



Pulmonary Medicine

A STUDY OF ASSOCIATION BETWEEN GOLD CATEGORISATION AND COMORBIDITIES AMONG COPD PATIENTS AT A TERTIARY CARE HOSPITAL

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ABSTRACT **Background:** COPD is associated with many comorbidities. The revised GOLD categorization of COPD A to D is based on symptoms and exacerbation. The current study aimed to determine the association of GOLD group A to D with major comorbidities. **Methods:** A total of 171 patients were studied with COPD. Comorbidities were included according to available medical records and relevant investigations. Ischemic heart disease(IHD), Diabetes Mellitus(DM), Hypertension(HTN), and Gastroesophageal reflux disease(GERD) were the major comorbidities included. Pulmonary Tuberculosis though not a comorbidity was also included to observe its association with COPD. **RESULTS:** It was observed in the present study that COPD group B was associated with most of the comorbidities. The most common comorbidity was IHD(Ischemic heart disease). **CONCLUSION:** COPD is not only associated with comorbidities but it also affects the course of the said comorbidities. Categorization of COPD in groups A to D helps not only to assess severity but also for better medical care for COPD patients.

KEYWORDS :

INTRODUCTION:

COPD is defined as airflow obstruction that does not change appreciably over a period. It is a syndrome composed of chronic bronchitis, emphysema, and small airway disease. This is normally due to smoking, but recurrent infection also contributes to the process. Whilst, preventable and increasingly treatable the airflow obstruction seen in COPD is usually progressive. COPD often coexists with other diseases have a significant impact on prognosis. Some of this arises independently of COPD whereas others are causally related either by shared risk factors or by some disease increasing the risk of compromising the severity of others. Comorbidities are common at any severity of COPD. Some of the comorbidities are Heart failure, IHD, Peripheral vascular diseases, Hypertension, Lung cancer, Gastroesophageal Reflux Disease, Osteoporosis, Anxiety and Depression, Metabolic Syndrome, Bronchiectasis, etc. The GOLD classification of COPD in four classes of A, B, C, and D not only helps in the categorization of severity but also helps in the association of various comorbidities with COPD and vice versa^{1,2}.

MATERIALS AND METHODOLOGY:

SAMPLE SIZE

A total of 171 patients were studied.

STUDY DURATION

A period of one year from October 2021 to October 2022.

INCLUSION CRITERIA

1. All patients with COPD (FEV1/FVC<70%) with poor bronchodilator response and persistent non-variable dyspnea for months/years.
2. Chronic Active/Passive tobacco smokers of all age groups.
3. COPD patients with documented co-morbidities like Diabetes Mellitus, Hypertension, IHD, Stroke, Hyperlipidaemia, Metabolic Syndrome, etc.

EXCLUSION CRITERIA

1. Patients with FEV1/FVC<70% with a reversible bronchodilator response.

Those who do not give consent for the study

METHODOLOGY

COPD was categorized on basis of CAT assessment and mMRC dyspnea scale and was classified as A, B, C, D.

Various comorbidities were included on basis of patients' laboratory reports when they arrive in OPD and were confirmed by reviewing medications in the medical records and adding supplementary tests whenever applicable.

Bronchiectasis was recorded via clinical and or radiological methods. The questionnaire mentioned ahead is used to categorize COPD.

Spirometry was used to assess the GOLD clinical stage.

DM was measured by medical records and relevant tests like RBS(FBS, PPBS). If necessary, HBA1C was included as well for glycemic control as well as symptom exacerbation.

IHD was included with help of medical records, ECG study, 2D ECHO, and other supplementary tests(if relevant) to clinical scenarios e.g., cardiac markers, if the patient presented with an acute cardiac emergency.

Hypothyroidism was documented with relevant medical records, drug history, S. TSH, S. FT3, FT4, Lipid profile along with the above-mentioned tests were helpful for assessment of metabolic syndrome

Statistical analysis

Comparisons were performed using chi-square statistics and contingency tables for categorical data, and one-way analysis of variance for continuous variables. All analyses were performed using open-source packages such as R Studio, MS Excel®, and MedCalc® p-value of <0.05 was considered significant.

RESULTS:

In the current study, it was observed that the highest prevalence of COPD was among patients of 6th and 7th decades of life with male predominance(84.21%)

- The maximum number of COPD patients with co-morbidities falls into GOLD category B which accounts for 55% of the total COPD patients.
- The mean BMI of COPD patients is 20.80 Kg/m² ±4.53.
- 36.84% of patients with COPD had IHD, 30.99% had HTN, 11.11% had GERD
- 9.94% had DM majority of them falling into category B
- In the current study, 41 out of 171 patients(23.97%) with COPD had a history of Pulmonary tuberculosis. 12 out of 25 non-smokers patients had a history of pulmonary TB.(48%).

Category	IHD Present	IHD Absent	Total
A	11 (17.46%)	31 (28.7%)	42
B	34 (53.96%)	60 (55.55%)	94
C	2 (3.17%)	4 (3.70%)	6
D	16 (25.39%)	13 (12.03%)	29
Overall	63 (36.84%)	108 (63.15%)	171

Category	Hypertension Present	Hypertension Absent	Total
A	15 (28.3%)	27 (22.88%)	42
B	27 (50.94%)	67(56.77%)	94
C	2 (3.77%)	4(3.38%)	06
D	09 (16.98%)	20(16.94%)	29
TOTAL	53 (30.99%)	118 (69.005%)	171

Category	h/o GERD Present	h/o GERD Absent	Total
A	6 (31.57%)	36 (23.68%)	42
B	7 (36.84%)	86 (56.57%)	94
C	2 (10.52%)	4 (2.63%)	6
D	4 (21.05%)	25 (16.44%)	29
Overall	19 (11.11%)	152 (88.88%)	171

Category	DM Present	DM Absent	Total
A	3(17.64%)	39(25.32%)	42
B	7(41.17%)	87(56.49%)	94
C	1(5.88%)	5(3.24%)	6
D	6(35.29%)	23(14.93%)	29
Overall	17(9.94%)	154(90.05%)	171

Category	History of tuberculosis present	History of tuberculosis Absent	Total
A	4 (9.75%)	38 (29.23%)	42
B	22 (53.65%)	72 (55.38%)	94
C	2 (4.87%)	4 (3.07%)	6
D	13 (31.10%)	16 (12.30%)	29
Overall	41 (23.97%)	130 (76.02%)	171

DISCUSSION:

The study was conducted at SSGH to identify and derive the association between comorbidities and categories of COPD (GOLD A, B, C, D). We have studied the prevalence of ischemic heart disease (IHD), Hypertension (HTN), Diabetes Mellitus (DM), Gastroesophageal reflux disease (GERD), and Tuberculosis (TB) amongst 171 patients.

Out of 171 patients, 55% (94/171) patients were in GOLD category B, 42 patients (24.5%) were in Category in A, 17 % patients (29/171) were in Category D and only 3.5% were in GOLD category C. The average age of patients admitted in our cohort was 62.41±10.80 years of age.

Amongst the subset studied at SSGH, we had a maximum enrolment of 63 patients in 60-69 years of age followed by 49 patients >70 years of age. In our subset age varied in the range of 35 years to 86 years and 84.2% (144/171) of patients in our study were males and 27% of patients were Females. A similar, male predominance of 60% was seen in the COSYCONET trial. There were 44.8% of males in the ECLIPSE trial. Out of 144 males, 56%,5.5%, and 18% of patients were in GOLD B, C, and D groups respectively. Comparatively higher males were enrolled in the GOLD C group as per the ECLIPSE trial (71%).

The average BMI of the Indian population according to WHO is 18.9-21. The average BMI in our study is within this range. Higher BMI in European trials (COSYCONET, ECLIPSE) could be due to racial differences and higher comorbidities associated with obesity.

In the current study, smoking addiction was found in 65.49% of subjects which is comparable to Xiaolong Li et al 52%³ and Framingham heart study 47.3%.

This cross-sectional study was aimed at studying the association of COPD with various comorbidities such as TB, Diabetes mellitus,

GERD, hypertension, and ischemic heart disease (IHD). We have studied 171 patients with COPD and classified them into GOLD A, B, C, and D categories and we studied the prevalence of these comorbidities.

In the current study, the prevalence of IHD in COPD patients is (36.84%) which is comparable to Paul Carter et al (29%), Rosa et al (10%), and COSYCONET TRIAL (15.9%). In our study, the maximum occurrence of IHD belongs to COPD Gold group B (53.96%, 34/63)^{4,5}.

In the current study the prevalence of Hypertension among COPD patients is (30.99%) which is comparable to Seon Hye et al (45.83%), Vinay et al (37.25%), and the COSYCONET trials 56.4%. The majority of patients lie in group B (50.94%)^{6,7,8}

In the current study, the prevalence of GERD among COPD patients is 11.11% which is comparable to Jinhee Kim et al (28%) and Bore et al (16.5%)^{9,10}

In the current study, the maximum occurrence of GERD belongs to COPD Gold group B (36.84%) In the current study, the prevalence of Pulmonary TB among COPD patients was 48% which is comparable to Lee et al (22.7%), Menezes et al (30.7%), and Aggarwal et al (32.44%). The maximum occurrence of Pulmonary TB belongs to COPD Gold group B (41.17%) (53.65%)^{11,12,13}.

CONCLUSION

Multiple comorbidities are prevalent among COPD patients. Presence of comorbidities causes frequent exacerbations, repeated hospitalisation and gradual worsening of breathlessness leading to poor quality of life and increased mortality. COPD with comorbidities requires multimodality approach and multidimensional treatment. Early screening, Pulmonary Rehabilitation, Vaccination, Early diagnosis of Comorbidities, Managing comorbidities, Optimising Pharmacotherapy for MDI/DPI for better compliance are all of utmost importance. Regular follow-ups and timely Intervention can significantly reduce the frequent exacerbations and hence huge economic burden on society. There needs to be increased research in this area to point to the importance of incorporating the complexities of multimorbidity with regard to decision making in patients with COPD.

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