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A study of prevalence of pulmonary hypertension in COPD patients

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Abstract

The leading cause of mortality and morbidity all over the world is Chronic obstructive pulmonary disease and the major cause for it is its complications. The most prevalent complication being Pulmonary Hypertension. According to WHO data in 2002, COPD was the fifth leading cause of death. The prevalence of disease is rising among males and females equally because of increasing trends of tobacco usage. Deaths will increase by more than 30% in the next 10 years as predicted by the data. In 2030, the third leading cause of death will occur due to COPD. (Katiyar) It has also been observed non smoking females in rural population also suffer from COPD due to biomass smoke exposure at the time of cooking. (Sertogullarindan) Definition of Chronic obstructive pulmonary disease (COPD): it is an airflow obstruction resulting from an inflammatory process, which affects the parenchyma of lungs and airways. The presenting features are respiratory symptoms, which are confirmed by spirometry. The changes are not only limited to airways affects pulmonary vessels (Barbera) GOLD and BOLD are the two terms related to COPD. The Global initiative for Chronic Obstructive Lung disease (GOLD) has defined COPD as post-bronchodilator forced expiratory volume in one second (FEV₁)/forced vital capacity (FVC) 70.5.

Keywords: Pulmonary hypertension, prevalence, COPD

Introduction

According to WHO data in 2002, COPD was the fifth leading cause of death. The prevalence of disease is rising among males and females equally because of increasing trends of tobacco usage. Deaths will increase by more than 30% in the next 10 years as predicted by the data. Many such reports have been published in different populations around the world. Very few studies shed light in the local population and this study is intended to study the same. The estimated worldwide prevalence of 10% in adults is seen for Chronic obstructive pulmonary disease (COPD), the prevention and treatment cost remain a challenge. The main vascular complication of the disease is pulmonary hypertension (PH) which is defined as a resting mean pulmonary artery pressure (mPAP) \geq 25 mm Hg. According to World Health Organization (WHO) classification it is classified in group III when associated with COPD. (Andersen) Studies available in relation to pulmonary hypertension in COPD are very less. Safdar *et al.* Concluded that mild PH is seen in COPD. If PH is 40mmHg, then one should look for other etiologies of PH. But they have also found severe PH in moderate cases of COPD and it was found associated with poor prognosis (safdar). Andersen *et al.* Stated the inverse correlation of PH with the prognosis.

Pulmonary hypertension (PH) associated with parenchymal lung diseases is one of the most common forms of PH. Studies in patients with advanced COPD and hypoxemia have shown a very high prevalence of PH; however, prevalence in mild and moderate COPD is not known. Typical hemodynamic abnormalities include mild-to-moderate elevations in pulmonary artery pressure (PAP) and pulmonary vascular resistance with a preserved cardiac output. A small proportion (< 5%) of patients may have significant elevations in PAP (mean PAP > 35-40 mm Hg) in the presence of mild airflow limitation and are believed to have disproportionate PH. COPD-associated PH has significant clinical implications because it can produce functional limitation and has a negative impact on prognosis. Doppler echocardiography is the best non-invasive test, but non-invasive methods used for diagnosis are prone to error and cannot be relied on when making or refuting the diagnosis of PH. All patients require right-sided heart catheterization if treatment with PH-specific medications is

contemplated. The most important steps in managing these patients are: ^[1-7] confirm the diagnosis; ^[2, 8, 9] optimize COPD management; ^[3] rule out comorbidities; ^[10-13] assess and treat hypoxemia; and ^[5] enroll the patient in pulmonary rehabilitation, if indicated. In patients with PH and advanced airflow limitation, lung transplantation offers the best opportunity for long-term benefit. The role of PH-specific medications remains poorly defined and requires further study but may be considered in patients with disproportionate PH.

Aims and Objectives

To study the Prevalence of Pulmonary Hypertension in COPD Patients

Materials and Methods

This study was done in the Department of General Medicine, Srinivas Institute of Medical Sciences, Mangalore.

The study was done from April 2017 to April 2019

The patients sample size was 100.

Inclusion Criteria

- The history of the patients should include a follow up sheet at 3rd and 6th month.

Exclusion criteria

- Patients on immunodeficiency, steroid therapy or immune modulator drugs.
- Without complete follow up history.

Results

Table 1: Mean age of the Subjects

Mean Age	Std. deviation
51±2.4 years	± 11.32years

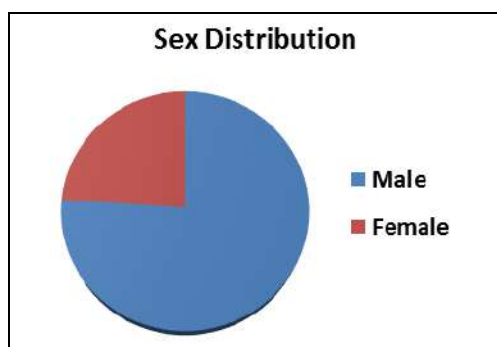


Fig 1: Sex Distribution

Table 2: Prevalence of pulmonary hypertension as by echocardiography

Total patients	Pulmonary hypertension prevalence	Percentage
100	19	19 percent

Table 3: Prevalence of pulmonary hypertension (gender specific)

Total patients	Pulmonary hypertension prevalence	Percentage
100	19	19%
76 males	15	19.73%
24 females	04	16.66%

Table 4: Mean age of Prevalence of pulmonary hypertension

Pulmonary hypertension prevalence age	Standard deviation
67.26 years	±3.42

Table 5: Mean FEV1

Total	Mean FEV1
100	48.41

Discussion

The disease is further classified into four stages based on calculated FEV1. Burden of obstructive disease initiative (BOLD) reported 10.1% as prevalence of COPD stage II or higher. Among GOLD's important objectives are to increase awareness of COPD and to help the thousands of people who suffer from this disease and die prematurely from COPD or its complications. (PAUWELS) GOLD aims to improve prevention and management of COPD through a concerted worldwide effort of people involved in all facets of health care and health care policy, and to encourage a renewed research interest in this extremely prevalent disease. (Vikas) Pulmonary hypertension (PH) is a well-known predictor of increased morbidity and mortality in COPD.) Definition of PH: Right ventricular systolic pressure (RVSP) was measured using the modified Bernoulli equation: $RVSP = 4(TRV)^2 + RAP$. Right atrial pressure (RAP) was estimated by degree of inferior vena cava collapse on inspiration (RAP = 5 mmHg if complete, 10 mmHg if partial, and 15 mmHg if there was no collapse on inspiration) as previously Described. (STONE) Pulmonary hypertension (PH) is the hemodynamic manifestation of various pathological processes that result in elevated pulmonary artery pressures (PAP). 1,2 The current hemodynamic definition of PH is a mean PAP 25 mm Hg with a pulmonary capillary wedge pressure (PCWP), left atrial pressure or left ventricular end-diastolic pressure 15 mm Hg and pulmonary vascular resistance (PVR) 3 Wood units. These criteria define PH associated with multiple other disease processes including chronic obstructive pulmonary disease (COPD). (Safdar) Hypoxia induced pulmonary vasoconstriction is a protective response to keep ventilation-perfusion ratio optimum by shunting blood away from the hypoxemic areas. The traditional hypoxic model of PH is based on the hypothesis that chronic hypoxia initiates vascular remodeling leading to permanent changes in pulmonary vasculature. Studies performed *in vitro* elucidated the mechanisms underlying hypoxia driven vascular changes.

Conclusion

The prevalence of pulmonary hypertension in COPD patients is successfully done. This would be a boon to the practising physicians and is intended to help the budding general practitioners.

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