STOP Questionnaire Warrants CAUTION Sign

To the Editor—Chung and colleagues are to be commended for simplifying the screening process for obstructive sleep apnea (OSA) by developing the STOP questionnaire using an apnea hypopnea index (AHI) derived during polysomnography as the “gold standard” for OSA. Having recently used the AHI in evaluating high-resolution pulse oximetry as a perioperative screening tool for OSA in surgical patients, we would like to draw attention to several limitations of the AHI.

In their methods, Chung and colleagues score the AHI according to “standard criteria,” referencing the 1999 recommendations of the American Academy of Sleep Medicine Task Force on definitions and measurement techniques during polysomnography. Unfortunately, the American Academy of Sleep Medicine stated in the revised Manual for Scoring Sleep and Associated Events as recently as 2007 that there is as yet no consensus on scoring the AHI. Redline’s group has shown that the median value of AHI rendered by polysomnography can vary as much as 10-fold, depending on the definition of hypopnea used in scoring the AHI. Manser and colleagues demonstrated that three different but acceptable scoring systems yielded significantly different disease prevalence and severity estimates. Differences in signal averaging times of pulse oximeters used during polysomnography can also affect the AHI, and standardization of oximetry techniques during polysomnography remain lacking.

It is thus possible that Chung’s predictive parameters for disease severity (table 6) may “shift” significantly between severity classifications if correlated with AHI measured in other centers. This may partly explain the decline in specificity and positive predictive value of all three tools (STOP, Berlin, and the AHI) when compared to the inverse. The AHI may lack the discriminating power to stratify risk in the postoperative environment, where, unlike the sleep laboratory, patients’ respiratory function is challenged by opiates, sleep deprivation, and rapid eye movement sleep rebound. Even sleep specialists are weary of relying on the AHI as a surrogate of disease severity.

The STOP questionnaire is a practical step forward in identifying patients with OSA (AHI > 5). It will require refinement and supplementation before we have a tool that can quantify risk, guide postoperative monitoring, and predict outcome in our expanding population of surgical patients with OSA.

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In Reply—In the letter to the editor titled “STOP Questionnaire Warrants CAUTION Sign,” Dr. Overdyk and colleagues raised some interesting issues regarding the apnea-hypopnea index (AHI) and our papers.

With the variation between different sleep centers, and even different nights for the same patient at the same sleep center,1,2 there have been different opinions regarding the definition and interpretation of the AHI. Considering the feasibility and cost, we chose the result of one night of in-laboratory polysomnography as the gold standard to validate the STOP questionnaire. When we started our study in early 2006, there were no widely accepted mandatory agreements on the definition of the different measurements in polysomnography. The majority of sleep laboratories followed the recommendations of the Academy of Sleep Medicine Task Force, published in 1997. The Academy of Sleep Medicine has since published a new manual for the scoring of sleep and associated events in 2007. The new manual is mandatory to be followed in United States after July 1, 2008.*

References

(Accepted for publication September 12, 2008.)

Comparing the criteria that we used with the 2007 manual, there is no difference regarding the definition of apnea. However, there are some changes in the definition of hypopnea. In the criteria we used, an episode of hypopnea was defined as a reduction of nasal air flow \( \geq 50\% \) with a drop in pulse oxygen saturation \( \geq 3\% \) which last more than 10 s. In the 2007 manual, either a drop of pulse oxygen saturation \( \geq 4\% \) with a decrease of nasal air flow \( \geq 30\% \) or a drop of pulse oxygen saturation \( \geq 3\% \) with a decrease of nasal air flow \( \geq 50\% \) which last \( \geq 10 \) s will be defined as 1 episode of hypopnea. The definition in the 2007 manual for hypopnea is broader than the definition we used for our study.

In our 177 study patients for validating the STOP questionnaire, the severity classification based on the AHI and number of patients in each group can be found on page 817, \( \text{AHI} \leq 5.55 \), \( \text{AHI} > 5 \) and \( \leq 15.52 \), \( \text{AHI} > 15 \) and \( \leq 30:31 \), and \( \text{AHI} > 30:39 \). When doing the analysis of predictive parameters, we had to classify patients into either smaller or bigger than the cutoff value and use this classification to evaluate the screening tools. This is the reason why we combined patients with moderate and severe obstructive sleep apnea (OSA) in one group to evaluate the capacity of screening tools to identify this group of patients.

We agree with Dr. Overdyk and colleagues that the duration of oxygen desaturation, apnea and hypopnea, rate of desaturation, adequacy of ventilation recovery, and level and stability of the arousal threshold are very important factors in evaluating the severity of OSA, especially for assessing the potential to trigger other perioperative adverse events. However, there is no agreement yet on how to incorporate these factors into the severity classification of OSA patients.

Our main focus was to develop and validate a concise and easy-to-use screening tool for preoperative clinics. We agree with Dr. Overdyk and colleagues that the STOP questionnaire is a practical step forward in identifying patients with OSA, and it bears the same limitations as other questionnaires. To more accurately stratify the perioperative risk, guide postoperative monitoring, and predict outcome, we need to combine the score of the STOP questionnaire with the other information such as the need for narcotics and the invasiveness of the surgery. These points were illustrated in the American Society of Anesthesiologists guideline on the perioperative management of OSA patients.

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(Accepted for publication September 12, 2008.)

Concerns about the Validation of the Berlin Questionnaire and American Society of Anesthesiologists Checklist as Screening Tools for Obstructive Sleep Apnea in Surgical Patients

To the Editor:—In the May 2008 issue of ANESTHESIOLOGY, Chung et al. published an article where they describe the validation of the Berlin questionnaire and the American Society of Anesthesiologists checklist as screening tools for obstructive sleep apnea in surgical patients, and compare them with the STOP questionnaire. The authors conclude that both the STOP and American Society of Anesthesiologists checklist were able to identify patients who were likely to develop postoperative complications. However, after taking a look at the results, I believe that it would have been more accurate to mention respiratory complications. I would want to know what result would have been obtained had those patients been excluded from the analysis.

To sum up, I believe that this study presents some unsatisfactory points that hamper the conclusions given and deserve to be addressed in more detail.

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(Accepted for publication September 16, 2008.)