



“DIFFICULT AIRWAY IN PATIENTS WITH AND WITHOUT OBSTRUCTIVE SLEEP APNEA AS ASSESSED BY STOP BANG SCORE, A COMPARATIVE STUDY.”

Anaesthesiology

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ABSTRACT

Background and Aims: Obstructive sleep apnea (OSA) is a common and often undiagnosed disease that causes blood oxygen desaturation as a result of recurrent collapse of the upper airways during sleep. In this study we are evaluating the perioperative difficulty in airway in patients with undiagnosed OSA using STOP BANG score as a screening parameter. **Methods:** A comparative study was conducted in a tertiary care centre in patients undergoing elective surgery. Population was divided into OSA and Non OSA based on STOP BANG score. Patients scoring ≥ 3 in STOP-BANG were taken as patients having OSA and patients with a score < 3 on STOP-BANG were taken as patients not having OSA. Occurrence of DMV, Laryngoscopy (DL) and DIT were compared between the groups using DMV score, Cormack-Lehane grading and intubation difficulty score respectively. **Results:** A total of 54 patients in OSA and 54 patients in non OSA group were studied. There was increased incidence of DMV (41 cases), DL (38 cases) and DIT (49 cases) in patients with risk of OSA compared to non OSA group. Individual components of STOPBANG were analysed and showed history of snoring, BMI > 35 , NC > 40 cm, history of tiredness and presence of systemic hypertension were found to have significant association with difficult BMV. For Difficult intubation History of snoring, BMI > 35 and NC > 40 cm are found to be significant.

KEYWORDS

Difficult mask ventilation, STOP bang score, Difficult intubation, Obstructive Sleep apnea.

INTRODUCTION

American Society of Anesthesiologists defines a difficult airway as “a clinical situation wherein a conventionally trained anesthesiologist experiences difficulty with facemask ventilation of the upper airway, difficulty with tracheal intubation, or both.” Evaluation of the airway for signs of potential difficulty should be performed preoperatively to decrease the perioperative morbidity and mortality. Obstructive sleep apnea (OSA) is an increasingly common sleep disorder, which is of particular concern to anaesthesiologists because it is associated with concerns of difficult intubation, upper airway collapse and obstruction in the perioperative period. Various studies have demonstrated the increased incidence of Difficult mask ventilation as well as tracheal intubation in patients with OSA. The prevalence of OSA in the general adult population ranges from 9% to 38%. Since OSA is undiagnosed in an estimated 80 percent of patients, it is necessary that anesthesia practitioners have adequate knowledge of the clinical presentation and diagnosis of OSA.

The STOP BANG questionnaire is a scoring model consisting of eight easily administered questions starting with the acronym STOP-Bang and is scored based on Yes/No answers (score: 1/0). A score of ≥ 3 has shown a high sensitivity for detecting OSA: 93% and 100% for moderate and severe OSA, respectively. Owing to its high sensitivity at a score of ≥ 3 , the STOP-Bang questionnaire is considered very helpful to rule out patients having moderate and severe OSA. The purpose of this study is to assess the airway in patients with and without OSA utilizing stop bang score for predicting difficult mask ventilation and difficult intubation.

OBJECTIVES

To compare the perioperative difficulty in airway in patients with and without Obstructive sleep apnea utilising STOP BANG score as an OSA screening parameter.

MATERIALS AND METHODS

A comparative study was conducted in a tertiary care centre in patients undergoing elective surgery after obtaining clearance from Institutional Ethical Committee and written informed consent. The study population consisted of 108 patients, divided into two groups each containing 54 participants. Group 1 with high risk for OSA (STOP BANG score $\geq 3/8$) and Group 2 with low risk for OSA (STOP BANG score $< 3/8$) posted for elective surgery. Sample size was calculated based on a study by Mathang et al.

Study population included all patients of either sex, age > 18 yrs belonging to ASA 1 or 2, posted for elective surgeries under general anesthesia with endotracheal intubation during the study period. A subject data sheet was used to collect demographic data and brief

medical history pertinent to the study and surgery. For all patients, STOP-BANG questionnaire was used to determine the risk of OSA.

The STOP-BANG stands for S— history of snoring T—history of tiredness O—observed apnoea during sleep P—blood pressure (hypertension) B—body mass index (BMI) > 35 kg/m² A—age > 50 years N—neck circumference > 40 cm G—gender is male. Every positive response was given a point of one and the sum of each score was taken as the total score. Anthropometric data like height, weight, BMI, neck circumference, thyromental, and sternomental distance were measured. These patients are followed up on the day of surgery and all the data pertaining to DMV and DIT were recorded by the anesthesiologist in charge of the case.

Statistical Analysis

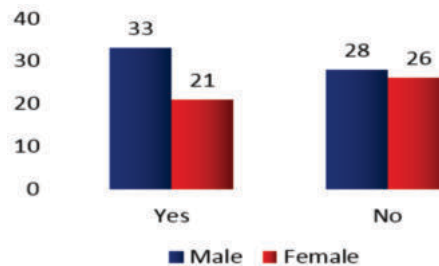
Data were entered in Microsoft Excel 365 software and analyzed using SPSS software. An unpaired t test was done to compare the different airway assessment parameters, bag mask ventilation and intubation with patients with OSA and without OSA, as assessed by STOP BANG score.

RESULTS AND OBSERVATION

The study population consisted of 108 patients, divided into two groups each containing 54 participants. Group 1 with high risk for OSA (STOP BANG score $\geq 3/8$) and Group 2 with low risk for OSA (STOP BANG score $< 3/8$) posted for elective surgery.

Comparison of Demographic variables between Group OSA and Group Non OSA

	AGE	HEIGHT	WEIGHT	BMI
GROUP 1 (OSA)	55.796 $\pm$ 12.632	159.852 $\pm$ 8.577	75.926 $\pm$ 15.706	30.035 $\pm$ 6.735
GROUP 2 (NON OSA)	42.889 $\pm$ 15.876	162.963 $\pm$ 8.342	64.982 $\pm$ 11.555	24.497 $\pm$ 3.881
P value	0.000	0.059	0.000	0.000



Sex distribution among Study participants

Comparison of BMV between OSA and Non Osa groups.

	VENTILATED WITH MASK	USE OF ORAL AIRWAY /ADJUVANTS	DIFFICULT VENTILATION	UNABLE TO VENTILATE
GROUP 1	13 (24.1%)	21 (38.9%)	18 (33.3%)	2 (3.7%)
GROUP 2	39 (72.2%)	12 (22.2%)	3 (5.6%)	0
P value	0.000			

Comparison of Cormack Lehane Grading between two groups

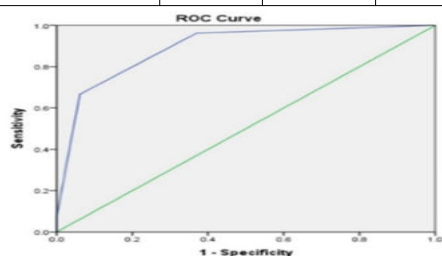
	CL 1	CL 2A	CL 2B	CL 3A	CL 3B
GROUP 1	0	16 (29.6%)	21 (38.9%)	16 (29.6%)	1 (1.9%)
GROUP 2	6 (11.1%)	23 (42.6%)	14 (25.9%)	10 (18.5%)	1 (1.9%)
P value	0.040				

Comparison of Intubation difficulty score between the Groups

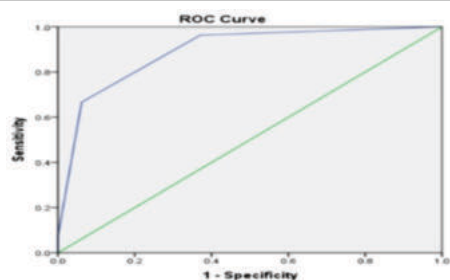
	EASY	NOT EASY	DIFFICULT	EXTREMELY DIFFICULT
GROUP 1	5 (9.3%)	28 (51.9%)	18 (33.3%)	3 (5.6%)
GROUP 2	26 (48.1%)	14 (25.9%)	11 (20.4%)	3 (5.6%)
P value	0.000			

Comparison of Individual Parameters in STOP BANG Score for Predicting Difficult Airway

	AUC	P value	95% CI
BMV	0.769	0.000	0.676-0.862
a) Snoring	0.864	0.000	0.769-0.959
b) Tiredness	0.888	0.183	0.767-1.000
c) Observes apnea			
d) Pressure	0.641	0.012	0.535-0.746
e) BMI>35	0.811	0.000	0.693-0.930
f) Age>50	0.573	0.194	0.464-0.681
g) N>40cm	0.830	0.000	0.739-0.922
h) male	0.418	0.145	0.309-0.528
IDS	0.654	0.007	0.551-0.757
a) Snoring	0.679	0.064	0.538-0.819
b) Tiredness	0.481	0.949	0.246-0.717
c) Observes apnea			
d) Pressure	0.605	0.061	0.499-0.712
e) BMI>35	0.673	0.024	0.560-0.786
f) Age>50	0.587	0.117	0.480-0.695
g) N>40cm	0.674	0.005	0.569-0.778
h) male	0.508	0.887	0.397-0.619

**ROC curve for BMV and OSA**

Area	Std.Error	P value	95% CI	
			Lower Bound	Upper Bound
0.892	0.035	0.000	0.823	0.962

**ROC curve for IDS and OSA**

Area	Std Error	P value	95% CI	
			Lower Bound	Upper Bound
0.727	0.049	0.000	0.630	0.823

DISCUSSION

The mean age of the patients was 55 yrs in osa group & 42 yrs in non osa group. Elderly population are more prone for OSA and this finding is similar to previous studies. Our study included a total of 61 males & 47 females. 61.1% of males has increased risk for osa compared to 38.9% in females. However the value obtained for gender association for Osa was not significant. Previous studies in surgical patients have shown increased incidence of OSA in males. Smaller population in the present study might have contributed to absence of gender difference. OSA group had obese patients with mean weight 75 kg and BMI 30 compared with the non OSA group.

The DMV was significantly higher [p value 0.000] in OSA group when compared with non OSA group. The incidence of difficult laryngoscopy, CL grade 2B and CL grade 3A was higher in patients with OSA compared to non OSA group which was statistically significant [p value 0.040]. However incidence of CL grade 3B was found to be equal in both groups. There was increased incidence of difficult intubation in patients with high risk for OSA (33.3%) compared with that of non OSA group (20.4%). The intubation difficulty score was significantly high [p value 0.000] in OSA group compared to non OSA group.

Individual components of STOPBANG were analysed and showed significant correlation with difficult airway. History of snoring, BMI >35, NC >40cm, History of tiredness and Presence of systemic hypertension were found to have significant association with difficult BMV. For Difficult intubation History of snoring, BMI >35 and NC >40 cm are found to be significant.

In our study we found STOPBANG score >3 was an important predictor for difficult BMV with AUC 0.892. (p value 0.000) STOPBANG score >3 was also an important predictor for Difficult Intubation with AUC 0.727 which is significant (p value 0.000)

CONCLUSION

Various studies demonstrated DMV and DIT in patients with undiagnosed OSA. STOP BANG questionnaire has been validated in surgical patients and was shown to have high sensitivity and negative predictive value in diagnosing moderate to severe OSA. In our study we found that elderly age group, higher BMI, increased neck circumference, higher mallampatti grade are associated with DMV and DIT. All these risk factors are seen in OSA group in higher frequency compared to non OSA group. Higher ASAGrades were also associated with OSA group. STOP-BANG score was identified as the single most important predictor of difficult airway. Individual components of the STOPBANG score individually were also good predictors of difficult airway.

Conflicts Of Interest

Nil

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