Application of screening test for obstructive sleep apnoea detection in systemic hypertensive patients

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Abstract

Obstructive sleep apnoea (OSA) is prevalent in patients with hypertension (HTN). There is a lack of OSA screening in patients with HTN. Diagnosis and treatment of OSA in patients with HTN may improve blood pressure control and avoid complications of undiagnosed and untreated OSA. Hence, this study was conducted with the aim to screen OSA suspects in high risk groups of patients with hypertension using Stop Bang Questionnaire and Epworth sleepiness Scale (ESS).This was a cross sectional study carried out in OPD and IPD in Department of Respiratory Medicine, Lata Mangeshkar hospital, Hingna after obtaining approval from institutional ethics committee. Total 100 patients fulfilling the inclusion criteria were included after taking informed consent. The patients were screened according to ESS and Stop Bang Questionnaire. Out of 100, 53% of hypertensive patients were overweight / obese with mean BMI of 25.49 ± 5.43 kg/m^2. According to Stop bang questionnaire, 56% and 34% of patients had high risk and intermediate risk of OSA respectively with mean score of 4.69 ± 1.68. According to ESS, 61% patients had low probability of OSA, 15% patient on borderline and 24% abnormal patients with mean score of 8.38 ± 4.688. BMI along with stop bang score showed high probability of OSA which was statistically significant. Screening with Stop bang questionnaire and ESS is helpful for diagnosing OSA in case of strong clinical suspicion with high BMI. This will avoid complications of undiagnosed OSA in patients with hypertension.

Keywords: Obstructive sleep apnoea, Stop Bang Questionnaire, Systemic hypertension.

Introduction

Obstructive sleep apnea (OSA) though a common disorder but remains undiagnosed due to ignorance of symptoms and non-availability of polysomnography facility in most of the tertiary care institutes. These patients may present to physician/ Respiratory physician in advanced stages or with complications. OSA is characterized by repetitive episodes of upper airway collapse during sleep, resulting in interruption of airflow despite persistent respiratory efforts.[1] Hypertension is a major risk factor that can lead to severe complications of OSA.OSA is a secondary cause of hypertension,[2-7] and independently associated with target organ damage in hypertensive patients. The aim of the study was to screen OSA suspects in high risk group of patients with systemic hypertension using simple questionnaire even though, the two disorders are related a direct link between the two has not been established.[1-3] Furthermore, the specific physiological mechanisms underlying the association between OSA and systemic hypertension have not been identified.[8-10]

Materials and Methods

This study was carried out in OPD and IPD of Lata Mangeshkar Hospital, Nagpur after obtaining approval from institutional ethics committee. Inclusion criteria- Patients with systemic hypertension attending OPD and IPD in Lata Mangeshkar hospital were included after taking proper informed consent from the patients. The purpose of the study was properly explained to the patients.

Data Collection

Demographic data was collected from patients and the format of the same is given in the case study form. BMI (Body Mass Index) was calculated by the following formula

$$BMI = \frac{Weight\ in\ kilograms}{Height\ in\ meters}$$

Data regarding systemic hypertension like, systolic and diastolic blood pressure, duration of hypertension, time since when the patient has been taking treatment for hypertension, will be recorded. Symptoms suggestive of OSA will be recorded, following symptoms will be taken into account. The symptoms of the patients will be recorded and these patients will be screened according to the Epworth sleepiness scale,[3] and Stop Bang Questionnaire.[4]

Daytime Symptoms

Early morning headaches, daytime sleepiness, poor concentration, irritability, falling asleep during routine activities.

Night-time Symptoms

Loud persistent snoring, witnessed pauses in breathing, Choking or gasping for air, Restless sleep, Frequent visit to bathroom.

Results

In our study most of the patients are from middle age group which is economically productive age group. 56% of patients were in this age group. Table 1 shows the Age groups and the frequency of High Risk groups.

Table 1: Age group and frequency of high risk group

Age		
Age Group	**Frequency**	**Percent**
25-34	4	4.0
35-44	16	16.0
45-54	27	27.0
55-64	29	29.0
65-74	21	21.0
75-84	3	3.0
Total	100	100.0
Mean Age $\pm$ S.D.		54.93 $\pm$ 11.99

Systemic Hypertension is equally distributed among both genders in this study. Frequency of female patient is 49 and contributes or 49% whereas frequency of Male patients is 51 contributing 51%. In this cohort of hypertensive patients 53% of patient are having overweight/obesity by WHO (2000) with mean BMI of 25.49 standard deviation $\pm$ 5.43. Table 2 shows grading of weight as per WHO guidelines.

Table 2: BMI grading of patient as per WHO guideline

BMI		
	Frequency	**Percent**
Underweight	8	8.0
Normal	39	39.0
Overweight	36	36.0
Obesity 1	12	12.0
Obesity 2	3	3.0
Obesity 3	2	2.0
Total	100	100.0
Mean BMI $\pm$ S.D.		25.49 $\pm$ 5.43

Grading of hypertensive patient as per American Health Association criteria (2017) of systemic hypertensive patient are equally distributed among three classes of systemic hypertension is shown in Table 3.

Table 3: Grading of hypertensive patients as per AHA guidelines

Hypertension		
	Frequency	**Percent**
Stage 1	33	33.0
Stage 2	35	35.0
Hypertensive Crisis	32	32.0
Total	100	100.0

If BMI is considered along with Stop Bang Score and Epworth sleepiness scale it has high probability of OSA

which is statistically significant in this study (Table 4 and 5).

Table 4: Stop bang score and epworth scale

	Stop Bang Score (8)	**Epworth Scale (24)**
N	100	100
Mean	4.69	8.38
Std. Deviation	1.680	4.688

Body Mass Index Scores (BMI)
BMI scores of 53 patients was found to be high and that of 47 patients was normal.
Stop Bang Questionnaire Scores
Patients with systemic hypertension were subjected for stop bang questionnaire which suggests 56% of patients having high probability of OSA while 34% patients having intermediate probability with mean score of 4.69 standard deviation $\pm$ 1.68 (Fig. 1).
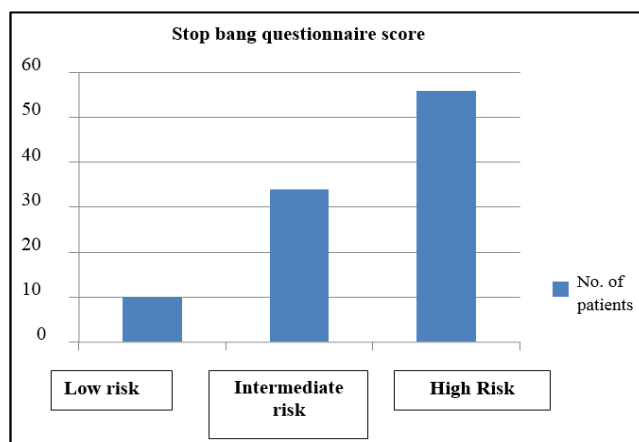

Fig. 1: Stop bang questionnaire score

Table 5: BMI along with stop bang questionnaire and Epworth sleepiness score

Group Statistics							
	BMI	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**	**T value**	**P value**
STOP BANG Score (8)	Underweight + Normal	47	4.11	1.760	0.257	-3.447	0.001
	Overweight +Obese	53	5.21	1.433	0.197		
Epworth Scale (24)	Underweight + Normal	47	7.98	4.513	0.658	-0.805	0.423
	Overweight +Obese	53	8.74	4.852	0.667		

Epworth Sleepiness Scale Score
Patients with systemic hypertension are subjected to Epworth Sleepiness Scale which suggest 61% patients having low probability of OSA 15% patient on borderline and 24% abnormal patients with mean score of 8.38 and standard deviation of ±4.688 (Fig. 2).
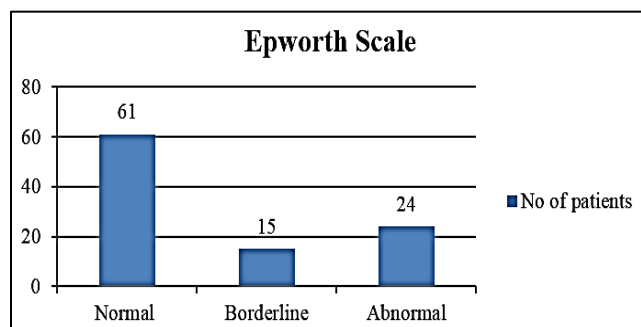

Fig. 2: Epworth sleepiness score

In our study most of the patients are from middle age group which is economically productive age group. 56% of patients were in this age group. Table 1 shows the Age Groups and the Frequency of High Risk groups. Systemic Hypertension is equally distributed among both genders in this study (Table 2). In this cohort of hypertensive patients 53% of patient are having overweight/obesity by WHO (2000) with mean BMI of 25.49 standard deviation ± 5.43. Table 3 shows grading of weight as per WHO guidelines. Grading of hypertensive patient as per American Health Association criteria (2017) of systemic hypertensive patient are equally distributed among three classes of systemic hypertension is shown in Table 4. If BMI is considered along with Stop Bang Score it has high probability of OSA which is statistically significant in this study.

Stop Bang Questionnaire Scores
Patients with systemic hypertension were subjected for stop bang questionnaire which suggests 56% of patients having high probability of OSA while 34% patients having intermediate probability with mean score of 4.69 standard deviation ± 1.68. (Fig. 1).

Epworth Sleepiness Scale Score
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Discussion
Obstructive sleep apnoea though a common disorder but remains undiagnosed due to ignorance of symptoms. OSA is characterised by repetitive episodes of upper airway collapse during sleep resulting in interruption of air flow despite persistent respiratory efforts. And hypertension is a major risk factors that can lead to severe complication of OSA. OSA often interacts and coexists with Obesity. The aim of this study is to screen OSA suspects in high risk groups of patient with hypertension using Stop Bang Questionnaire and Epworth sleepiness Scale. The study was conducted in tertiary health care centre and the patient having systemic hypertension was screened with Epworth Sleepiness Scale and Stop Bang Questionnaire. Body Mass Index was also calculated. Diagnosis of OSA is done by polysomnography (sleep study). However, there is less awareness of the disease among population. We have targeted high risk group that is systemic hypertension. In our study most of the patients were from middle age groups with sedentary lifestyle (56% patients). BMI was raised in 53% patients which is one of the risk factors for both OSA and systemic hypertension. We have screened these systemic hypertensive patients with stop bang questionnaire and Epworth apnea scale. BMI was considered with stop bang score and it shows high probability of OSA which is statistically significant in our study.

Limitation
ESS is one of the screening tool used in this study but set of question is not as per the local needs available. Extension of study is required to know exact prevalence of OSA after confirmation with polysomnography.

Conclusion
OSA is confirmed by subjecting patient to polysomnography in resource limited setting it is difficult to subject suspected patients of OSA to polysomnography hence screening of patients with stop bang questionnaire and ESS is helpful to some extent for diagnosis of OSA if there is strong clinical suspicion with high BMI. This in turn will help to avoid complications associated with undiagnosed OSA in a high risk group like systemic hypertension.

Conflict of Interest: None.

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