

Disproportionate Dyspnea in COPD Need for Diffusion StudyMohan C Manjakara¹, Ritesh Kamal²¹Assistant Professor, Department of Pulmonary Medicine, Katihar Medical College and Hospital, Katihar, Bihar²Professor and Head of Department, Department of Pulmonary Medicine, Katihar Medical College and Hospital, Katihar, Bihar

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Corresponding Author: Dr. Ritesh Kamal

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Abstract:**Background:** Dyspnea, a very upsetting sensation of dyspnea that interferes with daily tasks, is becoming more common in individuals with respiratory conditions including chronic obstructive pulmonary disease (COPD). This study set out to find out how often dyspnea is in COPD patients and what factors are linked to it.**Methods:** Ninety COPD patients from the Department of Respiratory Medicine at Varjun Arjun Medical College participated in this cross-sectional study. The modified Medical Research Council Dyspnea Scale and the Dyspnea 12 Questionnaire were used to evaluate the dyspnea of the patients. The Hospital Anxiety and Depression Scale was employed to gauge the patient's anxiety and depression, and the COPD Assessment Test (CAT) was utilized to gauge the effects of the disease. The Kruskal-Wallis and Mann-Whitney tests were utilized to determine the relationship between the variables. Using multiple regression analysis, the most important component connected to dyspnea was identified.**Results:** Out of 90 patients, 76 male and 14 female practically all (92.8%) patients exhibited some degrees of dyspnea. Dyspnea was statistically significantly associated with age ($P < 0.001$), education ($P < 0.001$), marital status ($P < 0.001$), type of family ($P = 0.009$), working status ($P < 0.001$), duration of illness ($P < 0.001$), history of previous hospitalization ($P < 0.001$), status of hospitalization in the last year ($P < 0.001$), domiciliary oxygen therapy ($P < 0.001$), other comorbidities ($P < 0.001$), anxiety ($P < 0.001$), and depression ($P < 0.001$).**Conclusion:** According to the study's findings, dyspnea is a common symptom of COPD, and the most important characteristics linked to dyspnea in COPD patients were depression, length of illness, and CAT score.**Keywords:** Anxiety, Chronic Obstructive Pulmonary Disease, Depression, Dyspnea, Factors, Prevalence.

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Introduction

COPD is an inflammatory disease affecting the airways characterized by symptoms of exertional dyspnea, cough and sputum production.

This is associated with variable degree of airflow obstruction which is not fully reversible.

Airflow obstruction in COPD is generally progressive accompanied by airway hyper responsiveness to noxious particles and gases.

Aim of the Study

- To examine the correlation between airflow limitation (post bronchodilator FEV1) and grade of dyspnea in COPD patients according to MMRC grading of breathlessness
- To identify cases with dyspnea disproportionate to FEV1 and to check for any diffusion abnormalities especially in subjects having predominant emphysema

Materials and Methods

90 patients attending the Department of Respiratory Medicine Varjun Arjun Medical College were included in the study group

Period of study: From July to December 2022.

All the patients were subjected to detailed clinical examination including h/o smoking and occupational or other exposure to risk factors for airway disease

Exclusion Criteria: Patients with asthma those having underlying cardiac disease chest wall deformity, and neuromuscular disorders were excluded.**Review of Literature:** COPD by definition encompasses airway disease associated with airflow obstruction which is generally irreversible. According to GOLD guidelines, a post bronchodilator FEV1 of $< 80\%$ or FEV1/FVC ratio < 70 repre-

sents COPD. And it is a preventable and treatable accounting for high degree of disease specific mortality and morbidity.

Grading of COPD

- **Mild:** FEV1/FVC ratio >70. Post bronchodilator FEV1>80% OF PREDICTED
- **Moderate:** FEV1 between 80 and 50
- **Severe:** FEV1 between 50 and 30
- **Very severe:** FEV1 less than 30

Predisposing factors for COPD: Smoking is the most common cause. Smoking cessation is the most effective and cost effective way of treating COPD.

Indoor air pollution and biomass cooking in poorly ventilated room is one common reason for non-smoking subjects developing COPD especially women.

Outdoor air pollution

- Motor vehicle exhaust
- Construction work (occupational)
- Lung growth
- At birth only 50% of the adult alveoli have developed. So exposure to any of the risk factors during child hood can lead to COPD.
- Smoking by pregnant women put the child on higher risk of COPD

Infections of various types

- Genetic- Alfa 1 antitrypsin deficiency
- TIMP- Tissue inhibitor of matrix metalloproteinase deficiency

Pathogenesis: There are two entities, chronic bronchitis and emphysema.

Various noxious particles in cigarette smoke including oxidants get deposited in the smaller airways. This triggers marginalization of neutrophils in the pulmonary capillary endothelium. Activated neutrophils then gain entry into the airway epithelium, initiating inflammation. Mucous glands will undergo hypertrophy secreting plenty of mucus. Neutrophil elastase and free radicals account for mainstay of air way and alveolar damage

Alveolar destruction in emphysema is the result of the imbalance between neutrophil elastase and endogenous anti elastase (alfa 1 antitrypsin).

The airflow obstruction in emphysema is largely due dynamic compression of the bronchi and bronchioles by the enlarged alveoli. Per say emphysema is largely a lung parenchymal disease. In the course time, these patients develop structural changes in the blood vessels and alveolar walls leading to diffusion abnormalities.

Such subjects demonstrate dyspnea in explicable by their FEV1. These patients need early DLCO esti-

mation to be initiated on home oxygen therapy to prevent pulmonary hypertension from developing.

Treating COPD according to gold guidelines

- Grade 1-Smoking cessation, pneumococcal vaccination, yearly influenza vaccination and inhaled short acting beta agonists SOS.
- Grade 2 -Smoking cessation, influenza and pneumococcal vaccination, inhaled tiotropium bromide with or without long acting beta agonists
- Grade 3- All the above plus inhaled steroids
- Grade 4 (very severe) -All the above plus pulmonary rehabilitation and home oxygen therapy (LTOT)

Airway inflammation in COPD even though generally steroid irresponsive, a significant subset shows good response to inhaled steroids. Such patients have h/o atopy airway hyper responsiveness or high percentage of eosinophils either in blood or BAL fluid

The only indication for systemic steroids in COPD is during acute exacerbation.

Observations

- Total 90 patients were studied
- Males 74 females 16
- Male female ratio 4.625:1
- Emphysema 20
- c/o bronchitis 70

Majority of the patients had moderate to severe airway obstruction before clinical presentation.

Mild cases 9 out of 90, some of these were diagnosed during preoperative pulmonary evaluation.

This underlines the importance of screening of people having risk factor for early detection of COPD.

Grading

- Mild 9 (10%)
- Moderate 35(38.8 %)
- Severe 40(44.4%)
- Very severe 4 (4.49%)

Correlation between degree of dyspnea and FEV1

- FEV1 68 TO 80 - grade 1 MMRC
- FEV1 44TO 62 - grade 2
- FEV1 < 35 - grade 3
- FEV1 25 T0 % severe

There is no clear cut correlation between dyspnea grading and airflow limitation probably due to subjective variability in perception of dyspnea.

Six patients with predominant emphysema had FEV1 ranging from 68 to 80 ang grade 2 to 3 dysp-

nea. They were subjected to six minute walk test and DLCO.

All of them were having significant exertional desaturation. (SPO2 fall 4% or more from baseline). These gentlemen were counseled regarding need of home oxygen therapy (LTOT)

Conclusion

- COPD is a lung disease with increasing prevalence and high morbidity and mortality
- COPD is a preventable and treatable disease
- The airway inflammation in COPD is largely steroid unresponsive
- There is consistent correlation between airflow limitation and grade of dyspnea in COPD
- A significant proportion of subjects with disproportionate dyspnea and COPD are having gas exchange abnormalities
- Screening of at risk patients has an important role in early diagnosis of COPD
- Patient education has role in treating patients with air way disease

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