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Original Research Article

Prevalence of coronary artery disease in chronic obstructive pulmonary disease patients- a retrospective observational study

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is characterized by chronic inflammation that results in progressive and irreversible air flow obstruction usually caused by an inflammatory response of the lungs to noxious particles and gases. There are periods of acute episodes of worsening and exacerbation. COPD was predicted to be the third leading cause of death worldwide by 2020, is a major cause of disability adjusted life years (DALY). Patients with COPD are often complicated by coronary artery disease (CAD), both of which are public health problems. There are probably a lot of mechanisms involved in the co-existence of these comorbidities like ageing, sedentary life style, systemic inflammation, atherosis and arterial stiffness. The confirmation of this comorbidity in COPD is very important as it can have implications in the management of the disease.
Methods: This observational study was done in a tertiary care hospital in Central Kerala. It was a retrospective observational study. 100 patients were included in the study.
Results: Out of 100 COPD patients that were included in the study, 27% of them had CAD as a comorbidity which implies that all patients with COPD should be screened for CAD as well.
Conclusions: All COPD patients should be screened for a coexisting CAD.

Keywords: COPD, CAD, HT, Inflammation

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common respiratory condition involving the airways and characterized by airflow limitation. Central role in the pathophysiology of COPD is a chronic inflammation of the airways that is expressed primarily by increased numbers of goblet cells, mucus gland hyperplasia, fibrosis, narrowing and reduction in the number of small airways and airway collapse due to the loss of tethering caused by alveolar wall destruction resulting in emphysema. COPD is characterised by lung inflammation that may persist even after smoking cessation. This inflammation is heterogeneous but the key inflammatory cell types involved are macrophages, neutrophils and T cells. The lung cells may also produce inflammatory mediators like TNF alpha, interleukin 6, interleukin 1, reactive oxygen species. COPD is also associated with systemic inflammation and there is a markedly increased risk of CAD and lung cancer in patients with COPD. This is a grey area and there is a requirement for further studies to define the relationship between the inflammatory process of COPD and CAD.

COPD patients often have comorbidities. which are associated with worse outcomes such as impaired quality of life, increased frequency of hospital admissions, worse therapeutic response, and even increased mortality. COPD is an important public health problem and is predicted to be the third leading cause of death by 2020 and is a major cause of DALY.[1,2]

Inflammation has been recognised to have a role in atherosclerosis particularly in the context of CAD. Immune and inflammatory cells are an important component of atheroma. Macrophages and T cells infiltrate the atheroma with the production of mediators and cytokines which play an important role in acute thrombosis and CAD.[3,4] In patients with COPD, there is a higher risk of CAD (OR 2.0), angina (OR 2.1) and myocardial infarction (OR 2.2).[5] In general, the presence of comorbidities is associated with the worst prognosis, but the impact of different comorbidities on outcomes varies significantly. Identification of the type of comorbidity and the possible clinical impact on the risk of exacerbations, impairment in quality of life, reduction of physical activity, and increased mortality, might help clinicians to improve the patient care in COPD population.

METHODS

This was a retrospective observational study done in a tertiary care hospital.

Design

100 COPD patients meeting the inclusion and exclusion criteria were considered for the study. The study was conducted over a 5-month period from February 2015-June 2015.Ethical clearance was obtained from the IEC. This was intended to be a pilot study and hence, sample size was not calculated.

Inclusion criteria

All COPD patients less than 80 years of age were included. The diagnosis of COPD was made on a baseline PFT done earlier showing a post bronchodilator FEV1/FVC ratio of less than 70% or was on treatment for COPD from a pulmonologist.

Exclusion criteria

Patients with age more than 80 years, renal or hepatic failure, and on treatment for pulmonary tuberculosis were excluded.

Procedure

A retrospective observational study was carried out after getting approval from IEC. Patients meeting the inclusion and exclusion criteria were included in the study. Data such as age, gender, duration of COPD symptoms, medication history, details of comorbidities was obtained. A patient was considered to have CAD if his previous angiogram report showed at least 1 coronary artery (left main [LM], left anterior descending artery [LAD], right coronary artery [RCA] or left circumflex [LCX]) stenosis ≥50% or patient had a stress test positive for inducible ischaemia and was on treatment for CAD by the cardiologist.

Analysis

Data analysis was done using statistical package for the social sciences (SPSS) software.

RESULTS

The total number of patients were 100. The age wise distribution is as given in Table 1. Majority of patients were in the age group of 60-70 years.

Table 1: Age distribution.

Age (in years)	Number
<50	10
50-60	30
60-70	41
70-80	19

The prevalence of COPD is two to three times higher in people over the age of 60 years than in younger age groups. Indeed, COPD has been considered a condition of accelerated lung ageing.

Several mechanisms associated with ageing are present in the lungs of patients with COPD. Cell senescence is present in emphysematous lungs and is associated with shortened telomeres, elevated levels of inflammation, oxidative stress and changes in both adaptive and innate immune responses.

Table 2: Gender wise distribution.

Gender	Total (n=100)
Males	89
Females	11

89 out of the 100 patients were males and the remaining 11 were females (Table 2) highlighting the importance of smoking as a risk factor for COPD.

Although increasing tobacco consumption among women during the past several decades is linked to the rising prevalence of COPD in women, the relationship may be more complex, including additional factors such as differential susceptibility to tobacco, greater exposure to indoor air pollution, anatomic and hormonal differences, as well as behavioral differences in response to available

therapeutic modalities. Our study showed a male preponderance.

Table 3: CAD and HT as comorbidities.

COPD	n=100
CAD	27
HT	43

Out of the 100 patients enrolled in the study, 27 of them had CAD and were on treatment in addition to their treatment for COPD. 43 of them had hypertension as well (Table 3). This suggests that nearly one fourth of the COPD patients had CAD and less than half of them had systemic hypertension as comorbidities which warrants a regular screening of all COPD patients for cardiovascular problems as these may have implications in the diagnosis and further management.

DISCUSSION

The prevalence of CAD as comorbidity among COPD patients in this study was 27%. The overall prevalence of cardiovascular disease in COPD patients in various studies ranged from 28% to 70%.[6,7] In the evaluation of COPD longitudinally to identify predictive surrogate end-points (ECLIPSE) study, ''heart trouble'' was reported in 26% of 2164 COPD patients, compared with 11% of 337 smoking controls, and MI was reported in 9% versus 3%.[8] COPD and CAD share several risk factors such as smoking, ageing and sedentary life style. Patients with limitation of airflow present a high risk of mortality for myocardial infarction which is independent of age, gender, smoking habit and thus COPD may represent an independent risk factor for cardiovascular morbidity.[9-11]

The associated concomitant COPD and heart disease, especially if the cardiovascular status has never been investigated, is of prime importance in clinical practice. Indeed, both beta 2 agonists and antimuscarinics should be used in caution in such patients as these drugs may worsen any concomitant and undiagnosed CAD. While a systematic review of long-acting β2-agonists (LABAs), in combination with inhaled corticosteroids (ICS), concluded that ICS/LABA products may have a good CV safety profile in asthma patients, evidence for the CV safety of LABAs in COPD is less definitive.[12] LABAs have been associated with an increased risk of CV events, possibly due to stimulation of sympathetic drive, which may also increase the risk of arrhythmias and myocardial ischaemia in patients with CVD.[13,14]

Limitations

This study has certain limitations. This was a pilot study which underlines the need for future larger studies so as to know the exact prevalence of CAD in COPD patients in order to integrate the services of both the departments for better patient management.

CONCLUSION

We wish to conclude that all patients with COPD should undergo a routine cardiac screening to pick up a concomitant CAD. Management of concomitant COPD and CAD can often be challenging and hence integration of outpatient services for detection of CAD in COPD patients is the need of the hour.

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REFERENCES

1. Vestbo J, Hurd SS, Agustí AG, Jones PW, Vogelmeier C, Anzueto A, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. Am J Respir Crit Care Med. 2012;187:347-65.
2. Mannino DM, Buist AS. Global burden of COPD: risk factors, prevalence, and future trends. Lancet. 2007;370:765-73.
3. Hansson GK. Inflammation, atherosclerosis, and coronary artery disease. New Engl J Med. 2005;352:1685-95.
4. Libby P, Tabas I, Fredman G, Fisher EA. Inflammation and its resolution as determinants of acute coronary syndromes. Circ Res. 2014;114:1867-79.
5. Finkelstein J, Cha E, Scharf SM. Chronic obstructive pulmonary disease as an independent risk factor for cardiovascular morbidity. Int J Chron Obstruct Pulm Dis. 2009;4:337-49.
6. Mannino DM, Thorn D, Swensen A, Holguin F. Prevalence and outcomes of diabetes, hypertension and cardiovascular disease in COPD. Eur Respir J. 2008;32:962-9.
7. Gupta R. Burden of coronary heart disease in India. Indian Heart J. 2005,57:632-8.
8. Ghaffar A, Reddy KS, Singhi M. Burden of non-communicable diseases in South Asia. Br Med J. 2004;328:807-10.
9. Divo M, Cote C, de Torres JP, Casanova C, Marin JM, Pinto-Plata V, et al. Comorbidities and risk of mortality in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2012;186:155-61.
10. Smith MC, Wrobel JP. Epidemiology and clinical impact of major comorbidities in patients with COPD. Int J Chron Obstruct Pulmon Dis. 2014;9:871-88.
11. van den Akker M, Buntinx F, Knottnerus JA. Comorbidity or multimorbidity: what's in a name? A review of literature. Eur J Gen Pract. 1996;2:65-70.
12. Iftikhar IH, Imtiaz M, Brett AS, Amrol DJ. Cardiovascular safety of long acting beta agonist-inhaled corticosteroid combination products in adult

patients with asthma: a systematic review. Lung. 2014;192:47-54.
13. Salpeter SR, Ormiston TM, Salpeter EE. Cardiovascular effects of β-agonists in patients with asthma and COPD: a meta-analysis. Chest. 2004;125:2309-21.
14. Gershon A, Croxford R, Calzavara A, To T, Stanbrook MB, Upshur R, et al. Cardiovascular safety of inhaled long-acting bronchodilators in individuals with chronic obstructive pulmonary disease. JAMA Intern Med. 2013;173:1175-85.

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