data collected through the survey allows us to make various suggestions and recommendations to Ohio Health as to when their sleep apnea screening questionnaire should be administered in order to reduce the amount of potential post-operative complications and to better serve the patients, anesthesiologists, and surgeons.

Results of the data collected from all respondents showed some clear trends to base recommendations on. For example, in Fig. 2, the majority of medical professionals polled feel that the screening questionnaire should be given during annual physical exams or during the pre- admissions process. Fig. 3 shows that these times would mostly benefit the patient, but also benefits the anesthesiologists and surgeons. In Fig. 4, the majority of those responding would support screening for sleep apnea during annual physical exams and (in Fig. 5) feel that the percentage of sleep apnea population is high enough to warrant this.

Fig. 6 shows how much the various medical specialties still need to learn concerning the relationship between sleep apnea and anesthesia, as 16% of respondents recognized that they did not know how big a problem sleep apnea and anesthesia were. Another 26% simply opted out of the question altogether.

Based on the the data gathered from the survey, we can recommend to Ohio Health that sleep apnea screening tests should begin to be integrated into annual physical exams or administered as early in the surgery process as possible.

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