International Journal of Biomedical Research
ISSN: 0976-9633 (Online); 2455-0566 (Print)
Journal DOI: 10.7439/ijbr
CODEN: IJBRFA

Original Research Article

The role of Sleep Apnea Clinical Score (SACS) as a pretest probability in obstructive sleep apnea

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Abstract

A retrospective study was conducted in 198 patients suspected to have OSA at a tertiary centre in Mumbai**.** The pretest probability for the presence of OSAS was performed using Sleep Apnea Clinical Score (SACS).SACS score was calculated as: Snoring 3 points, Apnea 3 points, Neck Circumference in centimeters, Systemic Hypertension 4 points. Risk stratification of SACS score was done as < 43 low risk, 43-48 moderate risk, >48 high risk. A diagnosis of OSAS was done by using the criteria laid down by American Academy of Sleep Medicine (AASM). Polysomnography (PSG) showing AHI of 5 or more was considered as diagnostic of OSA. A correlation was established between SACS and OSA using Chi square test. 29/51(56.8%) did not have OSA when their SACS score was low. 53/81(65.43%) had OSA when their SACS score was moderate. With high SACS score 56/66 (84.84%) showed presence of OSA. Overall moderate to high SACS score was able to predict OSA in 109/147 (74.15%). The correlation between SACS score and presence of OSA was highly significant (p value = 0.0000137).

Keywords: Obstructive Sleep Apnea (OSA), Sleep Apnea Clinical Score (SACS), Polysomnography.

1.Introduction

Obstructive sleep apnea is an under diagnosed condition, which has a global prevalence of 2-5%. The signs, symptoms and consequences of OSA occur as a direct result of the derangements that occur due to repeated collapsibility of the upper airways, sleep fragmentation, hypoxemia, hypercapnia and variations in intrathoracic pressure. Clinically the hallmarks of OSA are loud snoring, excessive daytime sleepiness, witnessed breathing interruptions, nocturnal choking and at least 5 obstructive respiratory events (apneas, hypopneas) per hour of sleep. Pretest probability for the presence of OSA, are simple scores which can enable a physician to stratify the risk in a patient for the development of OSA. Examples of such pretest probability tests include Sleep Apnea Clinical Score (SACS), Epworth Sleepiness Scale (ESS), STOP BANG and BERLIN scores.

2. Materials and methods

This study was conducted at a tertiary hospital in Mumbai. Patients, attending the outpatient department, and fulfilling the inclusion criteria, were randomly selected. All the study subjects were screened for the presence of OSA using the SACS score (S – snoring – 3 points, A – apnea – 3 points, C – neck circumference in centimeters, S – systemic hypertension – 4 points). The subjects were categorized into 3 groups based on their SACS score: low risk – less than 43, moderate risk – between 43 and 48, high risk – more than 48.

After this risk evaluation, all the patients were subjected to a level 4 limited channel sleep study, for diagnosing OSA by calculating the Apnea – Hypopnea index (AHI). The subjects were categorized into 3groups based on their AHI: mild OSA – AHI less than 5/hour, moderate OSA – AHI between 5/hour and 30/hour, severe OSA – AHI more than 30/hour. A relation was established between the SACS score and AHI.

2.1 Inclusion criteria

1)Patients more than 18 years of age.
2)Patients willing to participate in the study.
3)Mentally stable patients.
4)Patients who are hemodynamically stable.

2.2 Exclusion criteria

1)Patients below the age of 18 years.
2)Mentally unstable patients.
3)Patients with serious comorbidities.

3. Results

- A total of 198 patients were included in the study.
- Patients were classified as per their SACS score as follows :

i) SACS score less than 43 – 51
ii) SACS score between 43 and 48 – 81
iii) SACS score more than 48 – 66

Patients were classified as per their AHI as follows:

i) AHI less than 5 – 67
ii) AHI between 5 and 15 – 45
iii) AHI between 15 and 30 – 42
iv) AHI moe than 30 – 44

- 29/51 **(56.8%)** did not have OSA when their SACS score was low.
- 53/81 **(65.43%)** had OSA when their SACS score was moderate.
- With high SACS score 56/66 **(84.84%)** showed presence of OSA.
- Overall moderate to high SACS score was able to predict OSA in 109/147 **(74.15%).**
- The correlation between SACS score and presence of OSA was highly significant **(p value = 0.0000137).**

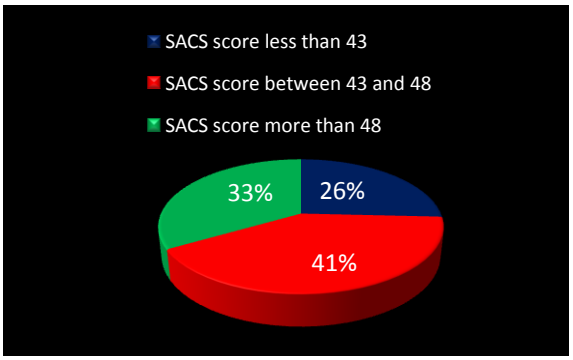

Figure 1: Distribution of patients as per their SACS score

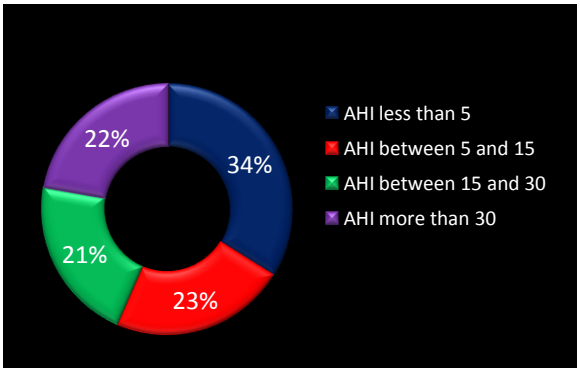

Figure 2: Distribution of patients as per their AHI

Table 1: correlation between AHI and SACS score

AHI : SACS :	<5	5-15	15-30	>30	Total
<43	**29**	**13**	**7**	**2**	51
43-48	**28**	**20**	**20**	**13**	81
>48	**10**	**12**	**15**	**29**	66
Total	67	45	42	44	198

4. Discussion

Obstructive sleep apnea is characterised by repetitive pattern of upper airway collapsibility, airflow obstruction and resultant arousals. Obstructive sleep apnea syndrome (OSAS) is characterised by repeated episodes of partial or full cessation of breathing during sleep, usually accompanied by oxyhemoglobin desaturation.[1]

Obstructive sleep apnea syndrome (OSAS) is an increasingly prevalent chronic condition, characterised by recurrent episodes of upper airway collapse during sleep, leading to intermittent hypoxemia and sleep fragmentation. Its severity is usually graded according to the average number of apneic or hypopneic episodes per sleep hour [apnea-hypopnea index (AHI)] in sleep studies.

In literature, Charles Dickens has been credited with one of the first descriptions in print regarding sleep apnea when he wrote of "Sleepy Joe", an obese man who sat in the corner of an English pub asleep. The archetype of a rotund, sleepy man became eponymous with "pickwickian syndrome" by Burwell in 1956.[2]

Various global epidemiologic studies have demonstrated the prevalence of OSAS to vary from 0.3-5.1%.[3,4] The prevalence of OSAS in adult Indian population is approximately 3.5%.[5,6] However, the majority of sleep apneics still remain undiagnosed.

The following criteria are recommended for the diagnosis of OSAS[7] :

A] Excessive daytime sleepiness (EDS) that is not better explained by other factors.

B] Two or more of the following that are not better explained by other factors:

- Choking or gasping during sleep
- Recurrent awakenings from sleep
- Non-refreshing sleep
- Daytime fatigue
- Impaired concentration

C] Overnight monitoring demonstrates five or more obstructed breathing events per hour during sleep. These events may include any combination of

obstructive apneas/hypopneas or respiratory effort-related arousals (RERAs).

The patient suspected of OSAS must fulfill criterion A or B plus criterion C.

There exists a variety of pretest probability scores for suspecting OSA, or for effective screening purposes. One such pretest probability score is Sleep Apnea Clinical Score (SACS). It is a screening tool based on:

- Snoring
- Witnessed episodes of apnea
- Neck circumference and
- Systemic hypertension [8,9]

In our study, patients were screened for the presence of OSA based on their SACS scores. It was found out that 74.15% of patients having a moderate to severe SACS score had OSA. This correlation highlights the importance of using SACS score as a quick and reliable method of screening for OSA.

5. Conclusion

SACS score is a quick and reliable method, which can be used effectively as a pretest probability to uncover underlying Obstructive Sleep Apnea.

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