



Original Article

A Study of Echocardiographic Changes Among the Patients of COPD

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Abstract

Background: Chronic Obstructive Pulmonary Disease (COPD) is one of the major health problems and causes of chronic morbidity and mortality in Bangladesh as well as worldwide. Echocardiogram was performed to observe changes among the patients of COPD.

Objectives: To observe echocardiographic changes among the patients of COPD.

Methods: It was a cross-sectional observational study carried out in the Department of Medicine, Rajshahi Medical College Hospital, Rajshahi from July, 2010 to June, 2012. According to inclusion and exclusion criteria 64 people aged 40-70 years having COPD were selected. Thorough history, physical examination and spirometric along with echocardiographic assessment were done.

Results: In case of COPD, 22(34.4%) cases showed echocardiographic changes and 42(65.6%) cases showed normal echocardiogram.

Conclusion: In this study, Echocardiographic changes were 34.4% in COPD patients which would help in early detection of cardiac morbidity among those patients and to manage them accordingly.

Keywords: COPD, Echocardiography

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Introduction

Our lungs are affected by multiple disorders such as Obstructive lung diseases e.g. COPD and Bronchial Asthma. These diseases are the major health problems and cause of chronic morbidity and mortality in Bangladesh as well as worldwide [Burden of Obstructive Lung Diseases in Bangladesh (BOLD-BD), October-2010].

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease with some significant extra pulmonary effects that may

contribute to the severity in individual patients. Its pulmonary component is characterized by airflow limitation that is not fully reversible. The chronic airflow limitation characteristic of COPD is caused by a mixture of small airway disease (Obstructive bronchiolitis) and parenchymal destruction (emphysema), the relative contributions of which vary from person to person [GOLD (Global Initiative for Chronic Obstructive Lung Disease) executive summary, updated 2009].

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As COPD occurs in middle aged longtime smokers, among risk factors-tobacco smoking either actively or passively, current or previous smoking all have a higher respiratory symptoms and lung function abnormalities, a greater annual rate of decline in FEV₁ and a greater COPD mortality rate than non-smokers. Other factors includes-occupational dusts and chemicals, indoor and outdoor air pollution, (almost equal in men and women in developed countries), childhood infection and socio-economic status. Rise in morbidity and

mortality from COPD will be greatest in Asian and African countries as a result of their increasing tobacco consumption (Reid, P.T. and Innes J.A. 2010).

It is a major public health problem worldwide. Although prevalence varies across countries, it appreciably higher in smokers and Ex-Smokers compared with non-smokers, in those older than 40 years compared with those younger than 40 years and in men compared with women (Menezes AM, et al., 2005).

Recently it has been realized that COPD is associated with a number of comorbidities, e.g. Ischemic heart disease, hypertension, diabetes, heart failure and cancer. COPD is the 4th of the most important causes of death and is predicted to 3rd most common causes of death and 5th most common cause of disability world wide by 2020 (Frew AJ and Holgate ST, 2009).

According to a study known as BOLD-BD on COPD conducted by Bangladesh lung foundation, Burden of COPD in Bangladeshis are as follows.

Prevalence in >40 years of age is 21.24%

Prevalence in general population is 4.3%

Total burden of COPD patients is about 6 million (BOLD-BD, 2010).

Material and Methods

Type of study: It was a cross-sectional observational study.

Place of study: Department of Medicine, indoor and outdoor, Rajshahi Medical College Hospital, Rajshahi.

Period of study: 02 years (July, 2010 to June, 2012)

Study population: All COPD patients fulfilling the inclusion and exclusion criteria as cases.

Sample size:

Sample size was 64 cases having COPD. In case of COPD prevalence of general population in Bangladesh =4.3%

Results

This study was intended to observe the echocardiographic changes among the patients of chronic obstructive pulmonary disease (COPD). To achieve this goal, a total 64 people aged 40-70 years were included in this study. The patients were free from diseases other than COPD. All the cases had under gone through complete history taking, physical examination and spirometric examination. Spirometry was done firstly without using bronchodilator inhalation in all both COPD and asthma cases and those who showed obstruction, they were also under gone through post bronchodilator spirometry to confirm irreversible obstruction i.e. COPD (FEV₁<15%) and post bronchodilator spirometry if FEV₁ increases ≥15%, it was treated as bronchial asthma. Then staging of COPD was done according to GOLD's criteria (2009).

Then Echocardiograms were done among the COPD cases to observe changes among them.

Table-1: Age distribution of the study population

Age group (yrs.)	COPD (n=64)	
	N	%
40-50	19	29.69
51-60	18	28.12
61-70	27	42.19
Total	64	100

Maximum age group of COPD cases were between 61-70 years, number of subjects were 27 (42.19%).

Minimum age group of COPD cases were between 51-60 years, number of COPD subject were 18(28.12%).

Table-2: Sex distribution of the study population

Sex	COPD (n=64)	
	N	%
Male	63	98.44
Female	01	1.56
Total	64	100

Incase of COPD 63 (98.44%) cases were male and 01 (1.56%) case was female out of 64 cases.

Table-3: Occupation distribution among cases of COPD and Asthma

Occupation	COPD (n=64)	
	No.	Percentage
Farmer	55	85.9
Businessman	05	7.8
Service	04	6.3
Housewife	00	00
Total	64	100

Maximum of the cases of COPD were farmers. 55(85.9%) out of 64 COPD cases were farmer. Minimum cases of COPD were service holder 04(6.3%).

Differences of occupational pattern between COPD patients were statistically highly significant.

Table-4: Change of right atrium in Echo among the cases of COPD and Asthma

Right atrium	COPD (n=64)	
	No.	Percentage
Normal	42	65.6
Dilated	22	34.4
Total	64	100

In case of COPD in Echo 42(65.6%) were normal right atrium and 22(34.4%) showed hypertrophy out of 64 COPD cases.

Table-5: Change of right ventricle in Echo among the cases of COPD

Right ventricle	COPD (n=64)	
	No.	Percentage
Normal	42	65.60
Dilated	22	34.40
Total	64	100

In Echo maximum 42(65.6%) were normal right ventricle and 22(34.4%) showed dilated out of 64COPD cases.

Table-6: Change of Tricuspid valve in Echo among the cases of COPD and Asthma

Maximum 42(65.6%) were normal tricuspid valve and 22(34.4%) were tricuspid regurgitation out of 64 COPD cases.

Table-7: Total No. of normal and Echo change

Tricuspid valve	COPD (n=64)	
	No.	Percentage
Normal	42	65.6
TR	22	34.4
Total	64	100

among the cases of COPD

Echo	COPD (n=64)	
	No.	%
Normal	42	65.6
Change	22	34.4
Total	64	100

42(65.6%) were normal echo and 22(34.4%) showed echo changes out of 64 COPD cases.

Discussion

COPD is an obstructive pulmonary disease. This disease is a major health problem and causes chronic morbidity and mortality in Bangladesh as well as worldwide.

In our study, maximum age group of COPD cases were between 61-70 years, number of subjects were 27 (42.19%). Minimum age group of COPD cases were between 51-60 years, number of COPD subject were 18(28.12%).

In our study, COPD 63 (98.44%) cases were male and 01 (1.56%) case was female out of 64 cases.

According to GOLD (Global Initiative for Chronic Obstructive Lung Disease) in its Global Strategy for diagnosis, management and prevention executive summary, update 2009, the risk of developing COPD is inversely related to socioeconomic status i.e. COPD occurs more in lower education, occupation and income groups of people in risk. Our study result was consistent with this because our study showed that COPD had occurred more in illiterate and primary status (81.3%) and low income group earning <3000 Tk/month (62.5%).

GOLD has mentioned any of chronic cough, sputum production and dyspnea as a key indicator of COPD. In our study, all these symptoms were present singly or in combination having COPD (cough 98.44%, chronic sputum 59.38%, Dyspnoea 34.4%).

Duration of illness in case of COPD, 7.81% were <5 years, 18.75% were within 6-10 years, 43.75% were within 11-15 years, 10.94% were within 16-20 years and 18.75% were more than 21 years. whereas duration of illness in case of bronchial asthma, 31.51% were <5 years, 23.29% were within 6-10 years, 10.96% were 11-15 years, 12.33% were within 16-20 years and 21.92% were >21 years.

According to a study conducted in Bangladesh on Burden of Obstructive Lung Diseases in Bangladeshi, the main age group involved by COPD is 40-50 years (42.06%). For the age group 51-60 years involvement was 26.64% and for 61-70 years it was 20-72%. But in our study, it was 25.00%, 28.13%, 42.19% for the age group 41-50 years, 51-60 years and 61-70 years respectively.

Burden in perspective of spirometric grading (BOLD-BD,2007). Mild COPD 14.0%, moderate 45.4%, severe 28.3%, very severe 12.3%.

In our study, according to spirometric classification of COPD based on GOLD, executive summary update 2009, was 7.8% mild COPD, 6.3% moderate COPD, 14.1% severe COPD and 7.1% very severe COPD.

50% cases of COPD had normal echocardiographic parameters. In their study in

COPD tricuspid regurgitation (TR) was 67.5% cases, but there was no change in pulmonary valve. In our study in COPD tricuspid regurgitation (TR) was 34.4%.

Nayak SK et al (2008) showed in their study that right atrium dilatation was 40%, right ventricular dilatation was 60% in COPD cases. In our study 65.6% was normal right atrium and right ventricle and 34.4% showed both right atrial and right ventricular dilatation in COPD cases.

The study population were 64. In case of Echocardiography among the study population, 42(65.6%) COPD cases showed normal echocardiogram and 22(34.4%) showed echocardiographic changes.

Conclusion

In this study, Echocardiographic changes were 34.4% in COPD patients. So while treating COPD patients physician should be aware of the cardiac condition also.

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