

Clinical profile and its relation to spirometry and 2D ECHO in COPD patients

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Abstract

Background: Present study was done with an aim to study the clinical profile and its relation to spirometry and 2D ECHO in COPD patients. **Methodology:** Sixty COPD patients with anonymous rigorousness attending department of respiratory medicine, G.K. General Hospital Bhuj, were incorporated in the study from 2017 onward. The patients were subjected to spirometry and classified according to GOLD guidelines. Whole history concerning the symptoms, past history, smoking history, occupational history and other linked illnesses were taken and noted in a proforma. Echocardiographic assessments of right ventricular and left ventricular function were done.

Results: COPD was more common in males (88.33%) as compared to females (11.66%) because of smoking prevalence high in male patients. COPD patients were having most common chest x-ray finding of Emphysema (75%), followed by increase bronchovascular markings (28.33%), cardiomegaly (6.66%), consolidation or mass (3.33%), calcification (3.33%), reticular pattern (3.33%) and bronchiectasis (3.33%). COPD patient were had mainly common ECG finding of normal (50%), p- pulmonale in (40%), right ventricular hypertrophy in (25%), right axis deviation in (18.33%), RBBB in (6.66%) and AF in (3.33%)

Conclusions: Severity of COPD has straight relation connection with occurrence of ECG changes in COPD. In the present study 50% of the patients had normal ECG. LV diastolic dysfunction was present in 38.33% of the patients. As the severity increases, frequency of LV diastolic dysfunction on 2 D and Doppler echocardiography goes on escalating.

Keywords: Chronic obstructive pulmonary diseases; Smoking; Spirometry.

Introduction

COPD symbolizes a significant public health challenge and is a chief reason of chronic morbidity and mortality right through the world. COPD is at this time the fourth most important reason of death in the world, however is expected to be the 3rd important cause of death by 2020. Over 3 million people died of COPD in 2012 accounting for 6% of all deaths worldwide [1].

In 2016, there were 251 million cases of COPD in the world and it is estimated that COPD causes 3.15 million deaths per year. The prevalence ranged between 2 to 22% among the men and 1.2 to 19% among women in different population-based studies across India [2]. COPD became fourth leading cause of years of life missed in Empowered Action Group (EAG) states including Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand. Also, COPD ranked seventh among the North-East States including Assam, Mizoram, Arunachal Pradesh, Meghalaya, Nagaland, Tripura, Sikkim and Manipur.

Treating COPD and associated comorbidities require institutional resources and frequent hospitalization which can be costly for the individuals as well as the health system [3]. The rate of hospitalization can be four times among elderly aged more than 65 years compared to younger patients. The mean length of hospital stays for COPD ranges from 4.5 to 16 days in normal to intensive care units [4].

The widespread principle suggested for finding of COPD is exhibition of "progressive irreversible airway obstruction" on spirometry. Nevertheless, spirometry is not extensively accessible and spirometric test findings are not forever optimally recorded or interpreted except for when performed by skilled workers. Even though there is now an accord;

spirometric criteria persist to have boundaries. The generalization of spirometry criteria by GOLD experts is possibly to support spirometry for analysis of COPD in primary-care settings globally [5].

COPD is associated with significant extra pulmonary (systemic) effects among which cardiac manifestations are most common. Cardiovascular disease accounts for approximately 50% of all hospitalization and nearly one third of all deaths, if required expiratory volume in one second (FEV1) < 50% of forecast [6].

COPD has significant things on cardiac functions, with those of the right ventricle, left ventricle, and pulmonary blood vessels. The majority of the increased mortality linked with COPD is owing to cardiac connection. RV dysfunction is widespread in patients with COPD inferior to development of pulmonary arterial hypertension, which lead to cor pulmonale. Once developed, the patient with cor pulmonale has deprived prediction. So, the premature gratitude of RV dysfunction and PAH may help in management and prolonging the endurance of the patients with cor pulmonale [7]. Echocardiography provides a quick, noninvasive, portable, and precise way to assess cardiac functions. Premature diagnoses and intervention for cardiac co morbidities would decrease mortalities in COPD patients.

Materials and Methods

A total of 60 COPD patients with unidentified severity who have attended as out-patients in Department of Respiratory Medicine, G.K. General Hospital Bhuj, were joined in the study from 2017 onward. Written informed consent was acquired from the patients in their local language, after amplification the particulars of the study. Whole history about the symptoms, past history, smoking history,

occupational history and other linked disease were taken and renowned in a proforma.

In the females, history concerning passive smoking and biomass fuel practice were obtained. Blood investigations like complete blood count, renal function tests, liver function tests, routine blood sugar, blood pressure, ECG, chest X ray PA view and CT chest, were performed. The patients are subjected to spirometry and classified according to GOLD guidelines (postbronchodilator FEV1/forced vital capacity (FVC) ratio < 70% predicted), mild (FEV1 ≥ 80% of predicted), moderate (50% ≤ FEV1 < 80% predicted), severe

(30% ≤ FEV1 < 50% predicted), and very severe (FEV1 < 30% predicted), correspondingly.

Echocardiography

Echocardiographic evaluation of right ventricular and left ventricular function were done utilizing Systolic pulmonary arterial pressure Tricuspid annular plane systolic excursion (TAPSE)

Results

Table 1: Demographic profile of study participants

Age group (in years)	Number of patients			Percentage of total cases (%)
	Male	Female	Total	
41-50	15	4	19	31.66%
51-60	15	3	18	30%
61-70	19	0	19	31.66%
71-80	3	0	3	5%
81-90	1	0	1	1.66%
Total	53	7	60	100%

Table 1 shows that most of patients (93.32%) were between the age group of 41-70 and they were evenly distributed across the age range. COPD was more common in males (88.33%) as compared to females (11.66%) because of smoking prevalence high in male patients. There was no female patient elder than 60 years of age, whereas there were 23 males above age of 60 years.

Table 2: Symptoms wise distribution of study participants

Symptoms	No. of patients			Percentage of total cases%
	Male	Female	Total	
Breathlessness	53	7	60	100%
Cough	49	5	54	90%
Easy fatigue	6	1	7	11.66%
Fever	7	1	8	13.33%
Pedal edema	6	1	7	11.66%
Chest tightness	5	1	6	10%
Abdominal Symptoms	3	0	3	5%
Joint pain	2	0	2	3.33%

Table 2 shows that most widespread symptom was breathlessness (100%), followed by cough (90%), easy fatigue (11.66%), fever (13.33%), pedal edema (11.66%), chest tightness (10%), abdominal symptoms (5%) and joint pain (3.33%).

Table 3: Grading wise distribution of study participants

mMRC Grading	No. of patients			Percentage of total cases%
	Male	Female	Total	
Grade I	0	0	0	0%
Grade II	31	3	34	56.66%
Grade III	18	2	20	33.33%
Grade IV	4	2	6	10%
Total	53	7	60	100%

Table 3 shows that most of patients were having dyspnea of MMRC grade II (56.66%), followed by grade III (33.33%) and grade IV (10%).

Table 4: Chest radiograph findings of COPD

Chest x-ray findings	No. of patients			Percentage of total cases%
	Male	Female	Total	
Emphysema	40	5	45	75%
Increase BVM*	16	1	17	28.33%
Consolidation/mass	2	0	2	3.33%
Calcification	2	0	2	3.33%
Cardiomegaly	3	1	4	6.66%
Reticular pattern	2	0	2	3.33%
Bronchiectasis	1	0	1	3.33%

Table 4 shows that COPD patients were having most common chest x-ray finding of Emphysema (75%), followed by increase bronchovascular markings (28.33%), cardiomegaly (6.66%), consolidation or mass (3.33%), calcification (3.33%), reticular pattern (3.33%) and bronchiectasis (3.33%).

Table 5: ECG findings of COPD

S. No	ECG finding	No of patient	Percentage
1	Normal	30	50%
2	P pulmonale	24	40%
3	RVH	15	25%
4	Right axis deviation	11	18.33%
5	RBBB	4	6.66%
6	AF	2	3.33%

Table 5 show that COPD patient were had most widespread ECG finding of normal (50%), p- pulmonale in (40%), right ventricular hypertrophy in (25%), right axis deviation in (18.33%), RBBB in (6.66%) and AF in (3.33%)

Table 6: Pulmonary hypertension and functional tricuspid regurgitation on 2D and Doppler echocardiography in patients of COPD

Grading of COPD	Pulmonary hypertension and functional tricuspid regurgitation		Total
	Present	Absent	
Mild	0	9	9
Moderate	1	22	23
Severe	11	5	16
Very severe	12	0	12
Total	24	36	60

P < 0.0001

Table 6 show Out of 60 patients, 24 patients (40%) had pulmonary hypertension and functional tricuspid regurgitation on 2D and Doppler echocardiography

Table 7: Left ventricular diastolic dysfunction on 2D ECHO in patients of COPD

Grading of COPD	Left ventricular diastolic dysfunction on 2d Echo		Total
	Present	Absent	
Mild	0	9	9
Moderate	2	21	23
Sever	10	6	16
Very sever	11	1	12
Total	23	37	60

P < 0.0001

Table 7 show Out of 60 patients, 23 patients (38.33%) had Left ventricular diastolic dysfunction on 2D and Doppler Echocardiography

Discussion

A total number of 60 patients were enrolled in study. In this study of 60 patients with COPD They all belonged to different age groups. Mostly they were between 40 to 70 years. In this study COPD is mostly seen from 4th to 7th decade [8-15]. History of smoking elicited. Excluding female almost all makes gave a history of chronic smoking either cigarette or beedi [16-21].

In our study COPD was present only 8 nonsmokers (10%). Of these, all females are nonsmoker although cigarette smoking is generally regarded as the dominant risk factor [22-30]. Cigarette smoking is not a prerequisite in all definition of COPD, since COPD can occur in non- smokers.

In the current research, the frequent symptoms were dyspnea and cough with expectoration. Dyspnea was there in all 60 (100%) patients and cough with expectoration was there in 54(90%) patients. Fever was present in 8(13.33%) patients.

X- Ray chest result in patients of COPD were famous bronchovascular markings, changes of emphysema and cardiomegaly Out of 60 patients, P pulmonale was present in 24(40%) patients, right ventricular hypertrophy was present in 15(25%) patients and right axis deviation was present in 11(18.33%) patients. In the current research, out of 60 patients LV systolic dysfunction was present in 3 patients (5%)

Conclusions

All patients in the present research were further than 40 years of age representing a growing drift of COPD in patients above the age of 40 years COPD was largely found in males. COPD is a avoidable disease as smoking is the chief risk factor for COPD in 86.66% of the patients in the present study were smokers. Alteration observed in chest x-ray were emphysema and increase bronchovascular marking is most frequently seen spirometry is obligatory to diagnose and evaluate the severity of COPD. Severity of COPD has straight relation with frequency of ECG changes in COPD. Most widespread ECG finding in our study was P pulmonale present in 40% of the patients. As the severity of COPD increases, frequency of pulmonary hypertension and RV dilatation on 2 D and Doppler echocardiography. Echocardiography offers a quick, non-invasive, moveable, and precise technique to assess cardiac functions.

Conflicts of Interest: None declared.

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