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Section A -Research paper

Use of DISE VS awake Muller maneuver to detect retrolingual collapse in patient with moderate to severe OSAS subjected to treatment with barbed tongue base suspension

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Abstract

Objective: to assess the accuracy of different endoscopic technique in diagbosis and detecting the site of collapse in OSAS patient. **Material and methods:** this was a prospective study including 32 patients (22 male and 10 females) the age mean is (43.41 year), the BMI mean is the (31.16 kg/m^2) and AHI mean is (55.21 event/hour), suspected to have tongue base retrolingual collapse by using modified mallambati and cephalometry. All patients received Barbed suture suspension of the tongue base alone or with conjugation with Antrolateral advancement pharyngeoplasty for treatment. **Results:** there was no statistically significant difference between using muller maneuver and drug induced sleep enoscopy in diagnosis of site of collapse. **Conclusion:** there is no superiority for DISE over muller manoeuvre in diagnosis of the site of collapse in OSAS patients.

Keywords: retrolingual collapse, barbed tongue base suspension, DISE

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Introduction

In 1973, Guilleminault first described obstructive sleep apnea (OSA) as a syndrome characterized by recurrent episodes of sleep apnea and hypopnea caused by repetitive upper airway (UA) collapse. OSA often results in decreased oxygen levels in blood and arousal from sleep (1). Obstructive Sleep Apnea Syndrome (OSAS) may induce excessive daytime somnolence, morning headaches, poor concentration, cardiopulmonary and cardiovascular diseases, and a lower quality of life (2).

Patients with moderate to severe obstructive sleep apnea mostly have a retrolingual collapse the cause obstruction of the airway. The important steps for treatment of obstructive sleep apnea patient is to detect the exact site of collapse in the airway, and whether it is a single site or there are multiple sites. There are multiple procedures invented and discovered to detect those sites which could be classified into clinical examination, endoscopic examination, and radiological investigations (3)

Clinical examination includes examination of the nose to detect if there is deviated nasal septum, hypertrophied turbinate or nasal polyposis. oropharyngeal examination to detect the size of the tonsils, the position of the palate and the tongue size that could be included in Mallampati and Friedman scores (4).

To evaluate and predict the site of obstruction or collapse causing the obstructive apnea syndrome there is a different method of investigation includes radiological and endoscopic investigations. Radiological investigations for diagnosis of OSAS include cephalometry, CT scan volumetry and MRI (5). Endoscopic examination which includes Muller maneuver, positional muller maneuver and Drug induced sleep endoscopy (DISE). Müller's maneuver (FNMM), which requires forced inspiration against a closed nasal and oral airway, to determine the most likely sites of airway collapse. However, no diagnostic gold standard exists. The introduction of drug-induced sleep endoscopy (DISE) has allowed for an objective form of dynamic airway size evaluation in a state that closely mimics natural sleep(6).

In this research we will discuss the difference between the different diagnostic endoscopic maneuvers and its value for diagnosis of retrolingual collapse.

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Methods

Approval was obtained from the Sohag University institutional review board for a prospective study for all patients having undergone DISE at our institution from June 2021 through November 2021. This period coincided with the implementation of routine DISE for preoperative evaluation of patients with OSAHS at our institution. All study patients had a full airway examination and awake Muller Maneuver in the clinic, followed by DISE in the operating room. Patients were included in this study if they had documented moderate to severe OSAHS based on a diagnostic polysomnography, comprehensive physical examination including FNMM evaluation, and a preoperative DISE evaluation.

Patient Information:

Detailed patient information was obtained as part of a standard obstructive sleep apnea (OSA) evaluation for all patients. Demographic information and physical examination records were obtained, including body mass index (BMI), relative tongue size, and tonsillar grade. Measurements of relative tongue and pharyngeal tonsillar sizes were graded according to criteria described by Friedman et al.(7) Finally, diagnostic testing, including polysomnographic variables, and DISE and FNMM findings were carefully documented.

Fiber-optic Nasal Endoscopy with Müller's Maneuver:

Awake FNMM was performed by a single surgeon on all study patients for investigation of retropalatal and retrolingual collapse. All individuals underwent topical nasal administration of aerosolized 4% lidocaine and 0.25% phenylephrine solutions for adequate preprocedure decongestion and topical anesthesia. Subsequently, patients were placed in a sitting position while a flexible fiber-optic nasal endoscope was passed through 1 nostril into the nasopharynx. Müller's maneuver was then performed by maintaining maximal inspiration with an open glottis against closed oral and nasal airways. The same maneuver and assessment were then performed with the nasal endoscope placed past the velopharynx into the oropharynx for a measurement of retrolingual collapse. The estimated degree of airway collapse was described qualitatively as a percentage change in cross-sectional airway area and divided into quartile groups of <25%, 25% to 50%, 50% to 75%, and >75% at each level. For this study, the degree of collapse was simplified into severe (> 75 %) moderate (50 -75 %) and mild > 50 %.

Drug-Induced Sleep Endoscopy

Sleep endoscopy was performed in the operating room by a single evaluating surgeon as part of a standard preoperative assessment. Sleep induction was achieved in the operating room according to a standard propofol titration protocol beginning at a rate of 50 to 75 mcg/kg/min intravenous infusion. The use of benzodiazepines and other sedating medications was strictly prohibited. The target level of sedation was that of light sleep with arousal to tactile but not vocal stimulation. Once sedation was achieved, a flexible fiberoptic nasal endoscope was passed through the nose for inspection of the entire upper airway. Dynamic collapse was evaluated at the level of the retropalatal and retrolingual airway segments and roughly described in terms of a percentage cross-sectional area change based on anteroposterior and lateral axes of collapse. The estimated degree of airway collapse at each level was recorded as >25%, 25% to 50%, 50% to 75%, and >75% and then simplified to the dichotomous groups of severe (>75%) moderate (50 -75 %) and mild > 50 %.for the purpose of this study.

Statistical analysis of the data

Data was fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Shapiro-Wilk test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Significance of the obtained results was judged at the 5% level.

Results:

In this study we recruited 32 patients male and females with mean age 43.41 ± 7.30, mean BMI 31.16 ± 2.59 and mean AHI 55.21 ± 27.0. all of the patients undergone awake muller maneuver and drug induced sleep endoscopy. According to the muller maneuver categorizing the patients to mild, moderate and sever there was 3 (9.4%) mild cases 26 (81.3) moderate cases and 3 (9.4) sever cases. And with drug induced sleep endoscopy there were no mild cases, 25 (78.1) patient with moderate collapse and 7 (21.9) cases with sever collapse. According to statistical analysis there were no statistically significant difference between muller maneuver and drug induced sleep endoscopy in detecting retrolingual collapse (P value 0.052) in patients with severe obstructive sleep apnea.

Discussion:

It was always a challenging to detect a retrolingual collapse in patients with moderate and severe obstructive sleep apnea. For this purpose, physicians and surgeons searched and invented different maneuver for detecting the different levels of obstructions in these patients, and for choosing the best way for detecting the correct level of muller maneuver and DISE they made research to compare the results of both maneuvers. In our

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study we found that there was no statistical significant difference between DISE and Muller Maneuver in detecting retroloingual and hypopharungeal collapse, which have similar results to the studies by:

Yilmaz etal 2015 (8) study on comparing doing muller maneuver alone vs muller maneuver and DISE in designing the surgical procedure for treatment of the condition, they concluded " DISE resulted in more changes in the surgical treatment plan and higher rate of combined treatment compared to MM, we determined that this difference did not result in a significant difference in treatment success"

And Yegin etal 2017 founded that there There was no statistically significant concordance between the two examinations for procedures involving the anteroposterior of the tongue (23.8%) and epiglottis (42.9%). In there study which included 62 patients. on the other hand a study that included 52 patients done by Soares et al 2013 (10) resulted in a significant difference between FNMM and DISE in the identification of severe retrolingual collapse

In Balu, Stella Moi and Menon 2019 (6) study they found that there is a significant difference between DISE and muller manouver in the interest of DISE in detecting collapsing of the epiglottis on the posterior wall of hypopharynx during inspiration.

Conclusion:

According to our study there is no superiority of Drug induced sleep endoscopy over muller maneuver in detecting retrolingual collapse in patients with obstructive sleep apnea patients.

Table (1): Comparison between DISE and Muller according to severity (n = 32)

	DISE		Muller		MH	p
	No.	%	No.	%		
Mild	0	0.0	3	9.4		
Moderate	25	78.1	26	81.3	16.50	0.052
Severe	7	21.9	3	9.4		

Figure (1): Comparison between DISE and Muller according to severity (n = 32)

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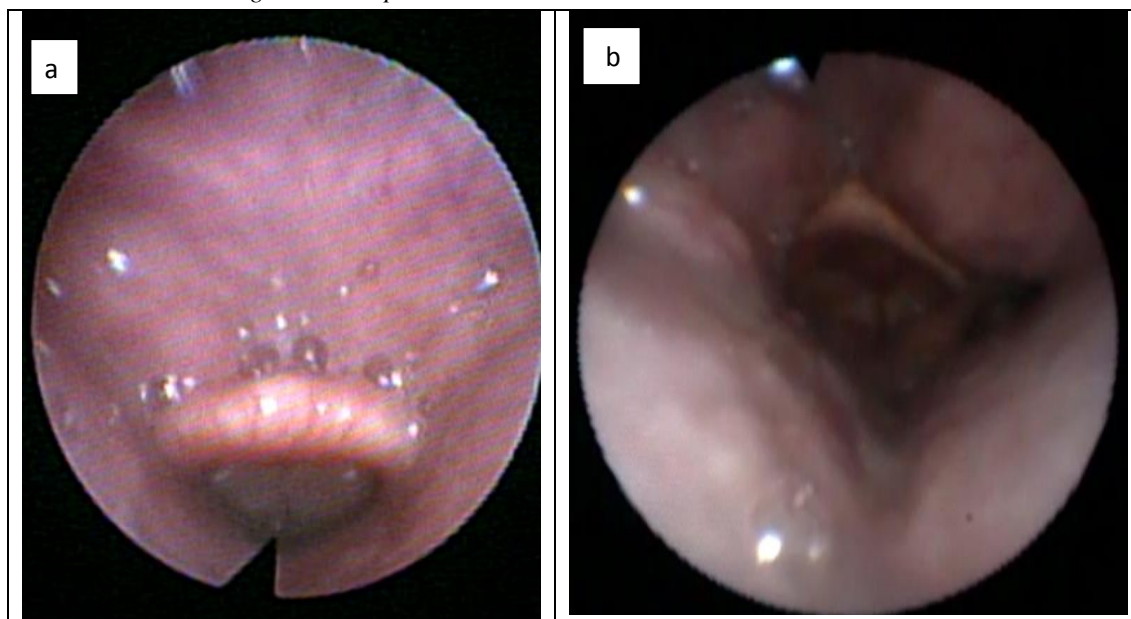
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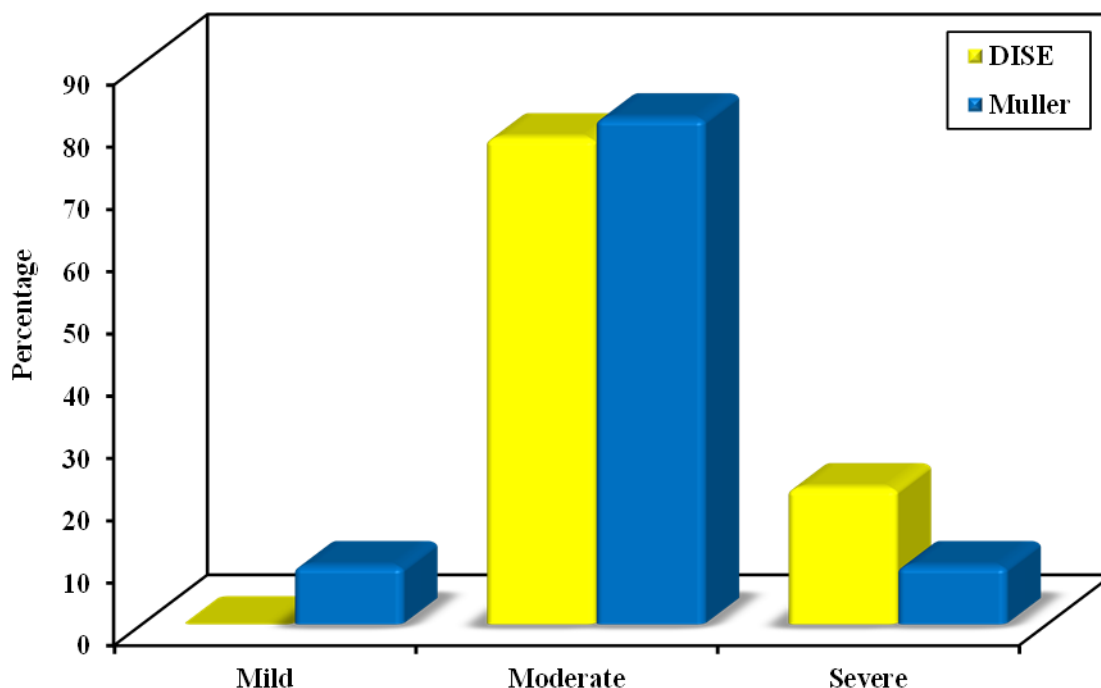
Figure (2): show sever retrolingual collapse (a) and moderate retrolingual collapse (b) with DISE.

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