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ORIGINAL ARTICLE

Pulmonary Arterial Hypertension in COPD and its Correlation with Disease Severity

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ABSTRACT

Background: Pulmonary arterial hypertension is a condition that develops in advanced stages of chronic obstructive pulmonary disease. The development of pulmonary arterial hypertension indicate poor prognosis.
Objective: To assess the arterial hypertension in COPD and its correlation with disease severity
Methodology: This descriptive study was carried out at the Pulmonology department, Fatima Jinnah Institute of Chest Diseases and Sheikh Khalifa Bin Zayyed Al Nahyan Medical Complex Quetta from December 2021 to May 2022. The severity of COPD was measured by FEV1 (spirometry). All the data was collected by using a pre-designed proforma. The data was analyzed via SPSS version 24.
Results: In this study, totally 80 patients were enrolled. The male participants in our study were 42 (52.5%) while female participants were 38 (48.5%). The overall frequency of pulmonary arterial hypertension in COPD was 28 (35%). There was a statistically significant positive association between the severity of COPD and presence of pulmonary arterial hypertension (p=0.038).
Conclusion: Our study concludes that the most common complication of COPD is pulmonary arterial hypertension and should be investigated particularly in patients with advanced (severe and very severe) COPD in order to reduce the morbidity and mortality.
Keywords: Prevalence, Pulmonary arterial Hypertension, Chronic obstructive pneumonic disease

INTRODUCTION

Chronic obstructive pneumonic disease (COPD) is the 4th driving reason of mortality on the planet and a significant reason for ongoing morbidity [1]. Although, principally it is a respiratory issue described via wind stream impediment, it has fundamental appearances as well. Pneumonic blood vessel hypertension (PAH) is a typical extra aspiratory intricacy of this illness and is a free indicator of mortality [2]. The 5-year endurance rate is just 36% in patients with ordinary pneumonic vein pressure (PAP) contrasted with 62% in those with aspiratory blood vessel hypertension [3]. In patients with chronic obstructive pulmonary disease, PAH has been operationally defined as a resting mean pneumonic vein pressure (mPAP) of more than 20-25 mm Hg [4]. The pathogenesis of PAH in COPD is ineffectively perceived and is probably going to be multifactorial. In spite of the fact that hypoxia has been portrayed to be the principle pathogenic specialist and long haul oxygen prompts reversal yet not all out standardization of the pneumonic corridor pressure (PAP) [5]. The focal upgrade to these progressions stays long haul presentation of aviation routes to poisonous stimuli on the grounds that morphologic changes in aspiratory vessels have been seen in corresponding with lung parenchymal changes in mellow to direct COPD without constant hypoxia [6]. New advances in the pathogenesis of pneumonic hypertension auxiliary to COPD sup-port an endothelium-determined vasoconstrictor-dilator awkwardness, predominantly from a diminished endothelial nitric oxide articulation, expanded vascular endothelial development factor and serotonin carrier expressions [7]. Right heart catheterization being the gold standard test to affirm the determination of PAH and its seriousness, its intrusive nature blocks is basic use [8]. Conventionally transthoracic Echocardiogram is performed to gauge right ventricular systolic weight which is a substitute marker of pneumonic blood vessel hypertension with a Sensitivity, particularity, negative prescient worth (NPV), and positive prescient worth (PPV) as 76, 65, 93, and 32%, individually [9]. PAH in stable COPD is generally mellow to direct and is typically not seen until the illness is genuinely best in class (FEV1 < half). Serious PAH in the range of >35 to 45 mm Hg is uncommon and reported in the range of 3% to 13% and must incite a quest for an extra reason for PH, for instance, left coronary illness, obstructive rest apnea, pneumonic embolism [10]. literature shows that PAH in COPD affects mortality, morbidity and natural course of the disease, and a disproportionately high right ventricular systolic pressure in relatively milder form of disease may warrant a look for extra reasons for PAH, we arranged this investigation to have a nearby proof for commonness of PAH in our patients with COPD and its connection with the seriousness of illness which might be of significant worth in figuring rules for dealing with this subset of patients. The current study was carried out with the objective to determine the frequency of pulmonary arterial hypertension in chronic obstructive pulmonary disease (COPD) and its correlation with disease severity in hospitalized patients.

MATERIALS AND METHODS

Study setting: The current study was descriptive carried out at the department of Pulmonology, Fatima Jinnah Institute of Chest Diseases and Sheikh Khalifa Bin Zayyed Al Nahyan Medical Complex Quetta.
Study duration: The study was conducted for a period of six months from December 2021 to May 2022.
Sampling Method: Non probability sampling technique
Sampling size: Based on WHO sample size calculator, the sample size in our study was 80.
Inclusion criteria: All adult patients including both genders with spirometry proven COPD admitted due to acute exacerbation
Exclusion criteria: Patients with respiratory distress, hemodynamic instability, mild COPD (FEV1 >80% predicted) or left heart failure.
Data collection: After consent and appropriate management of these patients; age, gender and spirometry findings of FEV1 (forced expiratory volume in 1st second) were recorded. Echocardiogram was done by a cardiologist for all patients when clinically stable and the results of RVSP (right ventricular systolic pressure) were obtained. RVSP was taken as an estimation of pulmonary artery pressure and a value of more than 25mm of Hg was taken as PAH (pulmonary arterial hypertension). The severity of COPD was measured by FEV1 (spirometry done via spirolab-III machine by a trained technician). FEV1 of >50% predicted was defined as moderate COPD, while 30-50% as severe disease and <30% as very severe disease.

Data analysis: The data was analyzed via SPSS version 24. Mean was calculated for age and FEV1 while percentage was determined for pulmonary arterial hypertension. Correlation was determined between FEV1 and PAH using spearman's correlation. The results were presented as table/graph.

RESULTS

In this study, totally 80 patients were enrolled. The male participants in our study were 42 (52.5%) while female participants were 38 (48.5%). (Figure 1) The mean age with ± SD was 58±9.32 years. Based on severity of COPD, 9 (11.25%) patients were observed with moderate COPD, 37 (46.25%) patients were observed with severe COPD whereas 34 (42.50%) patients were observed with very severe COPD. (Figure 2) The overall frequency of pulmonary arterial hypertension in COPD was 28 (35%). (Figure 3) The frequency of pulmonary arterial hypertension based on severity of COPD was observed as 00 (00%) in patients with moderate COPD, 12 (32.43%) in patients with severe COPD and 16 (47.06%) in patients with very severe COPD. There was a statistically significant positive association between the severity of COPD and presence of pulmonary arterial hypertension (p=0.038). (Figure 4)

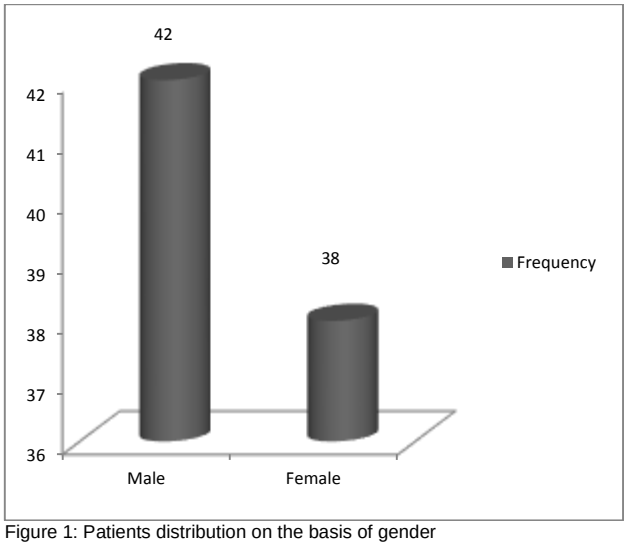

Figure 1: Patients distribution on the basis of gender

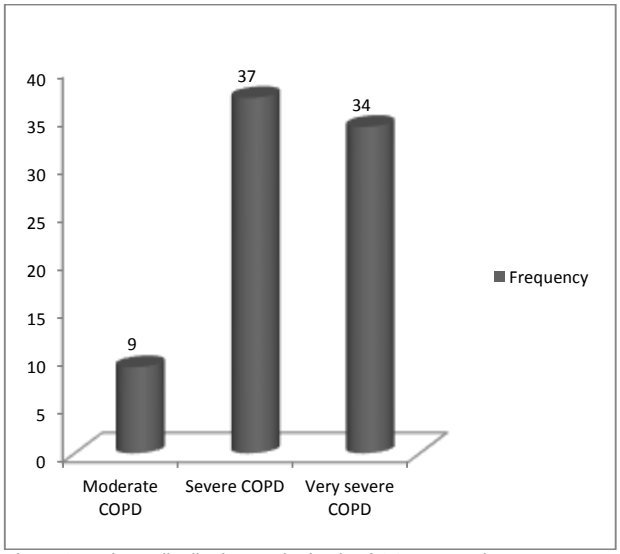

Figure 2: Patients distribution on the basis of COPD severity

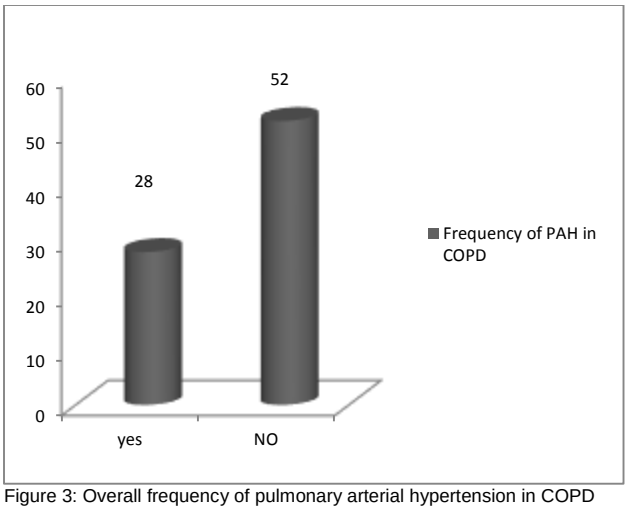

Figure 3: Overall frequency of pulmonary arterial hypertension in COPD

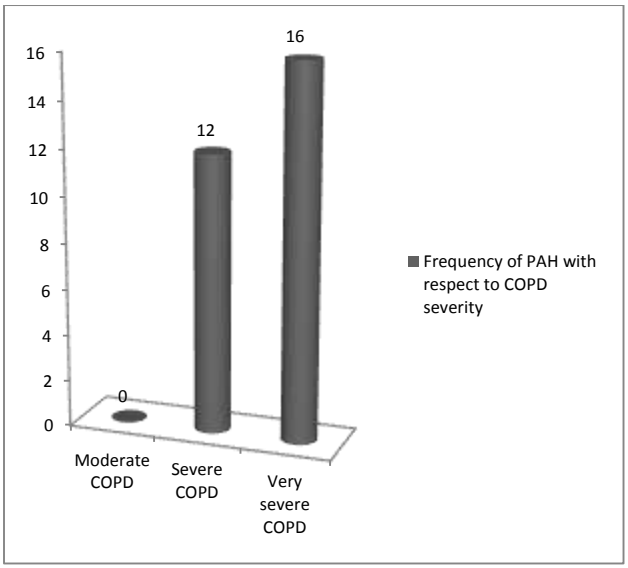

Figure 4: Frequency of pulmonary arterial hypertension with respect to COPD severity

DISCUSSION

The advancement of aspiratory blood vessel hypertension in COPD is straightforwardly identified with mortality in light of the fact that an expansion in the mean pneumonic conduit weight of 10 mm Hg builds the demise rate by more than fourfold [11]. Pulmonary hypertension is typically of mellow to direct PAH: Pulmonary blood vessel hypertension, COPD; ongoing obstructive pneumonic sickness, FEV1; Forced expiratory volume in first second seriousness and is more normal ahead of time phases of COPD; notwithstanding, a little extent of COPD patients may give "messed up" aspiratory hyper-strain, with a moderately safeguarded lung function [12].

In this study, totally 80 patients were enrolled. The male participants in our study were 52.5% while female participants were 48.5%. The mean age with ± SD was 58±9.32 years. The overall frequency of pulmonary arterial hypertension in COPD was 28 (35%). Based on severity of COPD, 9 (11.25%) patients were observed with moderate COPD, 37 (46.25%) patients were observed with severe COPD whereas 34 (42.50%) patients were observed with very severe COPD. The frequency of pulmonary arterial hypertension based on severity of COPD was observed as 00 (00%) in patients with moderate COPD, 12 (32.43%) in patients with severe COPD and 16 (47.06%) in patients with very severe

COPD. There was a statistically significant positive association between the severity of COPD and presence of pulmonary arterial hypertension (p=0.038).

The predominance of pneumonic hypertension in COPD has been accounted for by one investigation as 16.67 %, 54.55 %, 60.00 %, and 83.33 % in gentle, moderate, extreme, and serious COPD respectively [13]. In another study, the recurrence of PAH was observed to be 25 %, 43 %, and 68 % in mellow, moderate, and extreme COPD, respectively [14]. The various outcomes presumably rely upon the meaning of PAH, the seriousness of COPD, test determination standards, and the strategy for estimating the aspiratory conduit pressure [15]. We found a significant correlation between severity of COPD as measured by FEV1 and the presence of pulmonary arterial hypertension. One explanation for this correlation could be that more severe and persistent wind current constraint will prompt more serious hypoxia which is one of the significant supporters of the pathogenesis of pulmonary blood vessel hypertension. Writing proposes that aspiratory blood vessel hypertension in COPD progresses over the long haul and its seriousness connects with the level of wind stream check and the hindrance of pneumonic gas exchange [16, 17]. Pulmonary vascular renovating in COPD is the fundamental driver of expansion in pneumonic conduit pressure and is considered to result from the consolidated impacts of persistent hypoxemia, aggravation, endothelial brokenness and direct impacts of tobacco smoke on vessel structure.

CONCLUSION

Our study concludes that the most common complication of COPD is pulmonary arterial hypertension and should be investigated particularly in patients with advanced (severe and very severe) COPD in order to reduce the morbidity and mortality.

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