



CODEN [USA]: IAJPBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES<http://doi.org/10.5281/zenodo.3766881>Available online at: <http://www.iajps.com>

Research Article

**CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)
SEVERITY AND RIGHT HEART STATUS AMONG
PATIENTS ATTENDING A TERTIARY CARE HOSPITAL**¹Dr. Erisha Komal, ²Dr. Maria Nazir, ³Dr. Aisha Saddiqui¹Quaid-e-Azam Medical College BWP²Quaid-e-Azam Medical College BWP³KHAWAJA Muhammad Safdar Medical College Sialkot**Article Received:** February 2020**Accepted:** March 2020**Published:** April 2020**Abstract:***COPD trend is rising and lungs diseases its threatening complications is a health care challenge.****Objective-** Among COPD patients to assess the severity and based on Spirometry findings classify them and with Echocardiography, assess the right heart status among the patients under study.****Materials and Methods-** In this study 120 patients were selected and all the findings of this cross sectional study were entered in excel sheets. Study was conducted in Victoria Hospital Bahawalpur from jan 2017_ dec 2018.****Results-** According to this study there was a direct relation found between right heart status and COPD***Corresponding author:****Dr Erisha Komal,**

Quaid-e-Azam Medical College BWP

QR code



Please cite this article in press Erisha Komal et al, *Chronic Obstructive Pulmonary Disease (COPD) Severity And Right Heart Status Among Patients Attending A Tertiary Care Hospital.*, Indo Am. J. P. Sci, 2020; 07(04).

INTRODUCTION:

COPD is preventable, manageable and common diseases which can be characterized by airflow limitation and persistent respiratory symptoms due to alveolar or airway abnormalities caused by a lot of exposure to noxious gases or particles. In worldwide one fourth deaths happened due to COPD and in 2020 it can be a cause of one third deaths. According to World health Organization COPD is curable and preventable disease. At worldwide 400 million people were affected.

Life lost due to disability is the 9th leading cause due to COPD, several systematic manifestations are associated with COPD which resulted in reduced quality of life, worsening dyspnea, impaired functional capacity and increased mortality. This may increase the presence of anxiety, clinical depression, increased gastro esophageal reflux, anemia, osteoporosis and dysfunction of skeletal

Muscles. COPD increase the risk of co morbidities, hospitalization and risk of mortality and in this the severity of airway obstruction increases.

There is relation between heart and lungs and any abnormality or dysfunction in one organ may have consequences on other. This interaction is very important in patients and have two types of association.

First association share the risk of coronary disease and cigarette smoke or COPD and congestive heart failure. Second association that resulted from the primary lung disease due to dysfunction of heart e.g. ventricular dysfunction and pulmonary hypertension due to increase loads at intra-throic.

One of the most common cause of Pulmonary hypertension PH is COPD. In COPD patients the predictor of mortality and acute exacerbation is PH which is related to Lungs diseases. According to various studies the prevalence of COPD is up to 90%.

Hence due to COPD, for minimizing the risk of complications and death the diagnosis of PH is a strategy. For assessing valvular function, left ventricular function, pulmonary artery pressure and right ventricle function, Echocardiography is rapid and noninvasive function.

Normally it is thought that severity of COPD patients is related with the prevalence of PH but the correlation between FEV1 and PH had not found yet. The risk from COPD depend upon the severity of pulmonary hypertension that's why to assess the level of exact severity is very important.

Aims and Objectives

- To observe the right heart status through ECG in participants
- To assess the COPD severity and based on Spirometry findings classify them and with Echocardiography assess the right heart status among the patients under study.

MATERIALS AND METHODS:

In this study 120 patients were selected and a written consent paper was signed by all the participants. The participants were subjected to spirometry and ECG by same technician. According to guidelines GOLD guidelines the severity of COPD was classified. All the findings of this cross-sectional study was entered in excel sheets

Inclusion criteria

For this study 120 patients of COPD from the age group of 40 years were selected.

Exclusion criteria

For this study all those patients were excluded who were suffering in co morbidities like old pulmonary tuberculosis sequelae, Interstitial lung disease, Bronchiectasis, Diabetes Mellitus, Hypertension, congestive cardiac failure, Ischemic heart disease and Asthma

Table 1: Classification of COPD patients

Stages	Percentage of FEV1
Mild COPD	FEV1 ≥ 80% Predicted
Moderate COPD	50% FEV1 < 80% Predicted
Severe COPD	30% FEV1 < 50% Predicted
Very Severe COPD	FEV1 < 30% Predicted

RESULTS AND DISCUSSION

For this study around 120 patients were selected and of all of them very severe, severe, moderate, mild patients were depicted in below table 3. Out of all patients 12 i.e. 10% were females and 108 i.e. 90% were males. Majority of patients were belong to 50-59 years which is first highest age group 40% and 34% patients were from 60-69 years.

Table 2: Guidelines for right heart status among patients based on American society of echocardiography 2010

Parameter	View	Measurement
RV wall thickness	Subcostal view or Parasternal view measured during diastole, using either M-mode or two-dimensional (2D) imaging	RV hypertrophy (RVH) is present if thickness more than 5 mm.
Right ventricle dimension	Focused apical 4-chamber view	RV dilatation is present if Diameter is more than 42 mm at the base and more than 35 mm at the mid level and longitudinal dimension more than 86 mm indicates RV enlargement.
Right atrium dimension	Apical 4-chamber view	RA area > 18 cm ² RA length (referred to as the major dimension) > 53 mm, and RA diameter (otherwise known as the minor dimension) > 44 mm indicate at end-diastole RA enlargement.
RV diastolic function	Tricuspid inflow detected by pulsed doppler	Impaired relaxation: tricuspid E/A ratio < 0.8 Pseudonormal filling : tricuspid E/A ratio of 0.8 to 2.1 with an E/e ₀ ratio > 6 or diastolic flow predominance in the hepatic veins restrictive filling :tricuspid E/A ratio > 2.1 with deceleration time < 120 ms
Systolic Pulmonary Artery Pressure	TR velocity	Mean PA pressure can be estimated by the PA acceleration time (AT) or derived from the systolic and diastolic pressures.

Table 3: COPD severity category based on Spirometry

Gold staging	No of patients (percentage)
Mild	8(6.66%)
Moderate	48(40%)
Severe	48(40%)
Very severe	16(13.33%)

Table 4: Age and sex wise distribution

Age interval	Male(108)	Female(12)	Total	Percentage
40-49	10	2	12	10%
50-59	44	4	48	40%
60-69	38	3	41	34.16%
70-79	11	2	13	11%
>80	5	1	6	5%
Total	108(90%)	12(10%)	120	

In 96 patients (80%), right ventricular was seen, 50% had RV hypertrophy who had mild COPD 75% had RV hypertrophy from moderate COPD, 91.6% had RV hypertrophy from severe COPD as in table 5. In 56% of total COPD patients RV dilatation was seen. 37.5% had RV dilatation from mild COPD group, 100% of very severe COPD patients had RV dilatation, 52% from severe COPD patients, 50% of moderate patients had RV dilatation. None of the mild COPD patients had RA dilatation. 50% among very severe COPD patients, 18.75% of severe COPD patients and 8% of moderate COPD patients had RA dilatation.

Table 5: Frequency of RV hypertrophy among COPD patients

Stages	RV hypertrophy in numbers (total)	Percentage of RV Hypertrophy with severity of COPD
Mild	4(8)	50% of mild
Moderate	32(48)	75% of moderate
Severe	44 (48)	91.66% of severe
Very severe	16(16)	100% of very severe
Total	96(120)	80% OF 120 COPD patients irrespective of COPD stages

Table 6: Frequency of RV Dilatation among COPD patients

Stages	RV Dilatation in numbers (total)	Percentage of RV dilation with severity of COPD
Mild	3(8)	37.5% of mild
Moderate	24(48)	50% of mod
Severe	25(48)	52% of severe
Very Severe	16(16)	100% very severe
Total	68(120)	56.66% of copd irrespective of stages

Table 7: Frequency of RA Dilatation among COPD patients

Stages	RA Dilatation in numbers (total)	Percentage of RA dilation with severity of COPD
Mild	0(8)	NIL
Moderate	4(48)	8% of mod COPD
Severe	9(48)	18.75 of Severe COPD
Very severe	8(16)	50% of very severe COPD
Total	21(120)	17.5% of COPD irrespective of stages

Out of total 120 COPD patients 94 (78.3%) had pulmonary hypertension. 100% of very severe, 81% of severe, 72% of moderate and 50% of mild COPD patients had pulmonary hypertension. 75% of very severe, 75% of severe, 58% of moderate COPD patients had diastolic dysfunction.

Due to prolonged hypoxia, pulmonary vascular's structural changes and pulmonary vasoconstriction due to acute hypoxia called alveolar hypoxia, these two are considered mechanism of action. There is relation between heart and lungs and any abnormality or dysfunction in one organ may have consequences on other. This interaction is very important in patients and have two types of association. First association share the risk of coronary disease and cigarette smoke or COPD and congestive heart failure. Second association that resulted from the primary lung disease due to dysfunction of heart e.g. ventricular dysfunction and pulmonary hypertension due to increase loads at intra-throic.

Table 8: Frequency of Pulmonary hypertension among COPD patients

Stages	Pulmonary hypertension in numbers (total)	Percentage of pulmonary hypertension
Mild	4/8	50% of MILD
Moderate	35/48	72% of moderate
Severe	39/48	81% of severe
Very severe	16/16	100% of very severe
Total	94/120	78.33% of COPD irrespective of stages

Table 9: Frequency of diastolic dysfunction among COPD patients

Stages	Diastolic dysfunction-76	F requency of diastolic dysfunction of COPD
Mild	0/8	NIL
Moderate	28/48	58.33% of moderate
Severe	36/48	75% of severe
Very severe	12/16	75% of very severe
Total	76/120	63.33% of 30 COPD patients irrespective of COPD Stages

The ratio between male and female selected patients was 9:1. As males have more outdoor exposure so due to smoking air pollution the prevalence of COPD in males is high as comparatively to females because females had more indoor exposure and they smoke less than men.

The number of COPD patients is increasing gradually as in 5th decade it was 40% and in 6th decade it was increased up to 34%. According to this study the major cases are from severe category and moderate category. In this study it was observed that

as the severity of the disease increased, the incidence of echo findings also increases.

CONCLUSION:

According to this study there was a direct relation found between right heart status and COPD. In this study it was found that most of the most of the COPD patients were either from severe category or moderate category or in them pulmonary hypertension and RV hypertrophy are common echo findings. There should be a routine echocardiography for early detection of right heart changes e.g. Diastolic dysfunction, RA dilation, RV hypertrophy and dilatation, Pulmonary hypertension, so that mortality and morbidity can be reduced by initiating the treatment at early stages.

REFERENCES:

1. Lozano R, Naghavi M, Foreman K. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study. *Lancet*. 2010;380(9859):2095–2128.
2. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease. Executive summary. *Med Commun Resour Inc*. 2007;p. 1–43.
3. Jindal SK, Aggarwal AN, Chaudhry K, Chhabra SK, D'Souza GA, et al. A multicentric study on epidemiology of chronic obstructive pulmonary disease and its relationship with tobacco smoking and environmental tobacco smoke exposure. *Indian J Chest Dis Allied Sci*. 2006;48:23–29.
4. Jindal SK, Aggarwal AN, Gupta D, Agarwal R, Kumar R, Kaur T. Indian study on epidemiology of asthma, respiratory symptoms and chronic bronchitis in adults (INSEARCH). *Int J Tuberc Lung Dis*. 2012;16:1270–1277.
5. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, et al. Disability‑adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990‑2010: A systematic analysis for the Global Burden of Disease Study. *Lancet*. 2010;380:2197–2223.
6. Murthy KJ, Sastry JG. Economic burden of chronic obstructive pulmonary disease. In: Rao KS, editor. *Burden of Disease in India*, National Commission on Macroeconomics and Health. New Delhi. New Delhi ; 2005., p. 264–274.
7. Salvi S, Agarwal A. India needs a national COPD prevention and control programme. *J Assoc Physicians India*. 2012;60:5–7.
8. Mannino DM, Thorn D, Swensen A, Holguin F. Prevalence and outcomes of diabetes, hypertension, and cardiovascular disease in chronic obstructive pulmonary disease. *Eur Respir J*. 2008;32:962–969.
9. Foster TS, Miller JD, Marton JP, Caloyeras JP, Russell MW, Menzin J. Assessment of the economic burden of COPD in the US: a review and synthesis of the literature. *COPD*. 2006;3:211–218.
10. Agusti AG, Noguera A, Sauleda J, Sala E, Pons J, Busquets X. Systemic effects of chronic obstructive pulmonary disease. *Eur Respir J*. 2003;21:347–360.
11. Gan WQ, Man SF, Senthilselvan A, Sin DD. Association between chronic obstructive pulmonary disease and systemic inflammation: a systematic review and a metaanalysis. *Thorax*. 2004;59:574–580.
12. Wouters EF, Groenewegen KH, Dentener MA, Vernooij JH. Systemic inflammation in chronic obstructive pulmonary disease: the role of exacerbations. *Proc Am Thorac Soc*. 2007;4:626–634.
13. Kessler R, Faller M, Fourgot G. Predictive factors of hospitalization for acute exacerbation in a series of 64 patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 1999;159:158–164.
14. Simonneau G, Robbins IM, Beghetti M. Updated clinical classification of pulmonary hypertension. *J Am Coll Cardiol*. 2009;54:43–54.
15. Gali N, Hoepfer MM, Humbert M. Guidelines for the diagnosis and treatment of pulmonary hypertension. *Eur Respir J*. 2009;34:1219–1263.
16. Andersen KH, Iversen M, Prevalence KJ. predictors and survival in pulmonary hypertension related to end-stage chronic obstructive pulmonary disease. *J Heart Lung Transplant*. 2012;31:373–380
17. Stone AC, Machan JT, Mazer J. Echocardiographic evidence of pulmonary hypertension is associated with increased 1-year mortality in patients admitted with chronic obstructive pulmonary disease. *Lung*. 2011;189:207–212.
18. Arcasoy SM, Christie JD, Ferrari VA. Echocardiographic assessment of pulmonary hypertension in patients with advanced lung disease. *Am J Respir Crit Care Med*. 2003;167:735–740.
19. Scharf SM, Iqbal M, Keller C. Hemodynamic characterization of patients with severe emphysema. *Am J Respir Crit Care Med*. 2002;166:314–322.s
20. Sertogullarindan B, Gumrukcuoglu HA, Sezgi C. Frequency of pulmonary hypertension in patients with COPD due to bio-mass smoke and tobacco smoke. *Int J Med Sci*. 2012;9:406–412.