



## COPD-OSA "THE OVERLAP SYNDROME"

Dr. Sanjay. S

M.D (PULMONARY MEDICINE) Assistant Professor, Shri Dharmasthala Manjunatheswara Medical College &amp; Hospital, Dharwad, Karnataka

**ABSTRACT**

**BACKGROUND:** Obstructive sleep Apnea(OOSA) & chronic obstructive pulmonary disease (COPD) are among the most common pulmonary diseases. Aim of the study: was to study the prevalence of OSA in COPD & to evaluate the quality of sleep in patients with overlap syndrome.

**MATERIALS & METHODS:** 25 clinically stable patients of COPD were recruited for the study, they were classified based on GOLD classification & polysomnography study was conducted in these patients. **RESULTS:** Majority of the patients were in the age group of 51-70 years. Prevalence of OSA was seen in 12% of the patients. Sleep disturbance was more severe in patients with overlap syndrome as compared to COPD alone.

**CONCLUSION:** Overlap syndrome is not a rare condition, due to high prevalence of both COPD & OSA. Patients with overlap syndrome have more sleep related disturbances than COPD alone.

**KEYWORDS :** COPD, OSA, POLYSOMNOGRAPHY**INTRODUCTION**

OSA(Obstructive Sleep Apnea) is a common disorder affecting atleast 2-4% of adult population. The signs, symptoms and consequences of OSA are a direct result of derangements that occur due to repetitive collapse of upper airway – sleep fragmentation, hypoxemia, hypercapnia, marked swings in intrathoracic pressure and increased sympathetic activity. Clinically OSA is defined by the occurrence of daytime sleepiness, loud snoring, witnessed breathing interruptions or awakenings due to gasping or choking in the presence of atleast 5 obstructive events (apnea, hypopnea, RERA) per hour sleep. The presence of 15 or more obstructive events per hour of sleep in the absence of sleep related symptoms.(1)

The coexistence of COPD and obstructive sleep apnea was first described as the "Overlap Syndrome" by David Flenley almost 30 years ago. Patients with overlap syndrome have an increased risk of developing hypercapnic respiratory failure & pulmonary hypertension when compared to patients with OSA or COPD alone. COPD and OSA are independent risk factors for cardiovascular events and their coexistence in overlap syndrome probably increases this risk. (2).

The prevalence of OSA is not greater in COPD patients compared with the non-COPD population. Nevertheless some predisposing factors such as age, active smoking, peripheral edema and oral corticosteroids, increase the risk of obstructive apnea events.

**MATERIALS & METHODS**

The present study was conducted from August 2012 to September 2013 in Kamla Nehru Chest Hospital, Dr S N Medical College, Jodhpur, a tertiary care centre for respiratory diseases in western part of Rajasthan. This study was a prospective cross sectional study in 25 patients with COPD. Patients of all ages either admitted or attending the Outpatient Clinic of the Department of Tuberculosis & Respiratory Diseases of our Hospital, who presented with signs, symptoms and history suggestive of COPD and willing to participate in the study were enrolled after proper counselling. The protocol was explained to the patient/care provider before enrolment and informed consent was taken from each patient. All patients underwent a complete clinical workup & also spirometry & classified as per GOLD 2011 guidelines. Those who had acute exacerbation of COPD in 4 weeks prior, history of depression or had other chronic systemic illness like malignancy, diabetes mellitus and coronary artery disease, renal or hepatic disease were excluded from the study. All the patients underwent attended nocturnal polysomnography (Level 1) at their approximate routine sleeping hours. The patients were asked to report to sleep lab at 9:00pm after taking consent they were explained what each sensor measures & then hooked to RMS Quest 32 polysomnograph machine. Sleep variables including total sleep time (TST) and sleep efficiency (SE), Sleep architecture (percentage of TST in various stages of sleep), AHI (Apnea Hypopnea Index), Decrease in oxyhemoglobin saturation tabulated as percentage of sleep time at SaO<sub>2</sub> <90% were tabulated. Nocturnal desaturators were defined as subjects with SPO<sub>2</sub> <90% on atleast >5% of TST (Total sleep time)(3).

**DATAANALYSIS**

Statistical Package for Social Sciences version 17.0 (SPSS Inc, Chicago, IL) was used for data analysis. A P value of less than 0.05 was considered as significant.

**RESULTS****TABLE 1 AGE WISE DISTRIBUTION OF PATIENT IN THE STUDY**

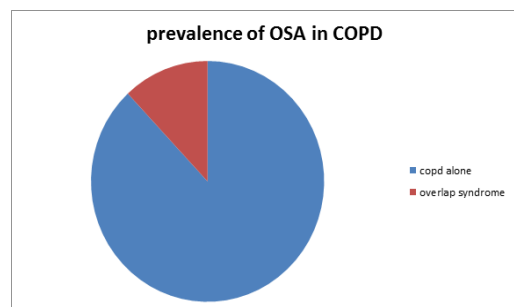
AGE GROUP (YEARS)	NUMBER OF PATIENTS	PERCENTAGE
≤40	1	4
41-50	6	24
51-60	7	28
61-70	10	40
71-80	1	4
TOTAL	25	100

This table shows that maximum number of patients were in the age group of 61-70yrs (40%), followed by 51-60yrs (28%)

**TABLE 2 PATIENT DISTRIBUTION ACCORDING TO GOLD STAGING OF COPD**

GOLD STAGE	NO. OF CASES	PERCENTAGE
STAGE I	5	20
STAGE II	13	52
STAGE III	7	28
STAGE IV	0	0
TOTAL	25	100

80% of the patients were suffering from moderate to severe COPD, Mild COPD was seen in 5 patients (20%), None of the patients belonged to very severe group.

**TABLE 3**

Prevalence of OSA in COPD (Overlap syndrome) was 3 (12%) in our study & all the 3 had mild OSA.

**TABLE 4 COMPARISON OF SLEEP PARAMETERS INVOLVED IN INITIATION & MAINTAINENCE OF SLEEP IN PATIENTS WITH ONLY COPD & OVERLAP SYNDROME**

PARAMETERS	COPD (N=22)		OVERLAP (N=3)		TESTS APPLIED			
SLEEP EFFICIENCY	<50	0	Mean±2SD (73.68±15.24)	0	Mean±2SD (55±5.28)	t-test		
	50-60	1		3		t	DOF	P
	61-70	8		0		8.375	8.105	<0.001
	71-80	8		0				
	>80	5		0				
TST (total sleep time)	<100	0	Mean±2SD (291.8±63.88)	0	Mean±2SD (213.3±23.08)	t-test		
	100-200	0		1		t	DOF	P
	201-300	14		2		4.153	23	<0.001
	>300	8		0				
SOL (sleep onset latency)	<10	0	Mean±2SD (23.22±16.54)	0	Mean±2SD (20.8±9.8)	t-test		
	10-20	9		2		t	DOF	P
	21-30	8		1		0.484	23	0.633
	>30	5		0				
ROL (REM onset latency)	<90	8	Mean±2SD (97.18±25.66)	0	Mean±2SD (95±10.38)	t-test		
	90-100	6		2		t	DOF	P
	>100	8		1		0.287	23	0.777
AHI(Apnea Hypopnea index)	<5	22	Mean±2SD (1.73±3.46)	0	Mean±2SD (11.76±5.16)	t-test		
	5-15	0		3		T	DOF	P
	15-30	0		0		-8.933	23	<0.001
	>30	0		0				

The above table shows that the mean sleep efficiency and Total sleep time were lower in patients with overlap syndrome which was statistically significant. However no significant difference was seen in sleep onset latency and REM onset latency between the 2 groups.

**TABLE 5 COMPARISON OF NOCTURNAL SATURATION VARIABLES IN PATIENTS WITH COPD AND OVERLAP SYNDROME**

PARAMETERS	COPD (N=22)		OVERLAP (N=3)		TESTS APPLIED			
DESATURAT ION INDEX	<5	7	Mean±2SD (9.55±12.28)	0	Mean±2SD (22.43±5.2)	t-test		
	5-15	10		0		T	DOF	P
	16-25	5		3		-3.53	23	<0.01
	>25	0		0				
%TST SPO2<90%	<5	8	Mean±2SD (6.22±7.68)	0	Mean±2SD (22.1±1.92)	t-test		
	5-15	14		0		T	DOF	P
	>15	0		3		-7.004	23	<0.001
	71-80	8		0				
	81-90	6		0				
	>90	2		0				

The above table shows that patients with overlap syndrome had statistically significant higher degree of desaturation as compared to patients with COPD alone.

**TABLE 6 COMPARISON OF SLEEP STAGES IN PATIENTS WITH COPD AND OVERLAP SYNDROME**

PARAMETERS	COPD (N=22)		OVERLAP (N=3)		TESTS APPLIED			
AWAKE	<5	8	Mean±2SD (5.68±5.82)	0	Mean±2SD (8±7.2)	t-test		
	5-10	12		2		t	DOF	P
	>10	2		1		-1.262	23	0.219
STAGEI	<5	5	Mean±2SD (12.77±20.24)	1	Mean±2SD (16±17.48)	t-test		
	5-10	6		0		T	DOF	P
	11-15	3		1		-0.500	23	0.622
	16-20	2		0				
STAGEII	<45	3	Mean±2SD (52.45±15.92)	1	Mean±2SD (47.33±11.36)	t-test		
	45-55	12		2		T	DOF	P
	56-65	7		0		1.067	23	0.297
	>65	0		0				
STAGEIII	≤10	16	Mean±2SD (8.86±7.76)	3	Mean±2SD (7±4)	t-test		
	11-20	6		0		t	DOF	P
	>20	0		0		0.806	23	0.428
STAGEIV	<10	17	Mean±2SD (6.63±6.56)	2	Mean±2SD (8.66±6.1)	t-test		
	10-15	5		1		t	DOF	P
	>15	0		0		-1.009	23	0.323
REM	<20	18	Mean±2SD (11.22±14.18)	3	Mean±2SD (11.66±8.32)	t-test		
	20-25	4		0		t	DOF	P
	>25	0		0		-0.104	23	0.918

There was no stastically significant difference in the stages of sleep between the 2 groups.

**DISCUSSION**

The mean AHI (Apnea Hypopnea Index) of the study group was 2.9

and three patients exhibited an index higher than 5, characterizing OSA & all 3 belonged to mild OSA group. Thus, we obtained a 12% of the sample with the so-called overlap syndrome, Studies from Chaouat et al 1995<sup>(4)</sup> also showed similar results.

Patients with overlap syndrome had statistically significant lower sleep efficiency, Total sleep time and higher nocturnal desaturation as compared to patients with COPD alone. Studies from Chaouat et al<sup>(4)</sup> showed similar observations.

Limitations of our study :-

1. Sample size of the study group was small in number.
2. Airflow was measured using thermal sensors which might miss around 25-50% of apneic episodes as compared to gold standard i.e esophageal manometry.

## CONCLUSION

COPD is one of the most prevalent illness, affecting millions of people worldwide. Overlap syndrome is not rare condition, due to high prevalence of both COPD and OSA. Patients with overlap syndrome have a more important sleep related oxygen desaturation than patients with COPD alone. Overnight oximetry should be considered in most individuals with COPD, irrespective of whether they have symptoms of sleep disruption, to exclude significant overnight desaturation that may be associated with overlap syndrome and polysomnography can be considered in these patients. Thus presence of sleep apnea is acknowledged as a comorbidity in COPD patients, and the patients should be asked about sleep disruption during follow-up visits.

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