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ORIGINAL ARTICLE

Comparison of findings of awake and induced sleep fiberoptic nasoendoscopy in cases of snoring and obstructive sleep apnea



Reham A. Ibrahim ^a, Emad K. Abdel-Haleem ^a, Fatma G. Asker ^b,
Alaa K. Abdel-Haleem ^c, Eman S. Hassan ^{a,*}

^a *Phoniatric Unit, Assiut University, Assiut 71526, Egypt*

^b *Anesthesia Department, Assiut University, Assiut 71526, Egypt*

^c *ENT Department, Assiut University, Assiut 71526, Egypt*

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Abstract *Background:* Identifying the site of obstruction and the pattern of airway change during sleep are the key points essential to guide surgical treatment decision making for snoring and obstructive sleep apnoea–hypopnoea syndrome (OSAHS) in adults. The use of nasopharyngoscopy during the application of the Müller maneuver is frequently employed to establish the site of upper airway obstruction. The Müller maneuver, however, is used when the patient is awake and therefore may not correlate with obstruction occurring during sleep. Drug-induced sleep endoscopy (DISE) avoids these drawbacks and may provide a more accurate evaluation of the upper airway.

Objective: The goal of this study is to compare videoendoscopic findings under induced sleep and those during the awake Müller's maneuver in order to provide an ideal and objective method for accurate assessment of upper airway in cases of snoring and obstructive sleep apnea. This will facilitate choosing the proper line of treatment and monitoring the effect of management.

Design: 50 adult subjects (42 males and 8 females) with an age range from 21 to 66 years complaining of snoring and obstructive sleep apnea underwent nasopharyngoscopy to assess airway during the Müller maneuver while awake and during sleep induced by i.v. propofol infusion 100–150 µg/kg/min. comparison between the awake and induced sleep fiberoptic nasoendoscopy findings regarding the degree and shape of airway obstruction at the retropalatal, oropharyngeal and hypopharyngeal levels was done.

* Corresponding author. Mobile: +20 1004082014; fax: +20 2 088 2333327.

E-mail address: eshh2003@yahoo.com (E.S. Hassan).

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Results: There was statistically significant difference between the two groups regarding the shape of obstruction at the retropalatal and oropharyngeal levels; while there was no statistically significant difference between the two groups regarding the degree of obstruction at the three levels.

Conclusion: The drug induced sleep endoscopy was more accurate than the Müller maneuver in assessing the shape of obstruction at the retropalatal and the oropharyngeal level, while it was the same as the Müller maneuver in assessing the degree of obstruction at retropalatal, oropharyngeal and hypopharyngeal levels.

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1. Introduction

Snoring is a breathing noise that appears during the inspiratory and sometimes also the expiratory phase of the respiratory cycle.¹ The source of the sound is the pharyngeal segment of the upper airway. Relative atonia of the upper airway dilator muscles during sleep induces narrowing and increased resistance at this level.² Obstructive sleep apnea hypopnea syndrome (OSAHS) is characterized by recurrent upper airway obstruction which can last up to 40 seconds each and occur up to 80 times per hour. These obstructions are caused by an abnormal increase – during sleep – in the collapsibility of the soft wall of the various structures in the upper airway.³

Current diagnostic testing with polysomnography (PSG) provides information regarding the number of apneas and hypopneas per hour of sleep, but it does not provide any information regarding the level of pharyngeal narrowing or collapse.⁴ A number of investigative methods have been used in order to determine the level of obstructive predominance in OSAHS: lateral cephalography, fluoroscopy, CT scanning, MR scanning, manometry, and acoustic reflections. But because all of them are performed on the awake patient, they may not be ideal methods to assess the behavior of the upper airway during sleep.⁵

Another tool of investigating the site of obstruction in OSAHS is the visual inspection of the nose and pharynx using fiberoptic endoscope, when it is done during wakefulness it permits visualization of the entire upper airway. Fiberoptic nasendoscopy can be combined with the Müller maneuver (FNMM). The Müller's maneuver consists of a forced inspiratory effort against a closed mouth and nose. The endoscope is inserted through one of the nostrils while the patient is supine and awake. The maneuver, when performed during wakefulness, may not necessarily reflect obstructions during sleep and this may explain its limited predictive value.⁶ Drug-induced sleep endoscopy (DISE) avoids these drawbacks and may provide a more accurate evaluation of the upper airway. The technique requires the pharmacologic sedation and the placement of a flexible fiberoptic endoscope (passed through the nose) to visualize the upper airway.⁶ This provides an opportunity to observe directly and characterize the upper airway collapse that occurs during sedation, hereafter referred to as drug-induced sleep endoscopy. DISE is a safe, feasible, and valid assessment of the upper airway. The aim of this study is to compare videoendoscopic findings under induced sleep and those during the awake Müller's maneuver in order to provide an ideal and objective method for accurate assessment of upper airway in cases of snoring and obstructive sleep apnea. This will facilitate choosing the proper line of treatment and monitoring the effect of management.

2. Subjects and methods

2.1. Subjects

Fifty adult subjects (42 males and 8 females) with an age range from 21 to 66 years and a mean age of 39.28 ± 9.94 years complaining of snoring and obstructive sleep apnea were included in the study.

2.2. Methods (procedures)

All patients went through the following:

2.2.1 Patient interview and history taking including searching for symptoms of snoring and obstructive sleep apnea

2.2.2 Clinical examination

- (a) Anterior rhinoscopy: Using simple examination tools, both nasal cavities are examined for presence or absence of signs of nasal obstruction.
- (b) Oral examination: Including assessment of dentition, bite and occlusion, soft palate and uvula, tonsil size with specific estimation of tongue base size using the Modified Mallampati Score.⁷

2.2.3 A wake fiberoptic nasoendoscopy (Müller's maneuver)

- Instrument used: Flexible nasofibroscope: Xion (EF-N14-n14), 4.2 mm diameter. Using a computerized system including:
 - (a) Camera: Xion (CH01-D).
 - (b) Light source: Explor ENT (HAL250).
 The software allowed audio, video recording and retrieval of recorded material.
- Technique: The nasofibroscope was introduced while the patient was lying in a supine position after lubrication using xylocaine jel 2%. The degree and the shape of obstruction at the retropalatal, oropharyngeal, and hypopharyngeal levels were visualized and documented during both resting respiration and Müller's maneuver:

2.2.4 Polysomnography

All patients were assessed by polysomnography (PSG) in the Sleep lab Unit. The patients were divided into two groups according to AHI. Patients with $AHI < 5$ were included in the study group having habitual snoring and negative OSAHS while those having $AHI \geq 5$ were included in the study group having positive OSAHS. Those with $AHI = 5-15$ were classified as having mild OSAH, those with $AHI = 15-30$ as moderate OSAHS and those with $AHI \geq 30$ as severe OSAHS.⁸

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