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Original Research

Echocardiographic findings in patients with COPD

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ABSTRACT:

Background: According to GOLD, COPD is a frequent clinical entity in clinical practice and is a preventable and treated disease with notable extrapulmonary consequences. The present study was conducted to assess echocardiographic findings in patients with COPD. **Materials & Methods:** 70 COPD patients of both genders were selected. All patients had pulmonary function tests, which were assessed using the Global Initiative for Obstructive Lung Disease (GOLD) standards based on the severity of COPD. **Results:** Out of 70 patients, 46 were males and 24 were females. Symptoms were breathlessness in 62, cough with sputum in 51, fever in 46, swelling of feet in 38 and decreased urinary output in 19. Signs were raised JVP in 63, tachypnea in 51, Loud P2 in 46, ascites in 21, pedal edema in 25 and cyanosis in 36 cases. The difference was significant (P< 0.05). ECG findings were Cor pulmonale (31), LVDD (25), RVH (7), PAH (5), RA/RV dilatation (12), RVSD (14) and LVH (8). There was significant association between echocardiographic findings with severity of COPD (P< 0.05). **Conclusion:** COPD patients have a significant prevalence of cardiac co-morbidities, including PAH, RV dysfunction, and LV dysfunction.

Key words: chronic obstructive pulmonary disease, LV dysfunction, echocardiograph

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INTRODUCTION

According to GOLD, COPD is a frequent clinical entity in clinical practice and is a preventable and treated disease with notable extrapulmonary consequences.[1] Among the world's top causes of death and disability is COPD. It was the fourth most common cause of death and illness in 2000, but it is now the third and fifth leading causes of death and morbidity, respectively, according to World Bank data.[2]

Significant morbidity and mortality in chronic obstructive pulmonary disease (COPD) are caused by cardiovascular disease. Its incidence and connection mechanisms remain unclear.[3] Emphysema, an anatomical condition marked by the destruction and enlargement of the lung alveoli; chronic bronchitis, a clinical condition marked by persistent coughing and phlegm; and small airway disease, a condition in which small bronchioles are narrowed, are all included in the category of chronic obstructive pulmonary disease (COPD).[4] In addition to left ventricular dysfunction, COPD is a strong and independent risk factor for cardiovascular morbidity and mortality, which includes right ventricular (RV) dysfunction and cor pulmonale due to pulmonary arterial hypertension (PAH). A quick, non-invasive, portable, and precise way to assess heart functioning is by echocardiography.[5]The present study was conducted to assess echocardiographic findings in patients with COPD.

MATERIALS & METHODS

The present consisted of 70 COPD patients of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Spirometry was used to validate the clinical diagnosis of COPD in the patients. A thorough clinical assessment was conducted. Breathlessness, coughing, the type and daily fluctuations in expectoration, and the intensity of dyspnea were among the symptoms noted. All patients had pulmonary function tests, which were assessed using the Global Initiative for Obstructive Lung Disease (GOLD) standards based on the severity of COPD. To assess the degree of RV dysfunction, a 12-lead ECG, a 2-D echo, and a chest x-ray were performed. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 70		
Gender	**Males**	**Females**
Number	46	24

Table I shows that out of 70 patients, 46 were males and 24 were females.

Table II Evaluation of clinical features

Parameters	Variables	Number	P value
Symptoms	Breathlessness	62	0.05
	Cough with sputum	51	
	Fever	46	
	Swelling of feet	38	
	Decreased urinary output	19	
Signs	Raised JVP	63	0.81
	Tachypnea	51	
	Loud P2	46	
	Ascites	21	
	Pedal edema	25	
	Cyanosis	36	

Table II, graph I shows that symptoms were breathlessness in 62, cough with sputum in 51, fever in 46, swelling of feet in 38 and decreased urinary output in 19. Signs were raised JVP in 63, tachypnea in 51, Loud P2 in 46, ascites in 21, pedal edema in 25 and cyanosis in 36 cases. The difference was significant (P< 0.05).

Graph I Evaluation of clinical features

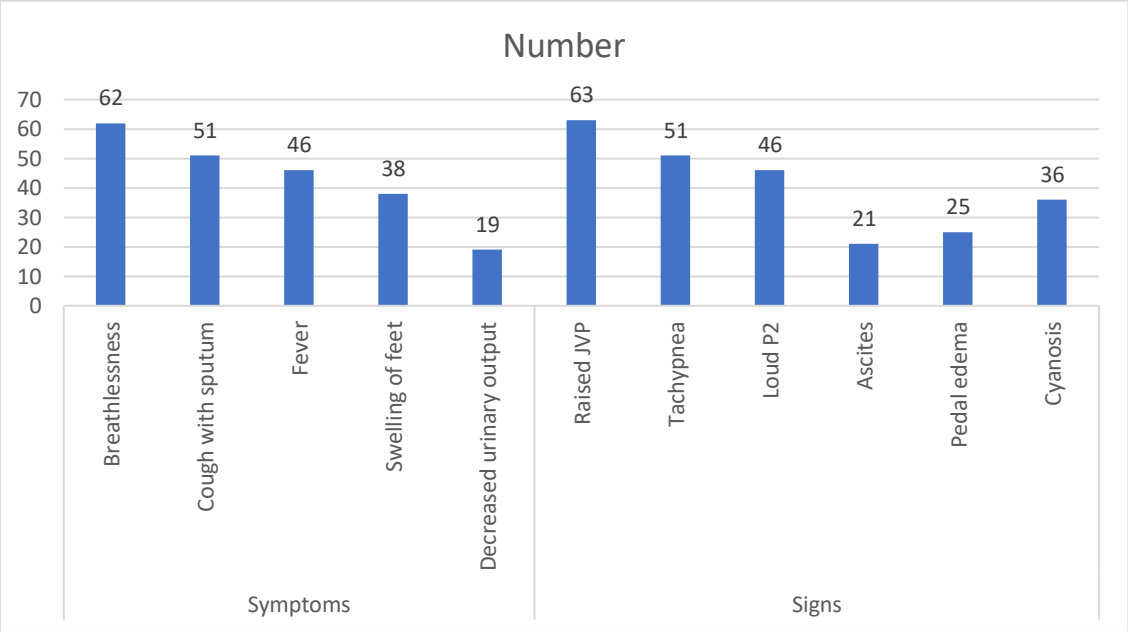

Table III Echocardiographic findings and severity of COPD

ECG findings	Mild	Moderate	Severe	Very severe	P value
Cor pulmonale (31)	2	7	13	9	0.05
LVDD (25)	1	2	12	10	0.02
RVH (7)	1	1	1	14	0.04
PAH (5)	2	1	0	2	0.03
RA/RV dilatation (12)	1	1	0	10	0.05
RVSD (14)	2	1	0	11	0.94
LVH (8)	1	0	0	7	0.85

Table III shows that ECG findings were Cor pulmonale (31), LVDD (25), RVH (7), PAH (5), RA/RV dilatation (12), RVSD (14) and LVH (8). There was significant association between echocardiographic findings with severity of COPD (P< 0.05).

DISCUSSION

Significant extrapulmonary (systemic) consequences are linked to COPD, with cardiac symptoms being the most prevalent.[6] About half of all hospitalizations and over one-third of all fatalities are caused by cardiovascular disease, assuming that the projected FEV1 (forced expiratory volume in one second) is less than 50%.[7] In more severe situations, 20–25% of COPD-related deaths are due to cardiovascular disease. COPD causes pulmonary hypertension, cor pulmonale, right ventricular dysfunction, and left ventricular dysfunction by affecting the pulmonary blood vessels, right ventricle, and left ventricle.[8] A quick, portable, non-invasive, and accurate way to assess tricuspid regurgitation, left ventricular function, valve function, right ventricle function, and right ventricular filling pressure is by echocardiography.[9,10] The present study was conducted to assess echocardiographic findings in patients with COPD.

We found that out of 70 patients, 46 were males and 24 were females. Gupta et al[11]assessed the cardiac changes secondary to COPD by echocardiography and to find out the correlation between echocardiographic findings and severity of COPD, if there is any.A total 40 of patients of COPD were selected and staged by pulmonary function test (PFT) and evaluated byechocardiography.On echocardiographic evaluation of COPD, 50% cases had normal echocardiographic parameters. Measurable tricuspid regurgitation (TR) was observed in 27/40 cases (67.5%). Pulmonary hypertension (PH), which is defined as systolic pulmonary arterial pressure (sPAP)> 30 mmHg was observed in 17/27 (63%) cases in which prevalence of mild, moderate, and severe PH were 10/17 (58.82%), 4/17 (23.53%), and 3/17 (17.65%), respectively. The frequencies of PH in mild, moderate, severe, and very severe COPD were 16.67%, 54.55%, 60.00%, and 83.33%, respectively. Right atrial pressure was 10 mmHg in 82.5% cases and 15 mmHg in 17.5% cases. Cor pulmonale was observed in 7/17 (41.17%) cases; 7.50% cases had left ventricle (LV) systolic dysfunction and 47.5% cases had evidence of LV diastolic dysfunction defined as $A \geq E$ (peak mitral flow velocity of the early rapid filling wave (E), peak velocity of the late filling wave caused by atrial contraction (A) on mitral valve tracing) Left ventricle hypertrophy was found in 22.5% cases.

We observed that symptoms were breathlessness in 62, cough with sputum in 51, fever in 46, swelling of feet in 38 and decreased urinary output in 19. Signs were raised JVP in 63, tachypnea in 51, Loud P2 in 46, ascites in 21, pedal edema in 25 and cyanosis in 36 cases. We found that ECG findings were Cor pulmonale (31), LVDD (25), RVH (7), PAH (5), RA/RV dilatation (12), RVSD (14) and LVH (8). There was significant association between echocardiographic findings with severity of COPD ($P< 0.05$).In their study, Das et al.[12] chose 86 consecutive stable and ambulatory IHD patients (65 males and 21 females). According to GOLD criteria, associated COPD was detected in 51.2% (n = 44) of the study group's patients (36 men and 8 females); moderate to severe disease was present in 90.9% of COPD cases. The prevalence of COPD in the general population was significantly lower than this. The degree of COPD and the reduced left ventricular ejection fraction (EF) were found to be positively correlated. This study also demonstrates that patients' and doctors' overall perceptions of COPD are negative. The majority of IHD's COPD cases (81.8%) were discovered in this study by spirometric analysis. Additionally, only 15.9% of the previously diagnosed individuals use inhaled bronchodilators. Managing and lowering the mortality and morbidity of COPD in IHD may be made easier with knowledge of the coexistence of the two conditions.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that COPD patients have a significant prevalence of cardiac co-morbidities, including PAH, RV dysfunction, and LV dysfunction.

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