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Pulmonology

FREQUENCY AND CLINICAL PROFILE OF PULMONARY HYPERTENSION IN PATIENTS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT **Introduction:** Chronic obstructive pulmonary disease (COPD) is often complicated by pulmonary hypertension (PH), which worsens symptoms, functional capacity, and prognosis. Early detection of PH in COPD patients is important for timely assessment and management.

Aims and objectives:

To study ,

1. Frequency of pulmonary hypertension in patients of COPD.
2. Clinical manifestations of pulmonary hypertension.

Methods: This prospective observational study included 109 patients aged >40 years with spirometry-confirmed COPD. COPD severity was classified by GOLD criteria. All patients underwent 2D echocardiography and 6-minute walk test for assessment of pulmonary hypertension and functional status. Patients with significant cardiac disease, autoimmune disease, HIV infection, or refusal of consent were excluded. **Results:** Pulmonary hypertension was detected in 68 of 109 patients (62.4%). Of these, 41 patients had mild PH (37.6%), 11 had moderate PH (10.1%), and 16 had severe PH (14.7%). The severity of PH increased with worsening COPD stage. Echocardiographic parameters such as RVSP, MPAP, RAP, and TR velocity showed a progressive rise with increasing PH severity, while TAPSE decreased. Structural abnormalities including right atrial enlargement, right ventricular enlargement, interventricular septal flattening, pericardial effusion, and right ventricular dysfunction were more frequent in moderate and severe PH.**Conclusion:** Pulmonary hypertension is common in COPD and is associated with worsening disease severity and significant right heart changes. Routine cardiac evaluation, especially echocardiography, should be considered in all COPD patients for early detection of PH and better prognostic assessment

KEYWORDS : Chronic obstructive pulmonary disease (COPD), Pulmonary hypertension, Echocardiography, Right ventricular dysfunction

INTRODUCTION

COPD is a heterogeneous lung condition characterized by chronic respiratory symptoms due to abnormalities of the airways and/or alveoli that causes persistent,often progressive, airflow obstruction[1]. Pulmonary Hypertension is a lung disorder,in which the arteries carrying blood from the heart to lungs become narrowed,making it difficult for blood to flow through the vessels.

Pulmonary hypertension has been defined as an increase in mean arterial pressure >25mmHg at rest or >30mmHg with exercise[2].The features of pulmonary hypertension develops if >50% reduction of pulmonary vascular bed or >2/3rd of lung reduction is present.

The abnormal high pressure strains the right ventricle of the heart, causing it to expand in size.

Overworked and enlarged right ventricle gradually becomes weaker and loses its ability to pump enough blood to the lungs leading to the development of right heart failure. Clinical profile of PH is always the initial anticipation which consists of clinical examination , 6MWT , and a comprehensive Echo cardiogram where necessary.

Aim and Objectives

To study ,

a. Frequency of pulmonary hypertension in patients of COPD.
b. Clinical manifestations of pulmonary hypertension.

Materials and methods

This prospective observational study was conducted in Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation.

Study Design: Prospective observational comparative study.

Study Setting: Department of Respiratory Medicine [Dr.PSIMS & RF].

Sample Size: 109 patients

Inclusion criteria:

a. Established cases of COPD.
b. Age > 40years are included.

Exclusion criteria:

a. Patients denying consent.
b. Patients with Left sided heart failure,Autoimmune disease,HIV infections,Congenital heart disease, Ischemic heart disease.

Results

A total of 109 patients with of pulmonary hypertension in chronic obstructive pulmonary disease were analyzed.

Table 1: Prevalence and severity of pulmonary hypertension in COPD patients

Variable	Number (n=109)	Percentage (%)
Normal (no pulmonary hypertension)	41	37.6%
Pulmonary hypertension	68	62.4%
a.Mild	41	37.6%
b.Moderate	11	10.1%
c.Severe	16	14.7%

Table 2: Association of pulmonary hypertension with COPD stage

COPD stage	Normal (n=41),n (%)	Mild (n=41),n (%)	Moderate (n=11),n (%)	Severe (n=16),n (%)

A	29 (70.7)	22(53.6)	2 (18.1)	0
B	11(26.8)	19 (46.3)	9 (81.8)	0
E	1 (2.4)	0	0	16 (100.0)

Table 3: Association of pulmonary hypertension with 2D ECHO parameters. Mean+/-SD

Findings	Normal (n=41)	Mild (n=41)	Moderate (n=11	Severe (n=16)
RVSP	-	37.5 +/- 1.2	48.3 +/- 2.0	68.3 +/- 4.6
MPAP	-	24.8 +/- 0.6	31.5 +/- 1.2	44.0 +/- 2.8
RAP	-	5.3 +/- 0.6	10.0 +/- 0.0	15.1 +/- 0.3
TR Velocity	-	2.9 +/- 0.0	3.1+/- 0.1	3.6+/- 0.2
TAPSE	1.6 +/- 0.2	1.5 +/- 0.3	1.0 +/- 0.3	0.9 +/- 0.1

Association of pulmonary hypertension with 2D ECHO IN mild moderate and severe disease .

Moderate PH: All patients had RA and RV enlargement. RV dysfunction was present in 54.5%. RVSP, MPAP, RAP and TR velocity were increased, while TAPSE was reduced, indicating early right ventricular dysfunction.

Severe PH: RA enlargement, RV enlargement and RV dysfunction were present in all patients. Small left chamber, interventricular septal flattening and pericardial effusion were more common. RVSP, MPAP, RAP and TR velocity were markedly elevated, with further reduction in TAPSE, reflecting advanced right ventricular impairment.

Thus, increasing severity of PH was associated with progressive right heart enlargement, worsening RV function and higher pulmonary artery pressures.

DISCUSSION :

Pulmonary hypertension (PH) is a frequent and clinically significant complication in patients with chronic obstructive pulmonary disease (COPD), contributing substantially to exercise limitation, recurrent exacerbations, reduced quality of life, and increased mortality.

In the present study, the majority of patients with COPD-associated PH were elderly males with a significant smoking history. This observation is consistent with the known epidemiological profile of COPD reported in previous Indian and international studies, where smoking remains the predominant risk factor for both COPD and secondary pulmonary hypertension.

The frequency of pulmonary hypertension was observed to increase with increasing severity of COPD according to GOLD classification.Similar observations have been reported in earlier studies by Chaouat et al. and Oswald-Mammosser et al., who demonstrated that worsening airflow obstruction and chronic hypoxemia are strongly associated.

Dyspnea was the most common presenting symptom among patients with COPD and PH in the present study. Clinical signs such as raised jugular venous pressure, loud pulmonary component of second heart sound, peripheral edema, and features of right heart failure were more common among patients with moderate to severe PH. These findings correlate with previous studies which have shown that pulmonary hypertension The present study also demonstrated a significant association between hypoxemia and pulmonary hypertension. Patients with lower oxygen saturation and reduced six-minute walk distance were more likely to have PH.

Echocardiography served as a useful non-invasive screening tool for detecting pulmonary hypertension in the present study. Although right heart catheterization remains the gold standard for diagnosis of PH, echocardiography is widely used in clinical practice.

The findings of the present study emphasize that pulmonary hypertension is not uncommon in COPD patients and its prevalence increases with disease severity.Therefore, routine screening for pulmonary hypertension should be considered in patients with severe COPD.

However, the study has certain limitations. The sample size was relatively small and the diagnosis of pulmonary hypertension was based on echocardiography rather than right heart catheterization.

CONCLUSION:

Pulmonary hypertension in COPD was significant ,therefore every COPD patient should be evaluated for PH. The patient population at risk , benefit by the application of the results of this study.

Our study put emphasises on early cardiac screening of all COPD patients which will be helpful in the assessment of prognosis, morbidity, and mortality.

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