Research Paper

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Clinical Indicators of Obstructive Sleep Apnea Syndrome

Medical Science

KEYWORDS : Obstructive sleep apnea, polysomnogram, Epworth sleepiness score, neck circumference, Friedman tongue position

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ABSTRACT

AIMS AND OBJECTIVES: To evaluate the role of Epworth sleepiness score, body mass index, neck circumference and Friedman tongue position in the diagnosis of obstructive sleep apnea syndrome (OSAS) in an Indian population.

MATERIALS AND METHODS: This is a retrospective, case control study where clinical data of 189 patients presenting with snoring and suspected to have OSAS were analysed. Patients with an apnea-hypopnea index (AHI) of more than 5 were taken as cases and AHI less than 5 were taken as controls.

RESULTS: Epworth sleepiness score, body mass index, neck circumference and Friedman tongue position were found to be statistically significant in OSAS patients when compared to simple snorers.

CONCLUSION: Polysomnogram is the gold standard in the diagnosis of OSAS. Careful clinical evaluation serves as an adjunct in providing certain objective indicators which are suggestive of OSAS.

INTRODUCTION

Obstructive sleep apnea (OSA) is defined as a sleep disorder where there is upper airway collapse and obstruction. It is also characterised by recurrent fall in the oxygen saturation leading to frequent arousals during sleep. Obstructive sleep apnea/hypopnea syndrome (OSAS) leads to symptoms such as snoring and excessive daytime sleepiness. It also increases the risk of cardiovascular disease, hypertension, insulin resistance, cerebrovascular disease and road traffic accidents.[1] OSAS is a fairly common condition, but often goes unrecognized. It is estimated that about 80% of the cases are not diagnosed. Very little literature is available about the prevalence of OSAS in Indian population. In the western population the prevalence of OSAS in the middle-aged (30 to 60 years) is 4% in men and 2% in women.[2] A study done in Delhi estimated the prevalence of OSA and OSAS in an Indian study population to be 13.7% and 3.6%.[3]

Although loud snoring is seen in all patients with OSAS, not all snorers have OSAS. Understanding the differences between patients with OSAS and simple snorers is important to explain the mechanisms responsible for upper airway obstruction rather than those between OSAS and normal non-snorers. Polysomnography is considered to be the gold standard for diagnosis of OSAS and estimation of severity and measurement of treatment response.[4,5,6] However, there are certain clinical parameters which can be considered to be adjunct in the diagnosis of OSAS as a probability, in patients with snoring. This study was carried out to elucidate a few clinical parameters which can serve as pointers to the diagnosis of OSAS in patients with snoring.

MATERIALS AND METHODS:

This is a retrospective, case control study conducted in a tertiary care hospital over a period of 5 years from 2008 to 2013. 189 consecutive patients with snoring and suspected to have OSAS were included in the study. Epworth sleepiness score, body mass index, neck circumference and Friedman tongue position of all patients were recorded. The polysomnographic data of all patients was categorised into 2 groups. The group having apnea-hypopnea index (AHI) of more than 5 were taken as cases i.e patients having OSAS and those with AHI less than 5 were taken as controls i.e simple snorers. The patients having central sleep apnea were excluded from the study.

Epworth sleepiness score:[7]

This score was considered to evaluate the severity of sleepiness in all patients. This questionnaire was used to help determine how frequently the patient is likely to doze off in 8 frequently encountered situations from a score of 0 (no chance of dozing) to 3 (high chance of dozing). An ESS score greater than 10 is generally considered sleepy.

Physical examination parameters:

(1) *Body mass index(BMI)*[8] – BMI which was calculated as kg/m^2 was recorded. BMI of 18.5 to 24.9 is normal, 25 to 29.9 is overweight, 30 to 34.9 is class I obesity, 35 to 39.9 is class II obesity and 40 or more is class III obesity. (2) *Friedman tongue position*[9] – Patient was asked to open mouth and without protruding the tongue relation of tongue and soft palate was assessed. Tongue position I was visualisation of entire uvula and tonsils/ pillars. Tongue position II allows visualization of uvula but not the pillars. Tongue position III is visualization of soft palate but not uvula. Tongue position IV is visualization of hard palate only. This grading system was used to assess enlarged tongue. (3) *Neck circumference*[10] – Measurement of neck circumference was carried out at the level of cricothyroid membrane and measurement noted in cm.

Polysomnography:

AHI data from overnight polysomnography which was carried out by Embletta portable sleep monitoring device (Medcare) was collected.

Statistical analysis:

This was done using the SPSS 16 software and Pearson chi square test and t-test were used to analyse the data and p value less than 0.05 was considered to be significant.

RESULTS:

According to the results from polysomnography, patients were subclassified as cases (OSAS patients having AHI more than 5) and controls (Simple snorers having AHI less than 5). Of the 189 patients, there were 120 cases and 69 controls. There were 88.3% & 82.6% males and 11.7% & 17.4% females in the case and the control groups respectively(Table 1).

TABLE 1	Cases	Controls
Male	106	57
Female	14	12
Mean age	43.56 +/- 11.339 years	40.87 +/- 13.337 years

The mean Epworth sleepiness score was 12.53 +/- 3.124 among cases and 7.06 +/- 3.531 among controls. There was a statistically significant association of ESS among cases over controls ($p < 0.001$).

BMI grades were analysed and we found that 27.5% were normal, 41.7% were overweight, 28.3% were class I obese and 2.5% were class II obese in the case group. Among the controls, 71% were normal, 20.3% were overweight, 5.8% were class I obese and 2.9% were class II obese. There was a statistically significant association of BMI with cases over controls ($p < 0.001$)

(Table 2).

TABLE 2	BMI Grade (no:of patients)			
	Normal	Overweight	Class I obesity	Class II obesity
Cases	33	50	34	3
Controls	49	14	4	2

The mean neck circumference was 37.01 +/- 5.553 cm among cases and 28.51 +/- 3.293 cm among controls. There was statistically significant association of neck circumference with cases over controls (p <0.001).

Among the cases, 8.3%, 31.7%, 35% and 25% had Friedman tongue position I,II,III and IV respectively and among the controls, 50.7%, 31.9%, 13% and 4.3% had Friedman tongue position I,II,III and IV respectively. There was a statistically significant association of Friedman tongue position among cases over controls (p <0.001)(Table 3).

TABLE 3	Friedman tongue position (no:of patients)			
	I	II	III	IV
Cases	10	38	42	30
Controls	35	22	9	3

DISCUSSION:

OSAS is a clinical syndrome associated with airway anatomical abnormalities.[11] Snoring is the most common symptom with which patients present to a clinician. However snoring can also be present in patients without OSAS and this is classified as simple snoring. Other associated symptoms of OSAS are excessive daytime sleepiness, choking spells during sleep, autonomic disturbances, morning headaches, lack of concentration and resetless sleep.[4] However, reliability of these symptoms in the diagnosis of OSAS is unknown. Severity of OSAS has got life threatening consequences on the cardiovascular system in the form of pulmonary hypertension, heart failure and stroke.[1,2]

OSAS has been classified as mild, moderate and severe with AHI of 5 to 15, 15 to 30 and more than 30 respectively.[5] AHI of less than 5 with snoring has been denoted as simple snoring without OSAS. Overnight polysomnogram is the gold standard in the diagnosis of OSAS.

In our study, we found male predominance in both OSAS and simple snoring mostly in the fourth decade of life. Literature[4,5,6] also indicates that OSAS affects mainly males in the fourth decade.

The role of ESS has been found to be controversial in literature. Studies[4] have found it to co-relate with the degree of OSAS, whereas there are other studies[12,13] which have indicated that it is not useful. In our study, ESS (p<0.001) served as a reliable clinical indicator to differentiate OSAS from simple snoring with means of 12.53 and 7.06 in the two groups respectively.

In our study, we found neck circumference (p<0.001), Friedman tongue position (p <0.001) and body mass index grade (p <0.001) as clinical pointers to differentiate OSAS from simple snoring. Studies in literature[2,5,6,9,13,14] have demonstrated the significance of these clinical indicators in diagnosis of OSAS, however, a baseline in an Indian population has to be considered to be different from western population. In our study, we found most of the patients were overweight (BMI of 25 to 29.9 kg/m^2), had a mean circumference of 37.01 +/- 5.553 cm and Friedman tongue position II and above. As per our study, we take this as a baseline henceforth in our population and take them as clinical pointers in the diagnosis of OSAS and differentiate from simple snoring.

Our study was mainly done to focus on a few clinical parameters which may raise the possibility of diagnosis of OSAS and we did not venture into imaging which plays an important role in surgical planning.

CONCLUSION:

OSAS is a complex disorder characterized by apneic episodes during sleep. This study is important in the Indian context as the physical stature of Indians is shorter than Caucasians and Indians have a shorter stout neck as compared to Caucasians. Also, lifestyle & food habits encourages people in India to develop obesity leading to short, stout necks - predisposing to OSAS.

Most of the patients come with trivial complaints and are diagnosed to have an underlying OSAS after detailed clinical examination and polysomnogram. High body mass index, short and stout neck, high ESS, Grade III or IV Friedman palate position with excessive daytime sleepiness and snoring would serve as clinical indicators to a probable clinical diagnosis of OSAS.

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