Original Article

A Study of Echocardiographic Evaluation in the Chronic Obstructive Pulmonary Disease Patients at a Tertiary Health Care Centre

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Abstract

Chronic obstructive pulmonary disease (COPD) is the most common medical problem in India. The purpose of this study is to evaluate the echocardiography based cardiac function in COPD patients (200) of C.U. Shah Medical College and Hospital during 05th August 2012 to 12th September 2013. 126 cases (63%) of the COPD patients were in age group 60-75 years, 34 cases (17.0%) in 45-59 years of age and 40 cases (20%) in the 76-90 years age groups. Of the total patients (200), significant number of patients 45 cases had poor LVEF (22.5%). 86 patients (43%) showed features of chronic corpulmonale followed by valvular heart disease in 74 cases 37%), diastolic dysfunction in 72 cases (36%) and left ventricular hypertrophy in 25 (12.5%). Mild pulmonary artery hypertension (PAH) was detected in 102 patients (51%), followed by moderate PAH in 41 patients (20.5%), Severe PAH in 18 patients (9%) Tran thoracic echocardiography was found to be very useful to identify various concomitant cardiac abnormalities demanding special treatment consideration in managing clinically COPD like patients.

Key Word: COPD, Chronic corpulmonale, echocardiography, DCM, PAH.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) has been defined by the presence of airways obstruction, which does not change markedly over several months and unlike asthma, is not fully reversible. Chronic cough, chronic sputum production, dyspnea and history of exposure to risk factors like tobacco smoking are the clues for the diagnosis of COPD. Global Initiative for Chronic Obstructive Lung Disease (GOLD) has described COPD as a disease that is preventable and curable. Estimates suggest that COPD will rise from the sixth rank as the cause of death in 1990 to the third rank as the most common cause of death worldwide by 2020. COPD is the most common medical problem in India according to a hospital-based evaluation and has significant morbidity and mortality. We are presenting our echocardiography based cardiac evaluation in COPD patients.

MATERIALS AND METHODS

Two Hundreds patients who are suffering from chronic obstructive pulmonary disease(COPD) and were assessed in C.U. Shah Medical College Teaching Hospital during 05th August 2012 to 12th September 2013. Patients underwent echocardiographic evaluation at our hospital. Echocardio graphic examination was undertaken as per the recommendation of American Society of Echocardiography. During echocardiographic evaluation left ventricle ejection fraction (LVEF)calculated, Estimated systolic pulmonary artery pressure (PAP) has been calculated, PAP has been arbitrarily sub-grouped in mild (40-59 mmHg), moderate (60-79 mm Hg) and severe (>80 mm Hg) groups and Diastolic functions, Other valvular abnormalities and Ventricular abnormalities were assessed.

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RESULTS

Two Hundreds patients who are suffering from chronic obstructive pulmonary disease(COPD) and were assessed in C.U. Shah Medical College Teaching Hospital during 05th August 2012 to 12th September 2013.Table 1 Shows 126 cases (63%) of the COPD patients were in age group 60-75 years, 34 cases (17.0%) in 45-59 years of age and 40 cases (20%) in the 76-90 years age groups. Table 3 Shows out of the total patients (200), significant number of patients 45 cases had poor LVEF (22.5%). 86 patients (43%) showed features of chronic corpulmonale followed by valvular heart disease in 74 cases (37%), diastolic dysfunction in 72 cases (36%) and left ventricular hypertrophy in 25 (12.5%). Table 2 shows Mild pulmonary artery hypertension (PAH) was detected in 102 patients (51%), followed by moderate PAH in 41 patients (20.5%), Severe PAH in 18 patients (9%) and other concomitant disease. the As a single patient may have more than one echocardiography-based diagnosis, total may be more than the number of patients undergoing echocardiography. Table 4 Shows the concomitant diseases among COPD patients (N =200) as per clinical diagnosis. A significant number of patients (43%) had already developed features of chronic corpulmonale clinically. Rest concomitant diseases are shown in Table 4.

Table 1: Age Distribution in Patients

Age group	45-59 yrs.	60-75 yrs.	76-90 yrs.
Number of cases	34	126	40
Cases %	17%	63%	20%

Table 2: Severity of PAH in COPD Patients

Pulmonary artery Pressure	< 40 mm Hg	40-59 mm Hg	60-79 mm Hg	>80 mm Hg
Number of Cases	39	102	41	18
Cases %	19.5%	51%	20.5%	9%

Table 3: Echocardiography Diagnosis in COPD Patients

Echo Findings	Number of Cases	Cases %
Corpulmonale	86	43%
Dilated Cardiomyopathy	22	11%
Left ventricular hypertrophy	25	12.5%
Pericardial effusion	26	13%
Valvular heart disease	74	37%
Diastolic Dysfunction	72	36%
Thickened Mitral Valve	4	2%
Thickened aortic valve	16	8%
Poor lvef	45	22.5%
Normal echo	20	10%

Table 4: Concomitant Disease in COPD

Concomitant disease	Number of Cases	Cases %
Chronic corpulmonale	86	43%
Respiratory failure	20	10%
Hypertension	22	11%
Dilated cardiomyopathy	5	2.5%
Valvular heart disease	74	37%
Ischemic heart disease	4	2%
Congestive cardiac failure	8	4%
Left ventricular hypertrophy	25	12.5%
Other cardiovascular disease	7	3.5%
Diabetes mellitus	6	3%
Pulmonary tb	8	4%
Chest infection	9	4.5%
Broncogenic carcinoma	2	1%
Other respiratory disease	6	3%
Chronic kidney disease	3	1.5%
Acid peptic disease	5	2.5%
Neurological disease	4	2%
Hepatobiliary disease	11	5.5%

DISCUSSION

COPD is the most common medical problem in India and has significant morbidity and mortality. We present here our echocardiography based cardiac evaluation in admitted COPD patients. Age group wise distribution of COPD as shown in Table 1showed patients of COPD appeared dramatically after the age of 45 years, and peaking at the age group 60-75 years. COPD is a chronic illness taking more than 10packs year of smoking to develop it. Chronic corpulmonale is an important complication of COPD and the development of pulmonary hypertensionis associated with higher mortality and morbidity. Longterm oxygen therapy is beneficial in COPD with chronic corpulmonale. Significant proportion of COPD patients had features of chronic corpulmonale (Table-3, 4). This data supports the excessive need of domiciliary oxygen therapy. As cylinder based oxygen supply is available in big cities only and are quite expensive for ordinary poor Indian people, management of COPD is not that easy in India. Though oxygen concentrator machines are introduced, frequent electric power cuts affects patients with good purchasing power as well. Introduction of liquid oxygen will be very useful milestone in the management of COPD, as it will help really ambulatory oxygen therapy to COPD patients. COPD is usually managed with inhaled bronchodilators like rapid acting and slow acting beta 2 adrenoceptoragonists like salbutamol, salmeterol, for moterol, anticholinergic drugs like ipratropium, tiotropiumand steroid like fluticasone. When component of heart failure is prominent, it may be good to introduce gradually specific beta 1 blocker like Metoprolol or Bisoprolol along with in halationalbronchodilator therapy

after optimizing the heart failure therapy with drugs like angiotgensin converting enzymeinhibitor, digoxin and diuretic as specific beta 1 blocker may be more appropriate and compatible with beta 2stimulants e.g. Salbutamol, Terbutaline, Salmeterol. Specific beta 1 blockers lose their specificity at higher dose, demanding extreme care in avoiding higher dose. Improved clinical outcomes have been previously reportedwith long term oxygen therapy. Significant number of COPD patients in this study had mild to moderate PAH shown in Table 2, reflecting the high oxygen demand inpoor patients. Though the reports of improved cardiopulmonary function in severe COPD are available with the combination of nitric oxide and oxygen, these strategies are not yet practiced in rural India but should be used in selected severe COPD patients if it is affordable. Though critically ill COPD patients require in gmechanical ventilation have higher mortality, noninvasive mechanical ventilation is better in terms of mortality. Use of echocardiography based cardiac evaluation in COPD to evaluate the status of pulmonary arterialhypertension and other concomitant cardiac lesions, is very valuable in the management of COPD. Selectingpatients with moderate or severe pulmonary arterial hypertension for long term oxygen therapy with or withoutnitric oxide and selecting poor LVEF patients for optimizing heart failure therapy has the potential to have further improvement in severe COPD patients havingapparently poor response in usual COPD management.

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