



## Retrospective Study of Frequency of Pulmonary Hypertension in Chronic Obstructive Pulmonary Disease (COPD)"

## KEYWORDS

Pulmonary Hypertension, COPD

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**ABSTRACT** *OBJECTIVE:* Pulmonary hypertension (PH) is a common complication of chronic obstructive pulmonary disease (COPD) which is associated with reduced survival<sup>1,2</sup>. This study was designed to investigate the frequency of PH in COPD patients.

*METHODOLOGY:* This study was conducted in SKN Medical College & General Hospital, Pune from 1st FEB. 2014 to 15th OCT. 2014. This study included 34 clinically stable COPD male and female patients. This was a retrospective descriptive study.

*RESULTS:* A total of 34 patients were included in the study. The age range was 40-86 years. The mean age was 63 years. There were 62% male and 38% females in the study. Pulmonary hypertension (PH) was present in 53% patients with sub classification of mild PH 23%, moderate PH 18% and severe PH 12%.

*CONCLUSION:* This study shows high prevalence of pulmonary hypertension in clinically stable COPD in this area.

**INTRODUCTION:** Chronic obstructive pulmonary disease (COPD) is an important cause of death and disability worldwide<sup>1,2</sup>. COPD being defined by GOLD Guidelines is a preventable and treatable disease with some significant extra pulmonary effects. Among the extra pulmonary effects heart is very commonly affected by COPD sometimes even leading to hospitalization. COPD can affect pulmonary blood vessels, right side of the heart and may be left side of the heart leading to pulmonary hypertension, cor pulmonale, tricuspid regurgitation and left ventricular dysfunction respectively. 2D echocardiography & Doppler is the simplest method to evaluate the cardiac function. It helps in diagnosis of many structural & functional abnormalities of heart<sup>3,4</sup>. Some of the studies have shown pulmonary hypertension and cor pulmonale frequently found in COPD patients, both of which are associated with decreased survival<sup>3,6</sup>. Our study is an effort to look for frequency of PH in COPD patients presenting to our hospital.

**MATERIALS & METHODS:** This retrospective study was conducted in of SKN Medical College & General Hospital, Pune from 1st FEB. 2014 to 15th OCT. 2014. This study included 34 clinically stable COPD male and female patients. This was a retrospective descriptive type of study.

### Inclusion Criteria:

All diagnosed clinically stable COPD patients admitted in the hospital.

### Exclusion Criteria:

1. Patients with suboptimal echo study because of any reason.
2. Clinically unstable patients.
3. Patients with other co morbidities like chest wall deformity, bronchiectasis, pulmonary fibrosis, lung cancer, sleep apnea, obesity (BMI more than 35), & primary cardiac illness were excluded.

Subjects were chosen from the inpatients of the wards of the our hospital. A retrospective review was conducted on COPD patients who had undergone echocardiography for the evaluation of pulmonary hypertension from 1st FEB. 2014 to 15th OCT. 2014. All patients were clinically stable. Patients were diagnosed on the basis of detailed clinical evaluation and spirometry (FEV1/FVC less than 70% and FEV1 less than 80% predicted)<sup>3,4</sup>. 2D echocardiography with Doppler study was performed for all patients. The gradient of tricuspid regurgitation was measured by Doppler echo at rest. The simplified Bernoulli's equation was used to calculate pulmonary artery systolic pressure (PASP). Systolic PAP (mmHg) =  $4 \times V^2 +$  right atrial mean pressure ( $V =$  TR max velocity). Right atrial pressure is estimated to be 5 mmHg when the diameter of inferior vena cava is  $< 1.7$ cm and  $> 50\%$  decrease in the diameter with inspiration, 10mmHg when IVC is  $> 1.7$ cm with a normal inspiratory collapse  $> 50\%$ , and 15 mmHg when IVC is  $> 1.7$ cm and inspiratory collapse is  $< 50\%$ <sup>4</sup>. Patients are said to have pulmonary hypertension when pulmonary artery systolic pressure (PASP) is more than or equal to 35 mm Hg<sup>3</sup>. Patients were categorized into mild (PASP=35-50), moderate (PASP=50-70) and severe PH (PASP $>$ 70)<sup>3</sup>. Statistical analysis was done using suitable statistical tests like t test, Chi-squared test, etc.

**RESULTS:** A total of 34 patients were included in the study. The age range was 40-86 years. The mean age was 63 years. There were 21 male and 13 females in the study with ratio 1.6:1. Pulmonary arterial hypertension (PH) was present in 18 patients out of these 18 cases with mild PH patients were 8 (23%), moderate PAH 06(18%) and severe PAH 4(12%) . PH was more in male (11) as compared to females (07) patients. Maximum number of PH and cor pulmonale patients were in the age range of between 50 and 65 years.

**TABLE I: SEVERITY WISE DISTRIBUTION OF PH IN COPD PATIENTS**

	NO PH	MILD PH	MODERATE PH	SEVERE PH
MALE	10	4	4	3
FEMALE	06	4	2	1
TOTAL	16 (47%)	8 (23%)	6 (18%)	4 (12%)

**DISCUSSION:** Pulmonary hypertension (PH) and cor pulmonale are important complications in the natural history of chronic obstructive pulmonary disease (COPD). Its presence is associated with adverse mortality & morbidity. The association between COPD & PH is well recognised, the exact nature of this association remains obscure. Theoretical possibilities include destruction of the pulmonary vascular bed, loss of elastic recoil of the pulmonary vessels, hypoxic constriction of the muscular pulmonary arteries, increased alveolar and intrathoracic pressure secondary to airways obstruction, and hyperplasia & hypertrophy of the vessel intima and media<sup>4,7</sup>. The exact prevalence of PH in patients with COPD is unclear. The routine investigation of PH is difficult in all COPD patients due to non availability of right heart catheterization in many centers. Estimates of the prevalence of PH in patients with COPD vary widely. The literature on the prevalence of PH in COPD is confounded by several limiting factors. Studies were different

each other from definition of PH to study condition (i.e. rest, exercise), severity of diseases and the methods used to determine pulmonary pressures. The true prevalence of PH in patients with mild or moderate COPD is not exactly known due to absence of large epidemiologic studies<sup>5,6</sup>. Direct measurements of PAP obtained at right-heart catheterization have been conducted only in small series of patients with mostly severe COPD. Most studies have reported a prevalence of PH in COPD to be between 30 % and 70 %. Severe PH is uncommon in COPD and typically is associated with less severe respiratory function compromise. This "severe" PH is "disproportionate" to the degree of airflow limitation in some cases. Patients with this condition are important to identify because they may be expected to have significant clinical compromise from the PH<sup>5</sup>. Severe pulmonary hypertension increases right ventricular afterload and eventually leads to the clinical syndrome of right heart failure with systemic congestion<sup>1,5</sup>. The prevalence of PH and Cor pulmonale shown by Naeiji R et al was less than 10% in severe COPD patients<sup>6</sup>. In contrast to our data Rashke K et al has shown total prevalence of PAH and cor pulmonale as 80%<sup>8</sup>.

**CONCLUSION:** This study shows high prevalence of pulmonary hypertension in patients of clinically stable COPD in this area.

**REFERENCE**

1. Robert Naeije, "Pulmonary Hypertension and Right Heart Failure in Chronic Obstructive Pulmonary Disease", Proc Am Thorac Soc Vol 2. pp 20-22, 2005. | 2. J L Wright, R D Levy, A Churg, "Pulmonary hypertension in chronic obstructive pulmonary disease: current theories of pathogenesis and their implications for treatment", Thorax 2005;60:605-609. | 3. N. K. Gupta, R. K. Agrawal, A. B. Shrivastav, M. L. Ved, "Echocardiographic evaluation of heart in COPD patient & its correlation with the severity of disease", Lung India, vol 28, issue 2 apr-june 2011, 105-109 | 4. Bunyamin Sertogullarindan, Hasan Ali Gumrukuoglu, Cengizhan Sezgi, Mehmet Ata Akil, " Frequency of Pulmonary Hypertension in Patients with COPD due to Bio-mass Smoke and Tobacco Smoke", Int. J. Med. Sci. 2012, 9 | 5. Chaouat A, Naeije R, Weitzenblum E, " Pulmonary hypertension in COPD", Eur Respir J. 2008 Nov;32(5):1371-85. doi: 10.1183/09031936.00015608. | 6. Robert Naeije and Joan A Barbera, "Pulmonary hypertension associated with COPD", Crit Care. 2001; 5(6): 286-289. | 7. F MAGEE, J L WRIGHT, B R WIGGS, P D PARE, J C HOGG, "Pulmonary vascular structure and function in chronic obstructive pulmonary disease", Thorax 1988;43:183-189. | 8. Roshke K, Orth M, Kushcha M, Dushna HW. Pulmonary diseases and heart function. Internist(Berl).2007;48(3):276-82. |