



Study of OSA in Chronic Obstructive Pulmonary Disease

Authors

N.N Ramraje¹, R.R.Hegde², P.L.Meshram³, J M Phadtare⁴

¹Professor and Head of Department, ^{2,3}Associate Professor, ⁴Professor

Department of Pulmonary Medicine, Grant Government Medical College, Mumbai-8

Corresponding Author

R.R.Hegde

Email: drgrhegde@gmail.com

Abstract

50 patients of COPD were screened for by symptomatology, history, clinical examination, Chest X ray & spirometry. The youngest subject was 30 yrs old and the oldest 75 years. In the study, 74% were males and 26% were females. Polysomnography was performed in these subjects. Patients were distributed as regards the severity of Obstructive Sleep Apnea (OSA). A linear relationship was found between Body Mass Index (BMI) and severity of OSA as also between neck circumference and severity of OSA. Occurrence of OSA in COPD was 42%

Keywords: Obstructive sleep apnea, COPD.

Introduction

Normal pattern of human sleep was first discovered by Davies, Harvey and Hobart in 1937-39. Prior to this, sleep was considered a passive state- an intermediate state between wakefulness and death. Today we know that sleep is an active and complex state. Herman Hans Berger recorded different electrical activities in the human brain during awake and sleep state in 1928. In 1949, Moruzzi and Magoun reasoned on the basis of electrical stimulation of the brain stem that its central core, the reticular formation contained element essential for arousal and consequently wakefulness. Asterinsky and Kleitman reported periods during sleep in which EEG resembled that of wakefulness. They also observed rapid eye movements during this stage that give this stage its name. Research of sleep has led to the staging of sleep and sleep related

disorders- of which Obstructive Sleep Apnea has generated maximum interest. Though Obstructive Sleep Apnea has been mentioned in literature since the time of Charles Dickens in his description of fat boy joe in The Posthumous papers of Pickwickian Club: it is only in the past 3 decades that this entity has been clinically defined. Sleep Disordered breathing is a common condition that is characterized by repetitive episodes of partial or complete upper airway obstruction during sleep. Sleep Related Breathing Disorder (SRBD) is common in vast majority of the population and is under-reported, under-diagnosed and under-treated. Population based epidemiological studies have uncovered a high prevalence of undiagnosed OSA and have consistently found that even mild obstructive sleep apnea is associated with significant morbidity. The term overlap syndrome was coined

in 1985 by David Flenley to describe patient having both Chronic Obstructive Pulmonary Disease and Obstructive Sleep Apnea. Co-existence of COPD and OSA is associated with a definite increase in morbidity and decrease in survival.

Materials and Methods

Amongst patients attending our OPD, 100 patients who were diagnosed as chronic obstructive pulmonary disease were selected and they underwent investigations like chest X-ray, pulmonary function test and polysomnography. Obstructive Sleep apnea was defined as Apnea hypopnea index (AHI) of more than 5/hour. The severity of OSA was graded as mild (AHI 5-14/hour), moderate (AHI 15-29/hour) and severe (AHI >or = 30/hour). The selected patients were studied for different variables in relation to the presence and severity of OSA. These patients were also evaluated on the basis of their morphological characteristics like Body mass Index (BMI) and neck circumference to see for any possible association with the disease.

All these variables were analyzed using SPS v13.0 software (Chicago, Illinois, Inc)

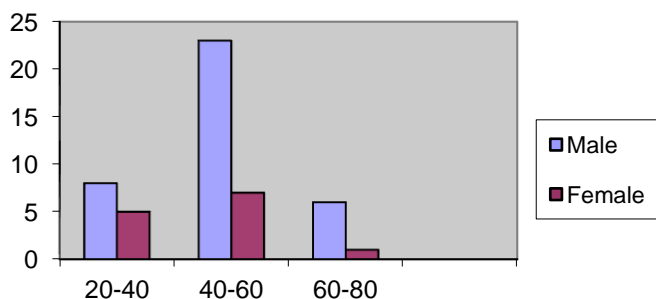
Results

Distribution

1. Age And Gender wise

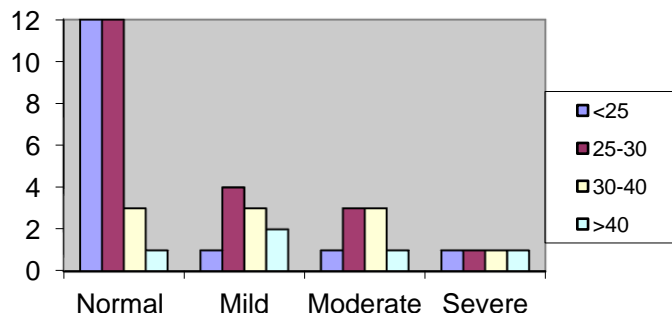
Of the 50 patients, 37 were male and 13 were females.

Age	Male	Female	Total
20-40	8	5	13
40-60	23	7	30
60-80	6	1	7
Total	37	13	50



2. BMI and severity wise

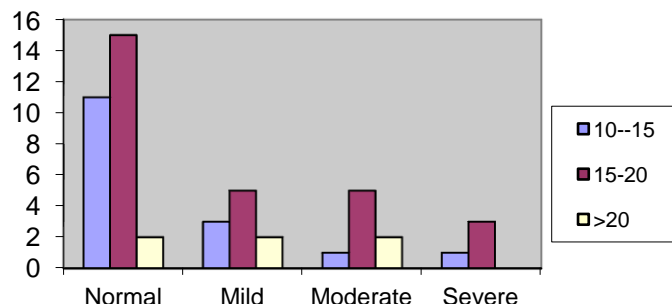
BMI	Normal	Mild	Moderate	Severe	Total
<25	12	1	1	1	15
25-30	12	4	3	1	20
30-40	3	3	3	1	10
>40	1	2	1	1	5
Total	28	10	8	4	50



As the BMI increases, severity of OSA increases

3 Neck Circumference and Severity wise

Neck Circumference	Normal	Mild	Moderate	Severe	Total
10-15	11	3	1	1	16
15-20	15	5	5	3	28
>20	2	2	2	0	6
Total	28	10	8	4	50



As the neck circumference increases, severity of OSA increases.

4. Severity wise occurrence of OSA in COPD

5. Respiratory Disease and Severity wise

Disease	Normal	Mild	Moderate	Severe	Total
COPD	29	9	8	4	50

Discussion

50 patients of COPD were included in the study. They were evaluated for sleep disordered breathing. This study provides data on the occurrence of OSA in COPD and its association with variety of potential factors such as Body Mass Index, Neck Circumference. A conventional measure of Apnea Hypopnea Index (AHI) was

used to define the presence of OSA. Various investigators have taken different levels of AHI cut off points of 5, 14 and 29 events per hour to indicate mild, moderate and severe levels of OSA. These recommendations were acknowledged to be an expert consensus statement based on a paucity of objective data and intended to stimulate further research to identify optimal approach to quantify sleep related breathing disorders. Out of 50 subjects included in the study, 37 were males and 13 were females. We found no sexual predilection conforming to other studies.⁽¹⁻⁵⁾

We used the correlation co-efficient test to establish a significant positive correlation between BMI and severity of OSA i.e as the BMI increases, the AHI increases. Guilleminault et al in their study found a clear relationship between excess body weight expressed as BMI and severity of OSA which corroborates with our study⁽⁶⁾. Similarly we used correlation co-efficient test to establish a linear correlation between neck circumference and severity of OSA. Anthropometric evaluation in the form of neck circumference was also found to be a good predictor of OSA. RJ Davies et al⁽⁷⁾ and Pineda et al⁽⁸⁾ showed that neck circumference corrected for height is more useful as a predictor of obstructive sleep apnea than general obesity. Occurrence of OSA in COPD was 42% in our study. Soler X et al found that 65% of moderate to severe COPD had OSA⁽⁹⁾.

Conclusions

Incidence of OSA is more in COPD and hence whenever these patients have symptoms of OSA, should undergo sleep study.

A linear relationship was found between Body Mass Index (BMI) and severity of OSA as also between neck circumference and severity of OSA.

References

1. J Respir Dis 2005; 26:423-35
2. J Asthma 2003 Dec; 40(8):865-71 Ygla M, Tov N, Solomonov A, Rubin AH, Harlev D

Division of Pulmonary Medicine, Rambam Medical centre, Faculty of Medicine, Technion-Israel institute of Technology, Haifa, Israel.

3. Pneumologie. 1989 Nov; 43 Suppl 1:600-2. Jackowski M, Fischer J, Korner K, Dahmen K.
4. Indian J Chest Diseases Allied Sci. 1997 Jul-Sep; 39(3):157-62. Hira HS, Sharma RK, Department of Medicine, Maulana Azad Medical College, New Delhi.
5. Gastaut H, Tassinari C, Duran B. Etude Polygraphique des manifestations episodiques (hypniques et respiratoires) du syndrome de pickwickian. Rev Neurol 1965; 112:568-579
6. Guilleminault C, Stoohs R. The upper airway resistance syndrome. Sleep research 1991; 20:250.
7. RJ Davies, NJ Ali et al Neck circumference and other clinical features in the diagnosis of the obstructive sleep apnea syndrome. Thorax. 1992 February; 47(2): 101-105.
8. Eldrige Pineda, MD; Daniel Fitelson, MD; Joseph Rahill, MD; Anne O'Donnell, MD; Tunay Kuru, MD; Richard Waldhorn, MD; Timothy Ruse, MD: Assessing the Adjusted Neck Circumference Sleep Apnea Screening Score in Patients Undergoing Polysomnography for Suspected Sleep Apnea : *Chest*. 2011; 140(4_MeetingAbstracts):812 A. doi:10.1378/chest.1119543
9. Soler X, Gaio E, Powell FL, Ramsdell JW, Loreda JS, Malhotra A, Ries AL. High Prevalence of Obstructive Sleep Apnea in Patients with Moderate to Severe Chronic Obstructive Pulmonary Disease. *Ann Am Thorac Soc*. 2015 Aug; 12(8):1219-25. doi: 10.1513/AnnalsATS.201407-336OC.