

Clinical use of the STOP-BANG questionnaire in patients undergoing sedation for endoscopic procedures

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Dear Editor,

Endoscopy is relatively safe, with a complication rate of less than 1% for standard procedures such as esophagogastroduodenoscopy (EGD) and colonoscopy.¹ Theoretically obstructive sleep apnea (OSA) can lead to cardiopulmonary complications during procedural sedation. However the initial studies addressing the presence of OSA in patients undergoing upper endoscopy and colonoscopy did not find an increased risk of cardiopulmonary complications.²⁻³ The STOP-BANG questionnaire represents a highly sensitive tool particularly useful to screen patients with severe OSA.⁴ A positive score, defined as ≥ 3 , has correlated with a higher rate of postoperative complications.⁵ The aim of this study was to evaluate the risk of OSA using a bedside screening instrument and determine if patients at high risk of OSA undergoing routine endoscopic procedures are more likely to become hypoxic during deep sedation. Institutional re-

view board approval was obtained for this study. We performed a prospective cohort study of patients undergoing deep sedation for endoscopic procedures in the endoscopy unit at "GB Morgagni-L. Pierantoni" Hospital in Forlì, Italy. Our routine practice is to sedate patients using propofol alone or in combination with low dose opiate and/or benzodiazepine. Depth of sedation was assessed using the Modified Observer's Assessment of Alertness/Sedation (MOAA/S) score. Consecutive patients were enrolled between January 2010 and December 2010. By using a STOP-BANG score of 3 or higher for high risk, patients were dichotomized into high risk (HR) and low risk (LR) for OSA groups. Demographic, procedural, and pharmacologic characteristics were compared between groups using the chi-square test for dichotomous variables and unpaired t testing or the Mann-Whitney test for continuous variables. During the study period, 271 patients were enrolled, including 59 (22%) patients undergoing endoscopic retrograde cholangiopancreatography (ERCP), 56 (21%) EGD, 93 (34%) colonoscopy and 63 (23%)

TABLE I.—Patient and procedural characteristics, stratified by risk for OSA.

Variable	Low risk (N=131)	High risk (N=141)	P value
Mean age \pm SD (yrs)	58 \pm 16	66 \pm 11	<0.0001
Sex M%	25	45	<0.0001
Mean BMI \pm SD	24 \pm 4	29 \pm 6.5	<0.0001
ASA ≥ 3 %	7	28	<0.0001
Mean endoscopy time \pm SD, min	60 \pm 20	58 \pm 18	NS
Mean total propofol dose \pm SD, mg/kg	7 \pm 5	6.5 \pm 6	NS
MOAA/S during the procedure, median (IQR)	0 (0-0)	0(0-0)	NS
Concomitant use of benzodiazepine and/or opiate, %	49 (39-60)	51(41-64)	NS

IQR, interquartile range; SD, standard deviation; MOAA/S: Modified Observers's Assessment of Alertness/Sedation.

undergoing EGD and colonoscopy in the same time. The prevalence of a STOP-BANG score of 3 or higher (*i.e.*, HR) was 52% (14 of 271). Patient, procedure, and pharmacologic characteristics are summarized in Table I. As expected, HR patients were significantly older, predominantly male, and had higher BMIs compared with the LR group. In the low-risk group, 2 (1.5%) patients became hypoxic. In the high-risk group, 21 (15%) patients had transient hypoxia, of these, there were 3 cases of positive pressure ventilation for apnea (2 cases) and upper airway obstruction (1 case). There were no cases of endotracheal intubation in the entire cohort. The OR of hypoxemia was significantly higher among HR patients (10.7; 95% CI, 2.4-47). This remained statistically significant after adjusting for ASA class of 3 or higher (OR, 0.79; 95% CI, 0.29-2.10). Among the patients undergoing to hypoxemia in high risk group, 14 were subject to ERCP confirming the higher risk of upper procedure as opposed to colonoscopy (RR 2.05, 95% CI 1.38-3). Our study confirms the high prevalence of patients with high risk for OSA and it shows that these patients are at risk for hypoxemia during deep sedation. This risk is higher in HR subjects undergoing ERCP as opposed to colonoscopy, however we did not power our study for subset analysis and further studies are needed to confirm differences in subsets. STOP-BANG questionnaire helps the anesthesiologist to identify patients likely to encounter sedation-related complications allowing an appropriate sedation strategy,

including ventilation monitoring or capnography, avoiding the use of combination long acting agents for sedation induction; using single agents for sedation maintenance.

References

1. Waring JP, Baron TH, Hirota WK, Goldstein JL, Jacobson BC, Leighton JA *et al.* American Society for Gastrointestinal Endoscopy, Standards of Practice Committee. Guidelines for conscious sedation and monitoring during gastrointestinal endoscopy. *Gastrointest Endosc* 2003;58:317-22.
2. Mador MJ, Nadler J, Mreyoud A, Khadka G, Gottumukula VA, Abo-Khamis M *et al.* Do patients at risk of sleep apnea have an increased risk of cardio-respiratory complications during endoscopy procedures? *Sleep Breath* 2011 Jun 27 [Epub ahead of print].
3. Khiani VS, Salah W, Maimone S, Cummings L, Chak A. Sedation during endoscopy for patients at risk of obstructive sleep apnea. *Gastrointest Endosc* 2009;70:1116-20.
4. Chung F, Yegneswaran B, Liao P, Chung SA, Vairavanathan S, Islam S *et al.* STOP questionnaire: a tool to screen patients for obstructive sleep apnea. *Anesthesiology* 2008;108:812-21.
5. Chung F, Yegneswaran B, Liao P, Chung SA, Vairavanathan S, Islam S *et al.* Validation of the Berlin questionnaire and American Society of Anesthesiologists checklist as screening tools for obstructive sleep apnea in surgical patients. *Anesthesiology* 2008;108:822-30.

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