

PREVALENCE OF LEFT VENTRICULAR DIASTOLIC
DYSFUNCTION IN COPD & ITS RELATION WITH DISEASE
SEVERITY

Dr BALAMURUGAN.T , Dr.R.BALAJINATHAN M.D

Dr. P.V. BALAMURUGAN M.D, Dr. R. PANDISELVAM M.D,

Dr. VINOTHKANNAN M.D

DEPARTMENT OF GENERAL MEDICINE , MADURAI MEDICAL COLLEGE MADURAI

BACKGROUND

Chronic Obstructive Pulmonary Disease (COPD) is characterized by chronic airflow limitation and various pathological changes in the lungs. COPD also presents with significant extra-pulmonary effects and is associated with various important co morbidities that may contribute to disease severity.

Chronic airflow limitation(CAL) is associated with an abnormal inflammatory response of the lung to noxious particles or gases, particularly cigarette smoke. The main causes of morbidity and mortality among COPD patients are cardiovascular disease . Cardiovascular disease is the leading cause of death worldwide , and smoking is the significant modifiable risk factor related to CVD .

Among COPD patients, Cardiovascular disease(CVD) is responsible for approximately 50% of all hospitalizations and 20% of all deaths . However studies

have suggested that regardless of smoking status, age or sex, a COPD diagnosis increases the risk of cardiovascular morbidity and mortality by approximately about two fold . Left Ventricular Diastolic Dysfunction(LVDD) is found to be a complication of COPD due to chronic hypoxia and as a consequence of inflammatory changes in the body. Eventhough Right Ventricular dysfunction is well studied in COPD patients, the presence of Left ventricular diastolic dysfunction(LVDD) in COPD patients is associated with increase in disease severity and frequent hospital admission .

Anthonisen et al. and Sin et al. have already assessed the association among COPD, CVD and increased serum concentrations of inflammatory markers like C-Reactive Protein (CRP) .

Inflammation is considered to be one of the systemic manifestations of COPD and provides an alternative hypothesis to explain the relationship between airflow limitation and cardiovascular risk . The current study is undertaken to analyse the prevalence of LV diastolic dysfunction in COPD and its relation to disease severity. Also to check whether the elevated CRP correlates with the prevalence of LVDD and severity of COPD.

AIMS & OBJECTIVES

To assess the prevalence of Left ventricular diastolic dysfunction (LVDD) in COPD patients.

To assess the relationship between COPD severity according to GOLD criteria and grading of LVDD and its correlation with inflammatory marker C-REACTIVE PROTEIN.

METHODS

Setting: Department Of General Medicine , Govt Rajaji Hospital, Madurai Medical College, Madurai. **STUDY DESIGN:** Prospective and observational study. This study will be conducted in 100 COPD patients. All patients are subjected to full medical history , basic blood investigations, CXR, SPIROMETRY, ECG, C-REACTIVE PROTEIN, ECHOCARDIOGRAPHY. They are classified into group 1 & group 2 according to GOLD criteria based on PFT. GROUP I - Mild & Moderate (GOLD CLASS 1&2) and GROUP II - Severe & very severe (GOLD CLASS 3&4) and study its associations with LVDD Grading based on echocardiography & its correlation with Serum CRP. **SOURCE OF DATA:** COPD patients attending / admitted in Thoracic Medicine & General Medicine OPD/ Wards during the period of March 2018 to August 2018 at Govt Rajaji Hospital, Madurai .**SAMPLE SIZE:**100 COPD Patients.**STUDY DURATION:** 6 Months.**INCLUSION CRITERIA :**One Hundred patients diagnosed as COPD as per GOLD(GLOBAL INITIATIVE FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE) were included in the study

population .**EXCLUSION CRITERIA:** Diabetes Mellitus, Systemic Hypertension, Obesity based on BMI, Other chronic lung disease like asthma ,ILD, PTB, Obstructive sleep apnea , Associated other known cardiac disease like CAD, Arrythmias, valvular or congenital Heart disease. **METHOD OF COLLECTING DATA :**COPD patients of varying age and sex were selected carefully using GOLD criteria. Their written consent was taken. The history was elicited. Age, height, weight were recorded. Thorough clinical examination were carried out.The performance of PFT were demonstrated. Patients were made to undergo pulmonary function tests using Medspiror, for 3 times at every 15 minutes interval and best of 3 readings was taken. The Forced Vital Capacity (FVC), Forced Expiratory Volume at the end of one second (FEV1),FEV1/ FVC ratio & FEV1 Predicted were recorded. Patient belonging all stages of COPD as per GOLD guidelines were included for the study. Then they were subjected to Echocardiography and blood investigations. **DATA COLLECTION:** Relevant History & Clinical Examination, Age, sex, Height, Weight, BMI, Basic blood investigations, C-REACTIVE PROTIEN, Pulmonary Function Test By Spirometry, Saturated Hb with o2 by Pulse oximeter, ECG, Chest Xray PA View, ECHOCARDIOGRAPHY.

RESULTS

100 COPD subjects admitted in the Govt Rajaji Hospital were study for left ventricular dysfunction during March 2018 to August 2018. Age of the subjects varied from 18 to 65 years of age. Males were 78 , Females were 22. COPD severity based on GOLD class as Mild – 13, Moderate - 25, Severe – 49 and Very

severe - 13 patients in the study. Prevalence of LVDD dysfunction in COPD subjects was 61% of study population with Normal being 39% of study population with GROUP 1 & GROUP 2 being 39.5% and 74.5% respectively, which was statistically significant. C – Reactive protein was positive in 35% of COPD patients in the study group, with GROUP 1 & GROUP 2 being 10.5% and 50% respectively, which was statistically significant. C – Reactive protein was positive in 26% Patients with grade 1 & 2 LVDD and 67% in Grade 3 & 4 LVDD, which was statistically significant. There was also prolonged hospital stay in patients with grade 3 and 4 left ventricular diastolic dysfunction.

Thus from the study, we came to know that as the COPD individuals progress in the airflow limitation from mild to moderate, severe & then to very severe COPD stages, they encounter higher prevalence of left ventricular diastolic dysfunction with correlation of inflammatory marker which remarkably affects severity of disease and the quality of life of COPD individuals

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CONCLUSION

COPD patients in their due course of the illness develop multiple systemic complications. LVDD is one among such systemic complications of COPD. As there is progressive airflow limitation, the severity of COPD progress which results in varied grades of LVDD. In conclusion there is a high prevalence of LVDD in COPD patients which is associated with increased disease severity

according to GOLD classification and with the presence high levels of inflammatory markers (CRP), and it is important to exclude decompensated heart failure during COPD exacerbation. Hence COPD patients should be regularly monitored for abnormal LVDD & managed accordingly to improve their quality of life.

KEYWORDS

Chronic Obstructive Pulmonary Disease (COPD), Left Ventricular Diastolic Dysfunction(LVDD) , C- Reactive Protein.