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"Assessment of Left Ventricular Function in Copd"

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I. INTRODUCTION:

• Chronic Obstructive Pulmonary Disease (COPD) is defined by GOLD (Global Initiative for Chronic Obstructive Lung disease)[1] as a common preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and / or alveolar abnormality usually caused by significant exposure to noxious particles or gases.

•Its pulmonary component is characterized by airflow limitation that is not fully reversible.

•Chronic hypoxia in COPD leads to secondary pulmonary arterial hypertension (PAH) and right ventricular hypertrophy, the condition known as cor-pulmonale.

•Some patients of cor-pulmonale developed right heart failure precipitated by hypercapnea or infection. These patients usually respond to oxygen (O) therapy, bronchodilators and antibiotics.

•However left ventricular (LV) dysfunction has been observed among such patients.

• In clinical practice, we suspect associate LV dysfunction when an AECOPD patient does not respond to usual management of COPD or there is unexplained disproportional dyspnea or symptoms.

• The prevalence of LV dysfunction, secondary to ischemic heart disease (IHD), is probably high in COPD patients because it shares many risk factors with coronary disease like age , male predominance , cigarette smoking etc..

• Associate factors such as hypoxia, hyper viscosity of blood secondary to polycythemia and shifting of inter-ventricular septum towards left side may contribute to the LV dysfunction.

• A considerable proportion of patients with diagnosis of concomitant heart failure which remains unrecognized care physicians or pulmonologists.

COPD have by primary

• Echocardiography is essential for establishing the diagnosis of left ventricular function.

• Accessibility to this diagnostic facility is limited in primary health care setup.

• Lack of awareness about associate LV dysfunction may be a contributing factor for under utilization of echocardiography as a standard investigational protocol in COPD.

•We tried to determine the prevalence of LV dysfunction that co-existent with COPD and the degree of disturbance in left ventricular function in COPD patients in the absence of identifiable LV disease.

AIMS AND OBJECTIVES

•The aim of our study is to assess left ventricular function in COPD patients without any apparent cardiac disease like hypertension, ischemic heart disease, valvular heart disease and congenital heart disease.

Objectives-

1. TO ASSESS CLINICAL PRESENTATIONS OF STUDY POPULATION AND TO USE SPIROMETRY
FOR CONFIRMATION AND ASSESSMENT OF DEGREE OF COPD.
2. TO DETERMINE THE DIAGNOSTIC YIELD OF ECHOCARDIOGRAPHY IN ASSESSMENT OF LV
DYSFUNCTION IN COPD PATIENTS.

II. MATERIALS AND METHODS

•All diagnosed cases of COPD of both gender, above the age of 40 years, attending outdoor and indoor of the department of Respiratory medicine of National Institute of Medical Sciences and Research, Jaipur (Rajasthan) over the stipulated period, after considering the inclusion and exclusion criteria were taken for the study.

• **INCLUSION CRITERIA:**

1. Age more than 40 years.
2. All confirmed stable COPD cases.
3. Willing to participate & give informed consent.

• **EXCLUSION CRITERIA:**

1. Patients with acute exacerbation of COPD 2. Patients with apparent cardiac disease.
3. Patients with ECG findings suggestive of arrythmia. 4. Pregnant females

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After going through the inclusion and exclusion criteria, we finally included 50 cases of stable COPD for the study.

• All COPD patients were subjected to detail history and clinical examination.
1.Chest x-ray (PA View):
Emphysema: obvious bullae or hyperlucency.
Hyperinflation / increased lung volumes , flattening of diaphragm Tubular shaped heart, hilar prominence.

2. We did spirometry with bronchodilator reversibility for confirmation of COPD.
For confirmation of COPD, spirometry was done. We checked for reversibility by repeating the procedure 20 minutes after inhalation of 200-400 microgram of salbutamol.

Parameters to be taken-
Post bronchodilator FEV1/FVC ratio (Forced Expiratory volume in one second/ Forced Vital Capacity)
FEV1(Forced Expiratory volume in one second)

• We confirmed cases of COPD following the GOLD criteria[1] that included symptoms, identification of risk factor and post bronchodilator FEV / FVC < 0.7. The severity of COPD was assessed by GOLD criteria and they were classified in to four stages.

• Cardiac diseases like hypertension , ischemic heart disease(IHD) , valvular heart disease and congenital heart diseases to be excluded by clinical examination and ECG (resting 12 leads ECG).

The study populations were then subjected to echocardiography for detection of left ventricular systolic and diastolic function

III. RESULTS AND ANALYSIS

• During the study period, we got 50 cases of stable mild to moderate COPD in chest out-patient department and after applying exclusion criteria.

Table -1

• We analyzed the correlation between duration of symptoms of the patients and prevalence of diastolic dysfunction and that was depicted in Table-1.
• Less than 5 years duration group
• the prevalence of LV diastolic dysfunction was 16 out of 23 cases (69.56%)
• More than 5 years duration group
• the prevalence of LV diastolic dysfunction was 96.30% (26 out of 27 cases)
• The calculated χ^2 was 4.76 and P was 0.03. So, there was a statistically significant correlation between the duration of illness and the prevalence of LV diastolic dysfunction (P= 0.03 i.e < 0.05).

Table-1 showing the correlation between duration of symptoms and LV diastolic dysfunction.

SYMPTOM DURATION (Years)	NO .OF PATIENTS	LEFT VEBTRICULAR DIASTOLIC DYSFUNCTION	PERCENTAGE
>5	27	26	96.30%
<5	23	16	69.56%

Table -2

• We analyzed the correlation between staging of COPD and prevalence of diastolic dysfunction and that was depicted in Table-3.
• In stage 1 COPD the prevalence of LV diastolic dysfunction was 28.57% (2 out of 7 patients),
• 90.90% (20 out of 22 patients) in stage II COPD,
• 93.33% (14 out of 15patients) in stage III COPD and
• 100% (6 out of 6 patients) in stage IV COPD.

• The calculated χ^2 was 18.76, and P was 0.000…… So, there was a statistically highly significant correlation between the staging of COPD and the prevalence of LV diastolic dysfunction (P=0.000…… i.e < 0.05).
• Comparing the presence of diastolic dysfunction in early stage i.e I and in advanced stage i.e IV we find that with increasing stages the prevalence of LV diastolic dysfunction increased significantly (P =0.000…… i.e < 0.05).

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Table-2 showing correlation between GOLD staging with LV diastolic dysfunction.

STAGE (GOLD)	NO. OF PATIENTS	LEFT VEBTRICULAR DIASTOLIC DYSFUNCTION	PERCENTAGE
I	7	2	28.57%
II	22	20	90.90%
III	15	14	93.33%
IV	6	6	100%

IV. CONCLUSION

• We reported a statistically highly significant correlation between the staging of COPD and the prevalence of LV diastolic dysfunction (P=0.000…… i.e < 0.05). The prevalence of LV diastolic dysfunction was increasing with increasing stages of COPD (28.57% in stage 1, 90.90% in stage II, 93.33% in stage III and 100% in stage IV).

• We concluded that there was a definite association between COPD and LV diastolic dysfunction. However, further large scale study is necessary to prove COPD as a cause of LV diastolic dysfunction.

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