ORIGINAL ARTICLE

Pulmonary Hypertension in Cases with Chronic Obstructive Pulmonary Disease

FARAH MUSHTAQ, HAFIZ MUHAMMAD ZEESHAN, SHAFQAT KHAN

ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is highly prevalent in developing countries and pulmonary hypertension (HTN) is one of the most common extra pulmonary complication of this.
Aim: To determine the frequency of pulmonary hypertension in cases with COPD.
Methodology: This was a cross sectional study conducted at Department of Pulmonology, Sheikh Zayed Hospital, Rahim Yar Khan between 01-06-2016 to 31-12-2016. There were total 70 cases of COPD of both genders with age range of 40 to 70 years. COPD was diagnosed as per COPD GOLD guidelines 2016 on PFTs. Detailed sociodemographic and clinical data was collected. Then the pulmonary HTN was labelled on transthoracic echocardiography having resting pulmonary artery pressure of more than 25 mmHg was labelled as pulmonary hypertension.
Results: In this study there were total 70 cases out of which 59 (84.29%) were males and 11(15.71%) females. The mean age was 56.45±7.35 years and mean duration of COPD was 5.72±2.37 years. Pulmonary HTN was seen in 44(62.86%) out of 70 cases. There was no significant difference in terms of gender, age groups and duration of COPD in terms of pulmonary HTN. But this HTN was significantly high in cases of moderate, severe and very severe COPD.
Conclusion: Pulmonary Hypertension is common in cases with chronic obstructive pulmonary disease and it is significantly associated with severe form of disease.
Keywords: COPD, Pulmonary HTN, PFTs

INTRODUCTION

Chronic obstructive pulmonary disease is very common in developing countries like Pakistan. There are variety of causes leading to this due to increase in smoking habits, lack of regulations on exposures to dust and toxins at work, and also increase in biomass fuel exposure. These all risk factors along with the personal susceptibility leads to development of COPD. The prevalence of pulmonary hypertension in cases of COPD ranges form 20 to 90% of cases[1,2].

COPD is diagnosed on the basis of clinical symptoms, radiology and pulmonary function testing. It has various complications that are not only caused by the disease but also are affected due to its treatment. The complications of COPD include, respiratory failure, pneumothorax, cor pulmonale due to pulmonary hypertension, osteoporosis, polycythaemia etc. These complications add to overall morbidity and mortality in such cases. That's why these complications warrant treatment to decrease the symptomatology in such casese[3,4].

There are wide ranges of causes leading to pulmonary hypertension (PH). The most prevalent causes are either cardiac or due to respiratory diseases[5]. Pulmonary hypertension is defined as resting mean pulmonary artery pressure of 20-25 mmHg in the absence of cardiac disease. Considering the pathophysiology, in pulmonary HTN, the damaged parenchyma not only affects the vasculature but also leads to hypoxia and that further causes vasoconstriction of pulmonary vasculature and increased the pressure over there. Moreover endothelial dysfunction and systemic inflammation are also thought to play an important role in the pathogenesis of PH[5,6,7].

Cardiac catheterization and the echocardiography is the mainstay of diagnostic modalities. There are different treatment options and they include calcium channel blockers, phosphodiesterase inhibitors, prostaglandin analogues, endothelin receptor modulator etc. affecting in various ways and different degree of success[8].

The objective of the study was to determine the frequency of pulmonary hypertension in cases with COPD.

MATERIAL AND METHODS

This cross sectional study was carried out in the Department of Pulmonology, Sheikh Zayed Hospital, Rahim Yar Khan from 01-06-2016 to 31-12-2016. Sampling technique was non-probability, consecutive

Dept of Pulmonology, Sheikh Zayed Hospital, Rahim Yar Khan
Correspondence to Dr Farah Mushtaq Email: farahmsq@gmail.com

sampling. The cases were selected according to the following inclusion and exclusion criteria.

Inclusion criteria:

1. Both genders
2. Age 40 to 70 years
3. Cases of COPD diagnosed on PFTs with fixed airflow limitation (FEV1/FVC ratio of less than 0.70 and the post bronchodilator (with salbutamol 400 microgram inhalation) change of less than 12% in FEV1) were included in this study. The COPD cases were defined and divided into 4 severity groups as per COPD GOLD guidelines 2016.

Mild. FEV1 > 80%
Moderate; FEV1 >50-80%
Severe; FEV1 >30-50%
Very severe; FEV1 < 30%

Exclusion Criteria:

1. Cases with history of cardiac failure.
2. Documented cases of pulmonary HTN due to any other reason.
3. Cases with end stage liver, or renal disease.

n this cross sectional study, there were total 70 cases of COPD diagnosed as per inclusion criteria were enrolled. Detailed sociodemographic data like gender, age and clinical data like duration and severity of COPD were also collected. Then these cases were assessed on transthoracic echocardiography and pulmonary artery pressure at rest of more than 25 mmHg was labelled as pulmonary hypertension.

Statistical analysis: The data was collected and assessed by using SPSS-20. Quantitative variables like age, duration of COPD were presented as mean ±SD (standard deviation) and qualitative variables like gender, severity of COPD and outcome i.e. pulmonary HTN as yes or no were presented as frequencies and percentages. Stratification was done on the basis of age, gender, duration and severity of COPD. Post stratification chi-square test was applied and p ≤0.05 was taken as significant.

RESULTS

In this study there were total 70 cases out of which 59 (84.29%) were males and 11 (15.71%) females. The mean age was 56.45±7.35 years and mean duration of COPD was 5.72±2.37 years. There were 3 cases in mild, 52 in moderate, 13 in severe and 2 in very sever COPD group. Pulmonary HTN was seen in 44 (62.86%) out of 70 cases as in figure 01. There was no significant difference in terms of gender, age groups and duration of COPD in terms of pulmonary HTN as in table 1-3. But this HTN was significantly high in cases of moderate, severe and very severe COPD where it was seen in 100% cases of very severe disease, and more than 60% in moderate and severe disease and none in mild disease as in table 4.

Fig.1: Frequency of Pulmonary HTN in cases of COPD (n= 70)

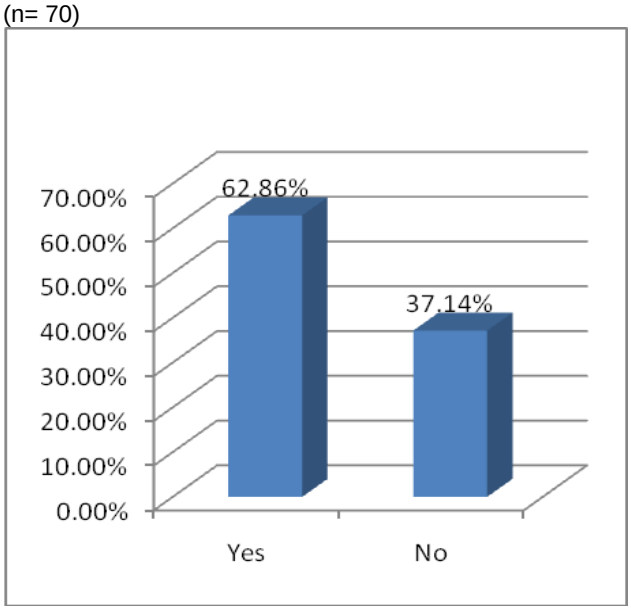

Table 1: Pulmonary HTN with respect to gender (**n= 70)**

Gender	Pulmonary HTN		Total
	Yes	No	
MALE	37 (62.71%)	22 (37.29%)	59 (100%)
FEMALE	7 (63.64%)	4 (36.36%)	11 (100%)
Total	44 (62.86%)	26 (37.14%)	70 (100%)

P value= 1.12

Table 2: Pulmonary HTN with respect to age groups (n= 70)

Age groups (Yrs)	Pulmonary HTN		Total
	Yes	No	
40-55	21 (65.63%)	11 (34.37%)	32 (100%)
56-70	23 (60.53%)	15 (39.47%)	38 (100%)
Total	**44 (62.86%)**	**26 (37.14%)**	**70 (100%)**

P value= 0.48

Table 3: Pulmonary HTN with respect to duration of COPD (n= 70)

Duration of COPD	Pulmonary HTN		Total
	Yes	No	
<3 years	13 (59.09%)	9 (40.91%)	22 (100%)
>3 years	31 (64.58%)	17 (35.42%)	48 (100%)
Total	44 (62.86%)	26 (37.14%)	70 (100%)

P value= 0.27

Table 4: Pulmonary HTN with respect to severity of COPD (**n= 70)**

Severity of COPD	Pulmonary HTN		Total
	Yes	No	
Mild	0 (00%)	3 (100%)	3 (100%)
Moderate	33 (63.46%)	19 (36.54%)	52 (100%)

Severe	9 (69.23%)	4 (30.77%)	13 (100%)
V Severe	2 (100%)	0 (00%)	2 (100%)
Total	44 (62.86%)	26 (37.14%)	70 (100%)

Pvalue= 0.04

DISCUSSION

Chronic obstructive pulmonary disease (COPD) is defined as a preventable and treatable disease and it has various pulmonary and extra pulmonary effects that can be detrimental. Among the extra pulmonary complications, the heart is amongst the most common to be affected. COPD can lead to increased resistance to pulmonary blood flow and hence exert pressure effects on these vessels and right side of the heart and ultimately may affect the left side of heart as well. Echocardiography is most commonly used to assess it and the right heart catheterization is the gold standard for its diagnosis.

In this study, the pulmonary hypertension was seen in 44 (62.86%) of cases. This was almost consistent with the studies in the past that have shown almost the similar types of results. In a study done by Roshke et al on cases of COPD and it was seen that its prevalence was seen in almost 80% of the cases[2]. In another study done by Kurundkar G et al, the pulmonary hypertension was seen in 53% of cases[9]. They further stratified in their study the different degree of severity of pulmonary HTN. It was observed that among these cases diagnosed with pulmonary HTN, mild HTN was seen in 23% of cases, moderate in 18% and sever pulmonary HTN was in 12% of cases with COPD[9]. In contrast to these studies where the results were similar to the present study, in a study conducted by Naeji R et al, the frequency of pulmonary HTN and cor pulmonale was seen in only less than 10% of cases[10]. The reason of these cases with such less number is not known. It might be due to difference in inclusion criteria where the more cases could have been of mild disease as compared to our study and the other studies with similar results to ours[2,9].

In the present study there was significant association of pulmonary HTN in case with moderate, severe and very severe disease with p value of 0.04. This was also observed by the studies done in the past that found the higher number of such cases.[11-12] The reason of higher number can be explained by the pathogenesis involved in the destruction of lung parenchyma and an extra factor of chronic hypoxia in cases with chronic COPD as compared to having those with mild disease.

CONCLUSION

Pulmonary Hypertension is common in cases with chronic obstructive pulmonary disease and it is significantly associated with severe form of disease.

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