

**FREQUENCY OF PULMONARY HYPERTENSION IN PATIENTS PRESENTING WITH COPD****Dr. Ufra Mateen<sup>1</sup>, Dr. Sana Munir<sup>2</sup> and Dr. Bareera Khan\*<sup>3</sup>**<sup>1</sup>(Pmdc# 92043-p) Nishtar Medical University Multan.<sup>2</sup>(Pmdc#80788-p) Isra University Hyderabad Sindh.<sup>3</sup>(Pmdc#90678-p) Quaid-e-Azam Medical College Bwp.**\*Corresponding Author: Dr. Bareera Khan**

(Pmdc#90678-p) Quaid-e-Azam Medical College Bwp.

Article Received on 18/01/2019

Article Revised on 08/02/2019

Article Accepted on 01/03/2019

**ABSTRACT**

**Objective:** COPD is a leading cause of morbidity and mortality in adults all over the world. Pulmonary hypertension (PH) is defined as a mean pulmonary artery pressure of  $\geq 25$  mmHg at rest. Pulmonary hypertension can occur as an isolated disease or as a consequence of a number of underlying diseases and conditions, such as heart failure and chronic obstructive pulmonary disease (COPD). Study was done to determine the frequency of pulmonary hypertension in patients presenting with COPD. **Methodology:** This was a cross sectional study conducted at Department of Cardiology, Bahawalpur Victoria Hospital. In this study the cases of either gender with age more than 40 years were included. The cases of COPD for at least 1 years were included. The cases with primary pulmonary HTN and those with connective tissue disorder and chronic pulmonary edema were excluded. The diagnosis of COPD was made on the basis of PFTs with FEV1/FVC ratio of less than 0.70 and the post bronchodilator (with salbutamol 400 microgram inhalation) change of less than 12% in FEV1 according to COPD GOLD guidelines 2017 and the cases were categorized according to same guidelines into different severity groups and cases of moderate or more severe disease were included. A total of 200 patients were evaluated for presence of pulmonary hypertension using chest X-ray, electrocardiogram, 2D echocardiography. **Results:** In this study 200 cases of COPD were included with mean age of  $61.21 \pm 12.79$  years. There were 162 (81%) males and all were smokers. Majority of the cases i.e. 102 (51%) had severe COPD. Pulmonary HTN was observed in 80 (40%) of the cases. It was significantly high in cases that had COPD for more than 5 years where it was seen in 72 (36%) of cases. It was also significantly high in cases that had very severe form of COPD affecting 46 (23%) of patients. **Conclusion:** Pulmonary Hypertension is seen in almost half of cases with COPD and it is significantly high in cases that had very severe COPD and for more than 5 years.

**KEYWORDS:** Pulmonary hypertension, COPD.**INTRODUCTION**

Chronic obstructive pulmonary disease is one of the most important cause of morbidity and mortality in adults all over the globe. While other major causes of non-cancer mortality such as coronary artery disease and stroke have shown a consistent downward trend, COPD is the only one that continues to increase.<sup>[1]</sup> Pollution and smoking are one of the major causes in the developing era and are potentially reversible risk factors that can affect the health care system badly by posing an immense degree of disease burden. Chronic obstructive pulmonary disease (COPD) is one of the very common complication of smoking especially in the developing countries like Pakistan. Pulmonary Hypertension (HTN) is another well-known entity and its prevalence in cases of COPD ranges from 20-90%.<sup>[2-3]</sup> The epidemiological scenario is

expected to worsen and the World Health Organization predicts that COPD will become the third leading cause of death (currently fourth) and the fifth leading cause of disability (currently twelfth) worldwide by the year 2020.<sup>[4-5]</sup>

COPD can result in various pulmonary and non-pulmonary complications. These include respiratory failure, chronic hypoxia, pneumothorax, pulmonary hypertension, polycythemia, osteoporosis, cardiac arrhythmias, systolic and diastolic dysfunctions etc.<sup>[6-7]</sup> According to a study pulmonary hypertension is associated with poor prognosis in patients with chronic respiratory disorders. In one cohort study of patients with chronic obstructive pulmonary disease, the 5-year survival rate was 36% for individuals with pulmonary

hypertension and 62% for those without.<sup>[8]</sup> In patients with severe pulmonary hypertension, median survival is 26 months.<sup>[9]</sup> In a study using echocardiography to estimate pulmonary artery systolic pressure in patients with idiopathic pulmonary fibrosis, mean survival was found to be 0.7 years among those presenting pulmonary artery systolic pressure > 50 mmHg, compared with >4 years in those with pulmonary artery systolic pressure <50 mmHg.<sup>[9]</sup>

Pulmonary HTN is represented as increased resistance to the pulmonary flow and causing strains on the right ventricle of the heart and can be measured by echocardiography or right heart catheterization which is gold standard but an invasive procedure. It can be diagnosed when the resting mean pulmonary artery pressure (PAP) is of 20-25 mmHg in the absence of cardiac disease.<sup>[10-11]</sup>

### OBJECTIVES

The aim of present study was to study the prevalence of pulmonary hypertension in COPD patients and to highlight the importance of early diagnosis of pulmonary hypertension to prevent further complications.

### MATERIAL AND METHODS

It is a Cross sectional study done at Department of cardiology, Bahawalpur Victoria Hospital from June 2018 to November 2018. Non probability consecutive sampling technique was used. In this study the cases of either gender with age more than 40 years were included. The cases of clinically diagnosed as COPD (mainly emphysema and chronic bronchitis) for more than 1 year with subsequent confirmation by spirometry i.e., FEV1/FVC <0.7 were included in the study. Patients diagnosed as having bronchial asthma, pulmonary tuberculosis (present or past), interstitial lung diseases, Vulvular, acute left ventricular failure and pulmonary edema secondary to other causes hypertension, ischemic heart disease, cardiomyopathies), primary pulmonary hypertension, bronchiectasis were excluded.

**Table 01. Pulmonary HTN and gender.**

Gender	Pulmonary HTN		Total
	Yes	No	
Male	68 (34%)	94 (47%)	162 (81%)
Female	12 (6%)	26 (13%)	38 (19%)
<b>Total</b>	<b>80 (40%)</b>	<b>120 (60%)</b>	<b>100 (100%)</b>

**Table 02: Pulmonary HTN and duration of COPD.**

Duration of COPD	Pulmonary HTN		Total
	Yes	No	
5 years or less	8 (4%)	58 (29%)	66 (33%)
>5 years	72 (36%)	62 (31%)	134 (67%)
<b>Total</b>	<b>80 (40%)</b>	<b>120 (60%)</b>	<b>100 (100%)</b>

Simple random sampling Data was collected using a pretested proforma meeting the objectives of the study. Detailed history, physical examination and necessary investigations were undertaken. Pulmonary HTN was labelled on transthoracic echocardiography as yes when at rest pulmonary artery pressure was more than 25 mmHg. Other investigations like CBC, Blood urea, serum creatinine Sputum for gram stain and AFB Urine Albumin /Sugar/Microscopy. The data was analyzed by using SPSS-version 23.

### RESULTS

In this study 200 cases of COPD were included with mean age of 61.21±12.79 years. There were 162 (81%) males and all were smokers. Majority of the cases i.e. 102 (51%) had severe chronic obstructive pulmonary disease. Pulmonary HTN was observed in 40 (40%) of the cases. There was no significant difference in terms of gender as in table 01. It was significantly high in cases that had COPD for more than 5 years where it was seen in 72 (36%) of cases as in table 02. It was also significantly high in cases that had very severe form of COPD affecting 46 (23%) of cases as in table 03.

**Table 03: Pulmonary HTN and severity of COPD.**

Severity of COPD	Pulmonary HTN		Total
	Yes	No	
Moderate	2 (1%)	16 (8%)	18 (9%)
Severe	32 (16%)	70 (35%)	102(51%)
Very severe	46 (23%)	34 (17%)	80 (40%)
<b>Total</b>	<b>80 (40%)</b>	<b>120 (60%)</b>	<b>100 (100%)</b>

## 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.

In the present study, on cases of COPD, pulmonary HTN was observed in 80 (40%) out of 200 cases. The results in the past from various studies were wide variable. Roshke et al, in their study found that pulmonary HTN in such cases of COPD was seen in 80% of the cases; which was double than the finding of the present study.<sup>[2]</sup> Kurundkar G et al, in another study found this prevalence in as high as 53% of cases.<sup>[12]</sup> They not only assessed for the presence of pulmonary HTN, but they also further sub classified such cases into different degree of severity with respect to pulmonary HTN. Mild pulmonary HTN was observed in 23% of cases, moderate in 18% and severe in 12% of cases presenting with COPD.<sup>[13]</sup>

Naeji R et al revealed altogether different results as compared to the present and the above mentioned findings of the different studies and they found pulmonary HTN in cases of COPD in only 10% of the cases.<sup>[14]</sup> the reason of this difference can be explained by the difference in the presentation of such cases with different degree of severity.

Pulmonary HTN was significantly high in cases that had COPD for more than 5 years where it was seen in 72 (36%) of cases and those that had very severe form of COPD affecting 46 (23%) of cases. This finding of the present study was also strengthened by the findings of the previous studies where though the same cut off were not used but it was seen that higher the degree of the disease; higher is the likelihood to develop pulmonary HTN and longer the duration also co exists with severe form of disease especially in cases that are non-compliant to the treatment.<sup>[16-17]</sup> The limitations of the present study were small sample size, study was only hospital based, and right heart catheterization and measurement of pulmonary artery pressure which is the gold standard to assess pulmonary hypertension was not done due to hospital limitations.

## CONCLUSION

Pulmonary Hypertension is seen in almost half of cases with COPD and it is significantly high in cases that had very severe COPD and for more than 5 years.

## REFERENCES

1. Mannino DM, Homa DM, Akinbami LJ, Ford ES, Redd SC. Chronic obstructive pulmonary disease surveillance: United States, 1971-2000. *MMWR Surveill Summ*, 2002; 51: 1-16.
2. Chen JC, Mannino DM. Worldwide epidemiology of chronic obstructive pulmonary disease. *Curr Opin Pulm Med*, 1999; 5: 93-9.
3. Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. *Lancet*, 1997; 349: 1436-42.
4. Chaouat A, Naeije R, Weitzenblum E, "Pulmonary hypertension in COPD", *EurRespir J.*, 2008; 32(5): 1371-85.
5. Roshke K, Orth M, Kushcha M, Dushna HW. Pulmonary diseases and heart function. *Internist (Berl)*, 2007; 48(3): 276-82. |
6. Fayngersh V, Drakopanagiotakis F, McCool FD, Klinger JR. Pulmonary hypertension in a stable community-based COPD population. *Lung*, 2011; 189: 377-82.
7. Sims MW, Margolis DJ, Localio AR, Panettieri RA, Kawut SM, Christie JD. Impact of pulmonary artery pressure on exercise function in severe COPD. *Chest*, 2009; 136: 412-19.
8. Damy T, Goode KM, Kallvikbacka-Bennett A, Lewinter C, Hobkirk J, Nikitin NP, et al. Determinants and prognostic value of pulmonary arterial pressure in patients with chronic heart failure. *Eur Heart J.*, 2010; 31(18): 2280-90.
9. D'Alto M, Romeo E, Argiento P, D'Andrea A, Vanderpool R, Corraera A, et al. Accuracy and precision of echocardiography versus right heart catheterization for the assessment of pulmonary hypertension. *Int J Cardiol*, 2013; 168(4): 4058-62.
10. Janda S, Shahidi N, Gin K, Swiston J. Diagnostic accuracy of echocardiography for pulmonary hypertension: a systematic review and meta-analysis. *Heart*, 2011; 97(8): 612-22.
11. Fisher MR, Forfia PR, Chamara E, Houston-Harris T, Champion HC, Girgis RE, et al. Accuracy of Doppler echocardiography in the hemodynamic assessment of pulmonary hypertension. *Am J Respir Crit Care Med*, 2009; 179(7): 615-21.

12. Badesch DB, Champion HC, Sanchez MA, Hoeper MM, Loyd JE, Manes A, et al. Diagnosis and assessment of pulmonary arterial hypertension. *J Am Coll Cardiol*, 2009; 54: 55–66.
13. Galie N, Corris PA, Frost A. Updated treatment algorithm of pulmonary arterial hypertension. *J Am Coll Cardiol*, 2013; 62: D60.
14. Weitzenblum E, Chaouat A. Right ventricular function in COPD: can it be assessed reliably by the measurement of right ventricular ejection fraction? *Chest*, 1998; 113: 567–569.
15. Crottogini AJ, Willshaw P. Calculating the end-systolic pressure-volume relation. *Circulation*, 1991; 83: 1121–1123.
16. Biernacki W, Flenley DC, Muir AL, MacNee W. Pulmonary hypertension and right ventricular function in patients with COPD. *Chest*, 1988; 94: 1169–1175.
17. MacNee W. Pathophysiology of cor pulmonale in chronic obstructive pulmonary disease. Part One. *Am J Respir Crit Care Med*, 1994; 150: 833–852.
18. Frequency of Pulmonary Hypertension in Patients Presenting with COPD, 2001; 5(6): 286–89. Apostolova O, Sushko V, Tatarenko O. Frequency of pulmonary hypertension in patients with COPD Clean-up workers of Chernobyl catastrophe. *EurResp J.*, 2013; 42: P1026.
19. Cuttica MJ, Kalhan R, Shlobin OA. “Categorization and impact of pulmonary hypertension in patients with advanced COPD,” *Resp Med.*, 2010; 104(12): 1877–82.