Original research article

PREVALENCE OF RISK FACTORS AND COMORBID CONDITIONS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS

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Abstract

Introduction: COPD is associated with several risk factors and co morbid conditions. Dealing with co-morbidity needs a patient centered approach, rather than a disease oriented approach7. The present study was conducted to study risk factors and co morbid conditions of COPD patients.

Material and Methods: The present study was conducted in department of Pulmonary Medicine at Shri Ram Murti Smarak Institute of Medical Sciences with respiratory complaints over a period of one and a half year. The data was collected in terms of demographic features, anthropometric measurements and various risk factors and co morbid conditions. Spirometry was performed thrice and the largest values of both FVC and FEV1 were noted from three technically satisfactory curves. COPD severity was classified based on Spirometric assessment according to the GOLD classification. Categorical variables were analyzed using proportions and percentages.

Results: In a study of 201 cases that were diagnosed as a case of COPD the mean age was 62.6 years and male predominance. Majority of the patients had sedentary life style and were from poor class. The co morbid conditions anemia, cardiac, hypertension, diabetes mellitus, lipid disorders, thyroid disorders, osteoporosis, psychiatric illness, ophthalmic defects and obstructive sleep apnea was found in 43.8%, 52.2%, 65.2%, 52.2%, 51.7%, 64.7%, 72.1%, 66.7%, 28.9% and 54.2% respectively.

Conclusion: Co morbidities should be taken into consideration while prescribing multiple drugs so that side effects and interactions of drug can be monitored and quality of life can be improved.

Keywords: Risk factors, co morbid conditions, chronic obstructive pulmonary disease

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common condition affecting 4-9% adult population and ranks among the five most common causes of death worldwide.[1,2] It is a preventable and treatable disease with some significant extra pulmonary effects that may contribute to the severity in individual patients.

COPD is associated with several co morbidities. Traditionally, co morbidity is defined as a disease coexisting with the primary disease of interest. In COPD this definition is slightly problematic since certain coexisting illnesses may be a consequence or may present a causal association with COPD.[3] The most common co morbidities described in association with COPD are[4]: hypertension, diabetes mellitus, heart failure, ischemic heart disease, cardiomyopathies, arrhythmias, depression and anxiety, loss of bone mineral density and osteoporosis, metabolic syndrome, malignancy, anemia, hypothyroidism, obesity and senile cataract.

Importance of taking co morbidities into consideration[5] may help in prescribing multiple drugs, side effects and interactions of drug can be monitored and quality of life can be improved. Dealing with co-morbidity needs a patient centered approach, rather than a disease oriented approach[5]. The present study was conducted to study risk factors and co morbid conditions of COPD patients.

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MATERIALS & METHODS

The study was conducted in department of Pulmonary Medicine at Shri Ram Murti Smarak Institute of Medical Sciences with respiratory complaints over a period of one and a half year from 1st November 2013 to 30th June 2015.

Inclusion Criteria: All patients of COPD attending OPD (defined as chest symptoms who show a post bronchodilator FEV1/FVC <0.7); age 30 years or more; willing to undergo assessment of associated co morbid conditions.

Exclusion Criteria: Other obstructive airway diseases like bronchial asthma and bronchiectasis; inability to undergo the lung function testing; any condition that could unacceptably increase the subject's risk of performing any of the testing.

The following patient data was documented:

Demographic information (name, age, sex, ID number), anthropometric measurements (height and weight), history of cigarette smoking, COPD categorization as per GOLD guidelines[6], test results to rule out co-morbidities (complete blood count, renal function test and liver function test), chest x-ray – P/A view, spirometry, cardiac evaluation (ECG, 2D-Echo if required), endocrinology evaluation (blood sugar - fasting and post prandial, HbA1c, lipid Profile, thyroid Profile), orthopedic evaluation (x-rays – bilateral hip and knee joints, bone mineral density if required), psychiatry evaluation, ophthalmology evaluation and polysomnography (if required).

Spirometry was done to measure the volume of air forcibly exhaled from the point of maximal inspiration (forced vital capacity, FVC) and the volume of air exhaled during the first second of this maneuver (forced expiratory volume in one second, FEV1), and the ratio of these two measurements (FEV1/FVC) was calculated. Spirometry measurements were evaluated by comparison with reference values based on age, height, sex, and race. For greater accuracy spirometry was performed thrice and the largest values of both FVC and FEV1 were noted from three technically satisfactory curves.[6]

COPD severity was classified based on Spirometric assessment according to GOLD classification (Table-1).

In patients with FEV1/FVC < 0.70:

The co morbid conditions were identified using standard tools:

Table-1: Classification of COPD severity on spirometric assessment

1	GOLD	Mild	FEV1 ≥ 80% predicted
2	GOLD	Moderate	50% ≤ FEV1 < 80% predicted
3	GOLD	Severe	30% ≤ FEV1 < 50% predicted
4	GOLD	Very Severe	FEV1 < 30% predicted

- Hypertension according to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7)[7].

- Diabetes Mellitus[8], Anemia[9], Thyroid Disorder (Hypothyroidism, Hyperthyroidism)[10] – According to WHO Criteria.

- Osteoporosis – According to WHO classified by T score[11].

- Psychiatry Illness (Anxiety and Depression disorders) – According to Hamilton Anxiety Rating Scale (HAM-A)[12], Hamilton Depression Rating Scale (HDRS)[13].

- Obstructive Sleep Apnea - Based on Apnea Hypoapnea Index values[14].

Statistical Analysis: Data were entered using Microsoft Excel 2010 and statistical analysis was done using IBM SPSS v 20.0.0. Categorical variables were analyzed using proportions and percentages. Association between categorical variables was established by Chi square and odds ratio (OR) with 95% confidence intervals (CI) where applicable.

RESULTS

The study was carried out on 201 cases who were diagnosed as a case of COPD. Majority of patients were in the age group of 61-70 years with the mean age of 62.6 years. There was male predominance with the male to female ratio of 2.3:1. More than half of the patients (54.7%) had history suggestive of sedentary life style and around 69.2% were from poor class.

Only 8% (16 patients) had a history of occupational hazards. Almost 95% (190 patients) had the history of smoking and long term chullah smoke exposure. Around one third (31.3%) of the patients were alcoholic.

According to body mass index, classified as underweight, normal, over weight and obese were 14.43%, 35.32%, 15.42% and 34.83% respectively.

Out of all the patients studied, the patients classified as mild, moderate, severe and very severe COPD were 24.4%, 40.8%, 31.3% and 3.5% respectively. Table 2 illustrates the

classification of various co morbid conditions within the study population.

Table-2: Classification of various co morbid conditions within the study population

Characteristics	n (%)
Anemia	
Non-anaemic	113 (56.2)
Mild Anaemia	51 (25.4)
Moderate Anaemia	31 (15.4)
Severe Anaemia	6 (3.0)
Cardiac Illness	
Normal	96 (47.8)
Cor pulmonale	53 (26.4)
Coronary Heart Disease	21 (10.4)
Ischaemic Heart Disease	3 (1.5)
Pulmonary Artery Hypertension	25 (12.4)
Cardiomyopathies	3 (1.5)
Severity of Hypertension	
Normal	70 (34.8)
Pre-hypertension	7 (3.5)
Hypertension I	70 (34.8)
Hypertension II	54 (26.9)
Severity of Hyperglycemia	
Normal	96 (47.8)
Diabetes Mellitus	68 (33.8)
Impaired Fasting glycaemia	17 (8.5)
Impaired Glucose Tolerance	20 (10.0)
Lipid Disorders	
Normal	97 (48.3)
Hypercholesterolemia	60 (29.9)
Hypertriglyceridemia	20 (10.0)
Mixed Hyperlipidemia	24 (11.9)
Thyroid Disorders	
Normal	71 (35.3)
Hypothyroidism	119 (59.2)
Hyperthyroidism	11 (5.5)
Osteoporosis Severity	
Normal	56 (27.9)
Osteopenia	58 (28.9)
Osteoporosis	71 (35.3)
Severe Osteoporosis	16 (8.0)
Psychiatric Illness	
Normal	67 (33.3)
Depression	120 (59.7)
Anxiety	14 (7.0)
Ophthalmic Defects	
Normal	143 (71.1)
Cataract	58 (28.9)
Obstructive Sleep Apnea	
Normal	92 (45.8)
Mild OSA	58 (28.9)
Moderate OSA	36 (17.9)
Severe OSA	15 (7.5)

DISCUSSION

COPD often coexists with other diseases (co morbidities) that may have a significant impact on prognosis.[15-20] Some of these arise independent of COPD whereas others may be causally related, either with shared risk factors or by one disease actually increasing the risk of another.

Correlation of COPD and Anaemia

In a study by Lorena Comeche Casanova et al[21] one hundred and thirty patients were included and anemia prevalence was 6.2%. On the other hand Donald S Silverberg et al[22] showed that 107 consecutive patients hospitalized with an AECOPD, 47 (43.9%) were found to be anemic on admission. Alexandru Corlateanu MD et al[23] showed anemia was present in 31% elderly patients and in 28% young patients with COPD.

In the present study anemia of different grades was present in almost 44% of cases. The variability in the prevalence of anemia may be due to different life style and food habits in different region of the study group. The different causes of anemia needs to be evaluated to find out the difference in the findings of different study.

Correlation of COPD and cardiac illness

Michela Bellocchia et al[24] in a study of 129 consecutive patients with COPD found cardiovascular disease in 65 patients (50.3%) which is almost similar to our finding (52.7%).

Pilar de Lucas-Ramos et al[25] did a case–control study (CONSISTE study) and 1200 COPD patients and 300 control subjects were recruited and reported that compared with the control group, the COPD group showed a significantly higher prevalence of ischemic heart disease (12.5% versus 4.7%; P , 0.0001). In our present study we had a lower prevalence (1.5%). This can be attributed to a smaller group of study population.

D.M. Mannino et al[17] published a study which analysed data from 20,296 subjects and reported that in subjects with GOLD stage 3 or 4 COPD had a higher prevalence of cardiovascular disease (OR 2.4, 95% CI 1.9–3.0).

Correlation of COPD and Hypertension

A study was conducted by P. Skyba et al[26] of 23 patients with acute exacerbations of COPD were evaluated and the use of NPPV resulted in significant increases of oxygen saturation in association with reductions in systolic and diastolic blood pressures and heart rate.

Dipak Chandy et al[27] reported in their review that systemic hypertension and chronic obstructive pulmonary disease (COPD) frequently coexist in the same patient, especially in the elderly.

In a study published by D.M. Mannino et al[17] reported that subjects with GOLD stage 3 or 4 COPD had a higher prevalence of hypertension (OR 1.6, 95% CI 1.3–1.9).

In present study prevalence of hypertension was 65.2% (131) and out of which 7 (3.5%) belonged to pre-hypertension and around 70 (34.8%) of the patients were classified into hypertension class I and 54 (26.9%) belonged to hypertension class II.

Correlation of COPD and Diabetes mellitus

In a study by G. P. Mishra et al[28] of 45 subjects demonstrated correlation of FEV1% with duration of diabetes (P<0.05) and RV/TLC% (p<0.05) & also of FVC % (Forced Vital Capacity %) with duration of diabetes (P<0.05).

Craig P Hersh et al[29] conducted a study and 4197 COPD subjects were evaluated out of which 1687 were classified as emphysema-predominant and 1817 as non-emphysematous. Self-reported diabetes was more frequent in non-emphysematous COPD (OR 2.13, p < 0.001), which was also confirmed using a strict definition of diabetes based on medication use.

Aibek E Mirrakhimov[30] reported that chronic obstructive pulmonary disease may be considered as a novel risk factor for new onset type 2 diabetes mellitus.

In our study diabetes mellitus was found to be prevalent in 105 (52.2%) patients out of which 68 (33.8%) had diabetes mellitus and 17 (8.5%) patients had impaired fasting glycemia and 20 (10.0%) had impaired glucose tolerance.

Correlation of COPD and Lipid disorders

In a study conducted by R. Graham Barr et al[31] on 1003 patients with COPD evaluated and reported that hypercholesterolemia was found in 52% of total patients.

In the present study only around 30% (60 patients) had Hypercholesterolemia. Hypertriglyceridemia and Mixed Hyperlipidemia were found in 10.0% and 11.9% respectively.

Correlation of COPD and Thyroid disorders

Study done by Gulfidan Aras et a[32] 21 patients within the exacerbation period of COPD were evaluated and found that 33.33% of the patients with COPD exacerbation had free T3 levels below the normal values, and 14.28% of the patients had TSH levels below the normal values. Another study by Gupta Madhuri et al[33] there was a significant difference with respect to BMI and mean serum FT3. Mean serum TSH was within normal limits but had lower values than controls. FT4 was within normal limits.

A study was conducted by R. Prakash et al[34] in which 96 cases of acute exacerbations of COPD were analysed and found that 62 patients had lower than normal thyroid functions, among whom the levels of T3, T4, and TSH were decreasing during the exacerbation stage and more significantly in above 60 years of age group.

In our study prevalence of thyroid disorders was 64.7% (130) and out of which around 119 (59.2%) patients had hypothyroidism and only 11 (5.5%) had hyperthyroidism.

Correlation of COPD and Osteoporosis severity

In our study of osteoporosis severity 58 (28.9%) patients had osteopenia, 71 (35.3%) had osteoporosis and only 16 (8.0%) had severe osteoporosis. Nuttapol et al[35] in 102 male stable COPD patients showed the overall prevalence of osteoporosis and osteopenia was 31.4% and 32.4%, respectively which is almost similar to our study.

Roozbeh Naghshin et al[36] in a study of one hundred volunteer men with history of at least 20 pack year cigarette smoking were divided into two groups of COPD and control. The frequency of osteoporosis in COPD and control group was 52% (26 patients) and 8% (4 persons) respectively.

Correlation of COPD and Psychiatric disorders

Balchand Motiani et al[37] conducted a study and 63 patients were included and showed that mild to moderate depression was found in 10 (15%) patients.

Athanasios Tselebis et al[39] included 139 COPD outpatients and regarding the SCL-90-R dimensions, depression was the highest followed by somatization, obsessive compulsive and anxiety dimensions.

E.J. Wagena et al[39] in a study of 118 patients with COPD, a random sample of 500 subjects from the general population and 500 psychiatric outpatients reported that the sample of patients with COPD experienced significantly more psychological distress than the general population and significantly less than psychiatric outpatients.

Deependra Kumar Rai et al[40] conducted a study and 84

COPD patients were included and depression was observed in 64.28 % of chronic obstructive pulmonary diseases patients. Our present study also showed depression in almost 60% of patients.

Correlation of COPD and Ophthalmic defects

R. Graham Barr et al[31] in patients of COPD reported cataract in 31% of total patients110 which is similar to our finding (28.9%).

Correlation of COPD and Obstructive sleep apnea severity

Aggelos S. Aggelakas[41] reported in their review that COPD and OSA are prevalent worldwide and their effect becomes even higher when these diseases coexist. Carlos Zamarron et al[42] also had the similar view that often coexist within an individual. Brian Mieczkowski et al[43] in their review that it is not surprising that many people with COPD also suffer from OSA.

In our study obstructive sleep apnea was prevalent in 109 (54.2%) and out of which 58 (28.9%) patients had mild OSA and 36 (17.9%) patients had moderate OSA and 15 (7.5%) had severe OSA.

CONCLUSION

Data on the prevalence of individual co morbidities among patients with COPD are highly variable. This may partly be due to differences in the methods of data acquisition, which range from self reported survey data to administrative database analysis.

When trying to determine the best diagnostic or treatment modality for given patient, physician often look to disease specific clinical guidelines for recommendations to guide clinical decisions. Even the strongest recommendation, however are meant to be interpreted within the context of individual patient preferences and goals of care. A physician must use his/her clinical judgment when applying these guidelines to medical practice.

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