Journal of Pharmaceutical Research International

22(5): 1-4, 2018; Article no.JPRI.41559
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Drug-Induced Sleep Endoscopy and Our Clınıcal Experıences

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Author's contribution

This work was carried out by the author SDY. Author SDY designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author SDY managed the analyses of the study. Author SDY managed the literature searches. The author read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2018/41559
Editor(s):
(1) Wenbin Zeng, School of Pharmaceutical Sciences, Central South University, Hunan, China.
Reviewers:
(1) Silke Anna Theresa, Universidade Estadual Paulista, Brazil.
(2) Marwa Abd- El Rahman Mohamed, Cairo University, Egypt.
(3) Fernando Gustavo Stelzer, Federal University of Health Science of Porto Alegre, Brazil.
Complete Peer review History: http://www.sciencedomain.org/review-history/25056

Original Research Article

Received 25th March 2018
Accepted 4th June 2018
Published 8th June 2018

ABSTRACT

Aim: This study aims to evaluate the results of drug-induced sleep endoscopy(DISE) patients.
Study Design: Retrospective study.
Place and Duration of Study: Department of otorhinolaryngology between January 2018 and March 2018.
Methodology: A total of 38 patients (32 males,6 females; mean age 42.0±9.11 years; range 23 to 67) Demographic data, apnea-hypopnea indexes and the level of obstruction of the patients were discussed in the light of literature.
Results: Most patients were with mild obstructive sleep apnea (42.1%).Most of the patients had a multilevel obstruction(60.5%). Most commonly seen level of obstruction was soft palate. When the patient's age, sex, BMI(body mass index), AHI(apnea-hypopnea index) and level of obstruction was compared there was not a statistically significant relation. (p>0.05).
Conclusion: There was no difference between the level of obstruction, body mass index and apnea-hypopnea index values. Large research studies are needed to investigate the value of drug-induced sleep endoscopy.

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Keywords: Drug-induced sleep endoscopy; obstructive sleep apnea; polysomnography.

1. INTRODUCTION

Sleep-disordered breathing (SDB) comprises a spectrum of disorders, ranging from simple snoring to severe obstructive sleep apnea (OSA), with a significant burden to healthcare systems. If left untreated, OSA has significant cumulative, long-term health consequences. Drug-induced sleep endoscopy (DISE), also referred to as sleep nasendoscopy and first proposed by Croft and Pringle in 1991, is a technique for direct visualisation of anatomical site or sites of obstruction in sleeping patients, is a diagnostic technique for 3D anatomical visualisation of upper airway obstruction [1,2].

Locating the level of upper airway obstruction is a key clinical feature for assessing sleep-disordered breathing. Obstructive sleep apnea is characterised by repetitive partial or complete obstruction of the upper airway during sleep. This results in the reduction or cessation of airflow. This may lead to repetitive hypoxia, increased retention of carbon dioxide and arousals to restore upper airway patency. Hence, sleep is fragmented [2].

SDB cause obstruction of the upper airway which can be alleviated by continuous positive airway pressure therapy, oral devices or surgical intervention. Non-surgical treatment modalities are not always accepted by patients and in order to attain successful surgical outcomes, evaluation of the upper airway is necessary to carefully select the patients who would benefit from surgery [2].

2. MATERIALS AND METHODS

We performed 38 sleep endoscopies to the patients admitted to Adana City Training and Research Hospital ENT clinic who were diagnosed simple snoring and obstructive sleep apnea with polysomnography between January 2018 and March 2018. The study was approved by the local ethic commission and the informed consent was obtained from all patients. All subjects underwent one night of laboratory-based polysomnography. All the recordings were made on a Grass-Comet Plus polysomnograph. According to AASM(American Association of Sleep Medicine) apnea is defined as an absence or reduction of airflow to less than 90% of the baseline level for at least 10 seconds and hypopnea is scored if peak signal excursion drops by > 30% of pre-event baseline, the duration of the > 30% drop is > 10 seconds and there is a> 3% or 4% oxygen desaturation from pre-event baseline or the event [3].

At the operation room the patient's electrocardiogram, blood pressure, pulse rate were monitored. Atropin(0.5 mg i.v.) was administered before the procedure to decrease secretions. The sedation started with midazolam(0.03 mg/kg). Propofol (1 mg/kg i.v) was administered in divided doses for deep sedation until the patient is grade 6 according to Ramsey Sedation Scale (No response to light glabellar tap or loud auditory stimulus). During the procedure nasal oxygen was given (4 L/sec). The patients were examined with the flexible endoscope. If more than one level of obstruction was present it was accepted multilevel(nose and palate,palate and tongue base,nose,palate and tongue base).

The patients were classified according to the apnea-hypopnea index(AHI) values in the polysomnography report. Patients with AHI<5 are considered as simple snoring, AHI=5-15 are mild OSA, patients with AHI=16-30 are moderate OSA and patients with AH>30 are severe OSA [4].

OSA classification

Clinical guidelines for assessing OSA severity, such as those implemented by the UK's National Institute for Health and Care Excellence (NICE)2, use the number of sleep disturbances the patient suffers for every hour of sleep, known as the Apnea-Hypopnea Index (AHI), to categorize the patient population:

Normal Sleep—— AHI of 0-5

Mild Apnea——— AHI of 5-15

Moderate Apnea– AHI of 15-30

Severe Apnea—— AHI of 30+

Table 1. Correlation of severity of obstructive sleep apnea and level of upper airway obstruction

		Single level	Multilevel	p-value
		Mean ± SD	Mean ± SD	
Age		42.13±11.81	41.91±7.14	[1]0.949
BMI(kg/m^2)		30.53±4.36	28.64±4.42	[1]0.202
AHI		9.77±7.13 (10.4)	16.52±22.82 (8.7)	[2]0.701
		n (%)	n (%)	
Sex	Male	11 (%73.3)	21 (%91.3)	[3]0.188
	Female	4 (%26.7)	2 (%8.7)	

[1]Student's t-test; [2]Mann-Whitney U test; [3]Fisher's Exact test
SD:Standard deviation; BMI:Body mass index; AHI:Apnea-hypopnea index

2.1 Statistical Analysis

SPSS statistical software (SPSS for Windows version 22.0; IBM Corp., Armonk, New York, NY, USA) programme was used for the statistical analysis. For comparison of quantitative data Student's t-test was used for continuous variables with normal distribution, and Mann-Whitney U test was used for continuous variables without normal distribution. Fisher's exact test was used to compare the relationship between independent variables. $p<0.05$ was accepted statistically significant.

3. RESULTS

The mean age of the patients was 42.0±9.11. The age range was 23-67. Male to female ratio was 32/6. The BMI average was 29.38±4.44 kg/m2. The mean of apnea-hypopnea index(AHI) values was13.85±18.44.

There were 11 simple snoring (28.9%), 16 mild OSA(42.1%), 9 moderate OSA (23.7%) and 2 severe OSA(5.3%) patients , nose in 14 patients(36.8%), palate and uvula in 35 patients(92.1%), tonsil in 2 patients (5.3%), tongue base in 12 patients (31.5%), epiglottis in one patient(2.6%). There is no consensus regarding which scoring system should be utilized to report findings during DISE so we classified the site of obstruction according to the anatomy.

There was not the statistically significant difference between the level of obstruction and AHI values (p=0.701). Similarly, there was not a statistically significant difference between the level of obstruction and BMI(p= 0.202). Also, there was not a statistically significant difference between the level of obstruction and age (p=0.949) or sex(p=0.188) (Table 1).

4. DISCUSSION

Most patients with obstructive sleep apnea have multiple levels of upper airway obstruction on drug-induced sleep endoscopy, with the palate being the most common site of the collapse [5,6,7]. Similarly, our study found that multilevel obstruction was present in the majority of patients (60.5%) and palatal collapse present in nearly all patients (92.1%).

We used both midazolam and propofol during DISE procedure. The respiratory depressant effects on the medulla represent the primary drawbacks of midazolam in DISE. Propofol also causes dose-dependent increases in airway collapsibility and decreases in genioglossus muscle tone. These facts raise the concern that sleep endoscopy with propofol requires close titration to avoid false-positive results by artificially inducing airway collapse [8].

When we look at the literature we still do not know enough to say the predictive value of DISE. Koutsourelakis et al. reported that DISE variables can predict the outcome of upper airway surgery and concluded that there was indeed a positive response in patients with OSA [9]. Krasny et al reported that pharyngeal obstruction at the level of the hard and soft palate differentiates patients with severe OSA from patients with mild and moderate OSA regardless of BMI [10]. Hsu et al reported that circumferential collapse of velum was associated with a higher AHI [11]. In our study, there was no difference between the level of obstruction, body mass index and apnea-hypopnea index values. This may be due to a limited number of the participants in the study and may be as we did not exclude obesity which may greatly affect our results.

There is a lack of standardised procedure and objective measurement associated with

information capture, information management, evaluation of DISE findings, treatment planning, and treatment outcomes. Further studies in order to investigate the validity of this technique are needed in order to understand the mechanisms better.

5. CONCLUSION

Further studies with large sample size are needed in order to investigate the value of drug-induced endoscopy.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history/25056