



SYMPTOMATOLOGY OF OBSTRUCTIVE SLEEP APNEA SYNDROME PATIENTS AND ITS CORRELATION WITH APNEA HYPOPNEA INDEX.

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ABSTRACT

Aim : The aim of this study was to characterize symptomatology of patients suffering from obstructive sleep apnea syndrome (OSAS) and investigate its correlations with severity of disease as assessed by apnea hypopnea index (AHI) score.

Materials and methods: All patients diagnosed to be having obstructive sleep apnea syndrome (OSAS) over a period of one year in tertiary care hospital were retrospectively studied. Symptomatology was recorded and sleepiness was measured quantitatively by Epworth sleepiness scale (ESS). Symptoms were correlated with AHI score using linear correlation for continuous variables and chi-square test for discrete variables.

Results : Snoring was detected to be most common symptom, seen in 28/30 (93.3%) of patients. Breathing pauses (16/30 -53.3%) and witnessed choking (13/30- 43.3%) on correlation with AHI had p value of 0.039 and 0.046 respectively. ESS scores increased linearly with the AHI (correlation coefficient 0.501, P value 0.005)

Conclusion Patients with complaints of choking and witnessed apneas are more likely to be suffering from Severe OSA. Raised values of ESS score also depict increased severity of disease in linearly

KEYWORDS : OSAS, Snoring, Epworth sleepiness scale, Apnea Hypopnea Index

Introduction

Obstructive sleep apnea (OSA) is characterised by repeated collapse of upper airways during inspiration leading to partial decrease in airflow (hypopnea) or complete cessation of breathing (apnea) despite continuous respiratory effort [1]. These apnea-hypopnea events are required to be equal to or greater than 5 events/h on polysomnography to define OSA. Obstructive sleep apnea hypopnea syndrome is a syndrome consisting of polysomnographic findings associated with characteristic clinical picture having persistent complaints of excessive day time sleepiness, unrefreshing sleep or fatigue [2]. Snoring, witnessed apneas and excessive day time somnolence are the most common presentations of SDB and are regarded as important screening tools. Currently, the most useful instrument to quantify the problem of sleepiness is Epworth sleepiness scale (ESS) [3]. The present study has been designed to study the clinical presentation of sleep apnea patients and correlating it with the severity of Obstructive sleep apnea as measured by apnea hypopnea index (AHI) [4].

Material and methods

A cross sectional descriptive study was carried out in tertiary care hospital. All cases of obstructive sleep apnea diagnosed on the basis of whole night fully attended polysomnography over the period of one year were included in the study. Patients on antipsychotic drugs, sedatives, substance abuse were excluded from the study. History was given both by patient and the bed partner. Symptomatology of such patients was recorded and to quantify day time sleepiness, their Epworth Sleepiness Scores (ESS) were calculated. It is a list of eight questions (table 1) that measure the propensity to sleep in familiar situations and has good test-retest reliability.

Table 1: The Epworth Sleepiness Scale

Situation	Chance of dozing
Sitting and reading	
Watching TV	
Sitting, inactive in a public place (e.g. theater or meeting)	
As a passenger in a car for an hour without a break	
Lying down to rest in the afternoon when circumstances permit	
Sitting and talking to someone	
Sitting quietly after a lunch without alcohol	
In a car, while stopped for a few minutes in traffic	

Situation Chance of dozing 0 = would never doze, 1 = slight chance of dozing, 2 = moderate chance of dozing, 3 = high chance of dozing.

Maximum score = 24. Based on the ESS, three groups were identified – those with mild sleepiness (ESS ≤ 10), moderate sleepiness (ESS 11-16) and severe sleepiness (ESS > 16). OSA was further classified into mild, moderate and severe based on AHI values of 5 to 15 /h, 15 to 30/h and more than 30 events/h respectively.

Statistical Analysis

Statistical analysis was performed using a statistical software package (SPSS Statistics 20.0). Linear correlation was applied for continuous variables for comparison with AHI values and the Chi Square test was performed for discrete variables.

Results

The symptomatology of the subjects is summarised in Table 2. The most common symptom was snoring (93.3%). The next most common symptoms were personality changes (63.3%), excessive day time somnolence (60%), witnessed breathing pauses and choking (53.3% and 43.3%). Erectile dysfunction was seen in 3 males, out of total number of 23.

Table 2: Symptomatology of OSA patients

SYMPTOM	COUNT	PERCENTAGE
Snoring	28	93.3
EDS	18	60.0
ESS	<10	23.3
	11-16	53.3
	>16	23.3
Frequent awakening	12	40.0
Non-restorative sleep	13	43.3
Cognitive impairment	9	30.0
Difficulty falling asleep	7	23.3
Morning headache	7	23.3
Erectile dysfunction	3	13.0 (of males)
Nasal congestion	4	13.3
Personality changes	19	63.3
Witnessed Breathing pauses	16	53.3
Witnessed Choking	13	43.3
Witnessed body movement	11	36.7
Nocturia	12	40.0

The co-relation of symptoms (binomial variables) with the severity of

the disease according to AHI is tabulated in Table 3. Frequency of every symptom has shown increment with the rise in AHI. Some symptoms like cognitive impairment and witnessed choking were not present in mild OSA (AHI<5/h).

Table 3: Co-relation of Binomial variables with severity of SDB according to AHI

Symptoms	AHI			P-Value
	>5 and ≤15 N=4	>15 and ≤30 N= 10	>30 N=16	
Freq awakening	0 (0%)	3 (25.0%)	9 (75.0%)	0.089
Non restorative sleep	1 (7.7%)	3 (23.1%)	9 (69.2%)	0.307
Cognitive impairment	0 (0%)	2 (22.2%)	7 (77.8%)	0.163
Difficulty falling asleep	2 (28.6%)	2 (28.6%)	3 (42.9%)	0.399
Morning headache	1 (14.3%)	2 (28.6%)	4 (57.1%)	0.954

Nasal congestion	1 (25.0%)	2 (50.0%)	1 (25.0%)	0.461
Personality changes	1 (5.3%)	5 (26.3%)	13 (68.4%)	0.064
Snoring	4 (14.3%)	9 (32.1%)	15 (53.6%)	0.791
Breathing pauses	1 (6.3%)	3 (18.8%)	12 (75.0%)	0.039
Witnessed choking	0 (0%)	3 (23.1%)	10 (76.9%)	0.046
Body movement	1 (9.1%)	2 (18.2%)	8 (72.7%)	0.265

For further analysis, the study population was divided into two groups- AHI >30 (severe SDB) and those with AHI ≤ 30 (mild to moderate SDB). Odds ratio was calculated for each of symptom (binomial variable) separately for mild –moderate OSA versus severe OSA patients. This is tabulated as per table 4.

Comparing the two groups i.e severe OSA (AHI >30/h) versus mild-moderate OSA (AHI ≤30/h), p value was lowest for breathing pauses (p value 0.011) followed by witnessed choking episodes (p value 0.024). Epworth sleepiness score(ESS) was calculated to measure sleepiness. Mean of ESS was calculated for AHI >30/h and AHI≤30/h as depicted in table 5.

Table 4 – Odds Ratios for Binomial variables

Symptoms	AHI > 30		AHI ≤30		Odds ratio	95% CI		p-value
	Present	Absent	Present	Absent		Lower	Higher	
Frequent awakening	9 (75.0%)	7 (38.9%)	3 (25.0%)	11 (61.1%)	1.929	0.992	3.750	0.052
Non-restorative sleep	9 (69.2%)	7 (41.2%)	4 (30.8%)	10 (58.8%)	1.681	0.857	3.299	0.052
Cognitive changes	7 (77.8%)	9 (42.9%)	2 (22.2%)	12 (57.1%)	1.815	0.991	3.323	0.079
Difficulty falling asleep	3 (42.9%)	13 (56.5%)	4 (57.1%)	10 (43.5%)	0.758	0.300	1.917	0.526
Morning headache	4 (57.1%)	12 (52.2%)	3 (42.9%)	11 (47.8%)	1.095	0.517	2.322	0.818
Nasal congestion	1 (25.0%)	15 (57.7%)	3 (75.0%)	11 (42.3%)	0.433	0.077	2.442	0.222
Personality change	13 (68.4%)	3 (27.3%)	6 (31.6%)	8 (72.7%)	2.509	0.912	6.903	0.029
Snoring	15 (53.6%)	1 (50.0%)	13 (46.4%)	1 (50.0%)	1.071	0.257	4.469	0.922
Breathing pauses	12 (75.0%)	4 (28.6%)	4 (25.0%)	10 (71.4%)	2.625	1.094	6.298	0.011
Witnessed Choking	10 (76.9%)	6 (35.3%)	3 (23.1%)	11 (64.7%)	2.179	1.072	4.429	0.024
Body movement	8 (72.7%)	8 (42.1%)	3 (27.3%)	11 (57.9)	1.727	0.911	3.274	0.105

Table 5 : Mean of AHI cross tabulated with AHI groups.

	Mean	Variance	Std Dev	
ESS	AHI >30	15.1875	13.8958	3.7277
	AHI ≤30	11.0714	14.6868	3.8323

Linear correlation of ESS with AHI was measured and it showed correlation coefficient of 0.501 with significance of 0.005.

Discussion

Among the extensive list of symptoms, snoring was the most common symptom in the patients of SDB. However only breathing pauses and choking achieved statistical significance with the severity of disease. Our study results were in analogy to the study conducted by Udwardia et al[5] on urban Indian adult population, where the main symptoms observed in patients of OSA were snoring (94%), EDS (43%), nocturnal choking (24%), recurrent awakening from sleep (10%), unrefreshing sleep (30%) and day time fatigue (29%). Out of these, nocturnal choking was noted as the strongest predictor of OSA (OR 24.6%, 95%CI 8.39-71.8).

Snoring was the most frequent symptom in the patients of SDB, but being such a common symptom, even in healthy patients, it can't be used as a predictor for presence or severity of the disease[6,7,8]. Community-based studies have estimated that as many 30% to 40% of the general population snores[9,10]. Studies from community, primary care, and sleep clinics have all shown a significant relationship between the presence of snoring and sleep apnea [7,8,10]. 93.3% subjects in our group were snorers, but this symptom failed to establish itself as a statistically significant predictor of the severity of disease. While snoring is clearly helpful in suggesting sleep apnea as a

diagnostic possibility, its high prevalence in widespread populations impairs its ability to identify real disease.

Excessive daytime sleepiness (EDS) is also very common. Epidemiological studies estimate the prevalence to be 8% to 30% in the general population depending on the definition of sleepiness and the population sampled[10,11]. EDS is a challenging symptom because of a significant overlap with features of fatigue and the difficulty patients and physicians have in differentiating between the two symptoms. ESS has proven to be very effective tool to measure sleepiness [12]. Our study results also provided further evidence that ESS scores give valid measurements of excessive daytime sleepiness as defined herein. The scores increased linearly with the severity of OSAS (correlation coefficient 0.501, P value 0.005) and can be used as a surrogate marker for the severity of the disease.

Polls have estimated that the prevalence of witnessed apneas in the general adult population ranges from 3.8% to 6%[10,13]. Similar to the results from the Sleep Health Heart study[6], witnessed apneas and choking episodes were found to be highly prevalent and were significantly associated with the severity of disease. Patients who had symptoms of breathing pauses or choking during sleep were 2-3 times more likely to have severe disease. Two limitations perceived were that not everyone has a bed partner and people may be poor reporters when it comes to describing respiratory events at night.

Presence or absence of insomnia was not significantly different in the severe and the mild-moderate group. Both 'frequent awakening' and 'difficulty falling asleep' may be described as insomnia by the patient. In our study, 40% patients had history of frequent awakening and

23.3% complained of difficulty falling asleep. 75% patients who complained of 'frequent awakening' had severe disease (AHI>30) compared to only 42.9% of those who complained of 'difficulty falling asleep'.

Besides these, history of 'personality change' had statistically significant association with the severity of disease. This was in agreement to previous study which has found OSA patients had significant higher score on hypochondriasis as compared to snorers[14]

'Non -restorative sleep' and 'witnessed body movements' also had strong associations with the severity of disease but statistical significance was not shown.

Conclusion

Among the symptoms, though snoring and excessive day time sleepiness are most prevalent, it is witnessed apneas and choking episodes, that have shown most robust association with the severity of disease

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