Clinical Presentation of Dilated Cardiomyopathy in Patients above Age of 45 Years and its correlation with Electrocardiography and Echocardiography

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ABSTRACT

Introduction: Cardiomyopathies represent varied groups of sickness that often lead to the progressive heart failure; incidence and prevalence of which appear to be increasing. Measurement of left ventricle (LV) size and ejection fraction remain central to diagnosis, risk stratification, and treatment but other aspects of cardiac remodeling indicate prognosis and carry therapeutic implications. Study aimed at clinical presentation of dilated cardiomyopathy above the age of 45 years and its correlation with ECG and Echocardiography in patients attending the Rohilkhand Medical College & Hospital, Bareilly, U.P, (India), a tertiary care center.

Material and methods: All patients presenting to the center with the features of CHF based on inclusion and exclusion criteria and who were willing to participate into study, were enrolled in current study. A prospective cross-sectional study was conducted in patients diagnosed as dilated cardiomyopathy (DCM) for evaluating its clinical presentation and correlation with electrocardiography and echocardiography. Total 52 patients who were satisfying inclusion and exclusion criteria were selected for the study.

Results: Amongst 52 patients, mean age of the patients was 58.1 ± 9.4 years with a range of 45 years to 85 year who had the symptoms at the time of hospital admission breathlessness (90.4%), pedal edema (59.6 %), cough (19.2%), palpitations (19.2%), chest pain (15.4%), and orthopnea (5.85).

Major ECG abnormalities were found Left Ventricular Hypertrophy (LVH) (46.2%), ST segment elevation (21.2%), T wave abnormalities (13.5), right or left bundle branch block (11.5%),broad QRS complex (3.8%). On echocardiography, LVEF < 30% was found in more than two third patients, (71.1%) who had severely abnormal LVEF (<30%); 27% had moderate abnormal LVEF (30% - 40%) and 1.9% had mild abnormal LVEF (41% - 51%) while none of the patients had LVEF in normal range (52% to 72%).

Conclusion: Patients of DCM suffer from LVH, ST and T segment abnormalities and bundle branch blocks with severely reduced ejection fraction in over two thirds of patients and none of the patients have LVEF in normal range.

The study suggests that the periodic assessment by echocardiography should be done in patients with more dilated ventricles with larger $LVED_{(D)}$ and lower EF which will make their management better.

Keywords: Dilated Cardiomyopathy, Left Ventricular Hypertrophy severely abnormal LVEF

INTRODUCTION

Cardiomyopathies represent varied groups of sickness that often lead to progressive heart failure with significant morbidity and mortality. The incidence and prevalence of heart failure (HF) because of cardiomyopathy appears to be increasing. The cardiomyopathies represent a various group of conditions whose final common pathway was myocardial dysfunction. World Health Organization (WHO) had classified cardiomyopathies in five categories: dilated cardiomyopathy, hypertrophic cardiomyopathy, restrictive cardiomyopathy, arrhythmogenic right ventricular dysplasia–cardiomyopathy and non-classified cardiomyopathies[1].

DCM defined as the presence of left ventricular (LV) dilatation and LV systolic dysfunction in the absence of abnormal loading conditions (hypertension and valve disease) or coronary artery disease sufficient to cause global systolic impairment[2].However, in 50% of DCM cases, the aetiology remains unknown and was termed 'idiopathic DCM'. It was recognized that between 20% to 35% of idiopathic cases might have a family history suggesting an inherited gene defect[3].

Measurement of LV size and ejection fraction remains central to diagnosis, risk stratification, and treatment, but other aspects of cardiac remodeling inform prognosis and carry therapeutic implications.

Assessment of myocardial fibrosis predicts both risk of sudden cardiac death and likelihood of LV functional recovery, and had significant potential to guide patient selection for cardioverter-defibrillator implantation[4].

With the increasing use of electrocardiogram (ECG) and

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Kinldy provide Table 1???

2D echocardiography, the incidence of DCM was also showing rising trend. It was a topic of interest of physicians, cardiologists, cardiac surgeons and many other group of scientists[5].

Echocardiography has a unique role in accurately defining the condition, establishing the diagnosis in patients presenting with HF and also identifying other cardiac diagnoses, e.g. coronary artery diseases and valvular diseases[6].

With the aim of studying the clinical presentation of dilated cardiomyopathy amongst more than 45 years people and its correlation with findings of ECG and Echocardiography, current study was conducted on patients attending Rohilkhand Medical College & Hospital, Bareilly

Study aimed at clinical presentation of dilated cardiomyopathy above the age of 45 years and its correlation with ECG and Echocardiography in patients attending the Rohilkhand Medical College & Hospital, Bareilly, U.P, (India), a tertiary care center with the objective to generate the data of all DCM patients presenting to tertiary care centre and find out its correlation with the findings of ECG and Echocardiography for management implications.

MATERIAL AND METHODS

All patients presenting to the center with the features of CHF based on inclusion and exclusion criteria and who were willing to participate into study, were enrolled in current study.

A prospective cross-sectional study was done in November 2018 to October 2019, conducted in patients diagnosed as dilated cardiomyopathy (DCM) for evaluating its clinical presentation and correlation with electrocardiography and echocardiography. Total 52 patients who were satisfying inclusion and exclusion criteria were selected for the study.

Written and informed consent was obtained from all the patients before enrolling them into study.

All the patients underwent thorough clinical evaluation and appropriate investigations like chest radiography and electrocardiography, echocardiography.

Other relevant investigations were also performed pertinent to cases like ischemic cardiomyopathy, diabetic cardiomyopathy, alcoholic cardiomyopathy, including coronary angiography in few cases and other required investigations.

Inclusion criteria:

Clinical Criteria: -Patients having symptoms and signs of heart failure

ECHO criteria

- Left ventricular ejection fraction <45%
- Left ventricular end diastolic dimension > 3 cm/ body surface area
- Global hypokinesia.
- Dilatation of all the chambers of heart.

Exclusion criteria

- Valvular heart diseases
- Congenital heart diseases
- Pericardial diseases
- Pulmonary hypertension with congestive heart failure
- Hypertrophic cardiomyopathy
- Restrictive cardiomyopathy
- Hypertension
- Ischemic post myocardial infraction

RESULTS

A. Age wise distribution of all patients

In current study, mean age of the patients was 58.1 ± 9.4 years with minimum 45 years and maximum 85 years. Majority of the patients (48.1%) were 45 – 55 years old, followed by 56 – 65 years old (40.4%), 66 – 75 years old (7.7%) and >75 years old (3.8%). three-fourth of the patients (75%) were males (n = 39), while 25% were females (n = 13) with male – female ratio of 3:1 as shown in table number 1

B. Distribution of all patients based on Symptoms

Present study reported commonest symptoms at the time of hospital admission as breathlessness (90.4%), oedema (59.6%), cough (19.2%), palpitations (19.2%), chest pain

Left Ventricular Ejection Fraction (LVEF)	No. of patients	Percentage
Normal range (52% - 72%)	0	0
Mild abnormal (41% - 51%)	1	1.9
Moderate abnormal (30% - 40%)	14	27.0
Severe abnormal (< 30%)	37	71.1
Total	52	100.0

Table-2: Distribution of all patients based on LVEF

Age group (Years)	Gender		
	Male (%)	Female (%)	Total (%)
45 – 55	18 (46.2)	7 (53.8)	25 (48.1)
56 – 65	17 (43.6)	4 (30.8)	21 (40.4)
66 – 75	3 (7.7)	1 (7.7)	4 (7.7)
> 75	1 (2.6)	1 (7.7)	2 (3.8)
Total	39 (100.0)	13 (100.0)	52 (100.0)
Chi square test = 1.183, df = 3, p value = 0.757			

Table-3: Age and gender wise distribution of all patients

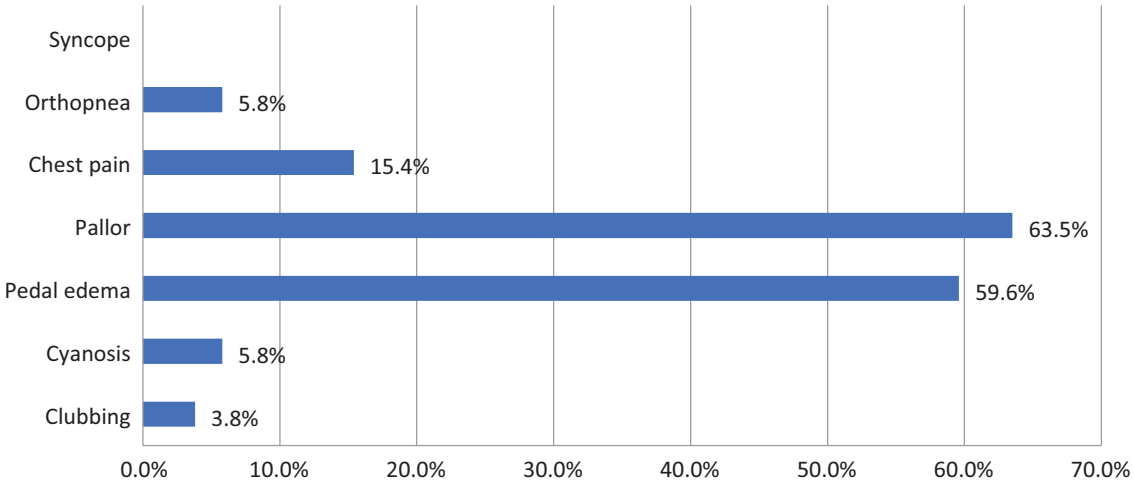

Figure-1: Distribution of all patients based on Symptoms

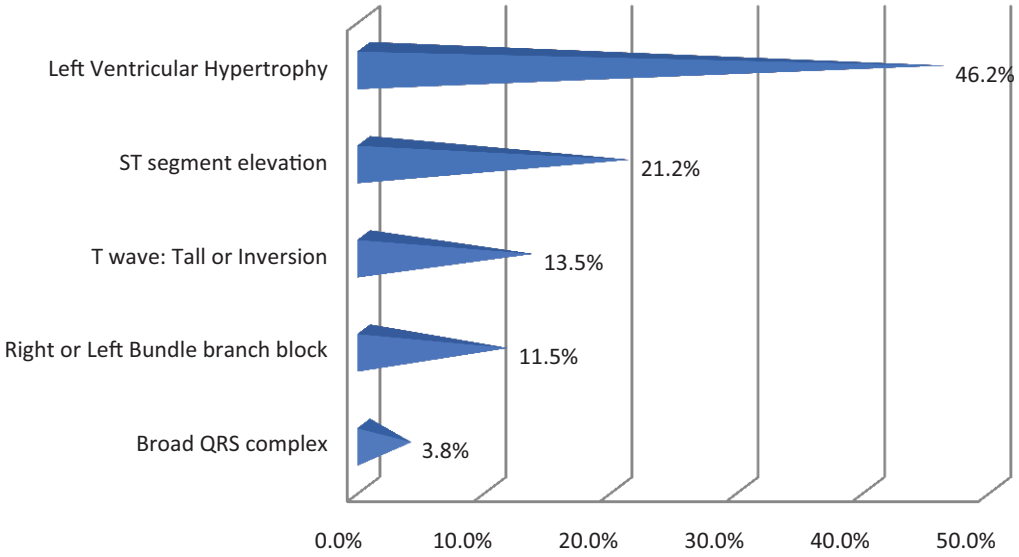

Figure-2: Distribution of all patients based on ECG changes

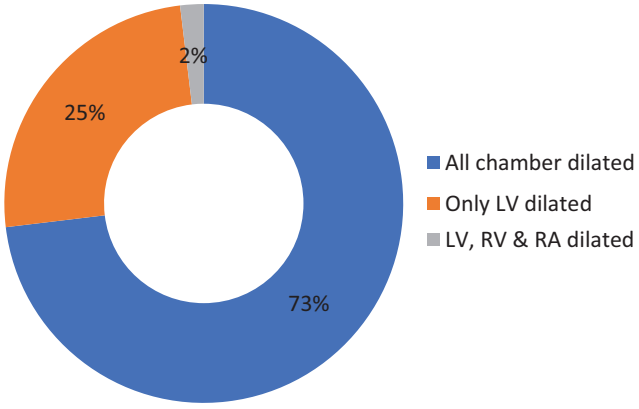

Figure-3: Distribution of all patients based on Cardiac chamber dilatation

(15.4%), and orthopnoea (5.85). As shown in Figure number 1

C. Distribution of all patients based on ECG changes

Figure 2 Represent the ECG findings; ECG finding had most common abnormality LVH (46.2%), followed by ST segment elevation (21.2%), broad QRS complex (3.8%), T wave abnormalities, tall or inversion (13.5%) and right or left bundle branch block (11.5%).

D. Distribution of all patients based on LVEF

More than two third of the patients (71.1%) had Left ventricular ejection fraction (LVEF) below 30%. However, 1.9% patients had mild abnormal LVEF (41% - 51%), 27% patients had moderate abnormal LVEF (30% - 40%) and no one patients had LVEF in normal range (52% to 72%).

In current study, we found all four chambers were dilated (73.1%); only LV dilated (25%) and LV, RV and RA dilated (1.9%).As shown in Fig. 3 and Table 2

DISCUSSION

Cardiomyopathies characterize a heterogeneous group of diseases that frequently leads to progressive heart failure (HF) with higher morbidity and mortality. The cardiomyopathies were an important and complex group of heart muscle diseases with several aetiologies and heterogeneous phenotypic appearance[7]. Depending upon the

basic abnormality of the function World Health Organization and American Heart Association classified cardiomyopathies into dilated, hypertrophic and restrictive type[8]

Current prospective cross-sectional study was conducted in 52 patients diagnosed as dilated cardiomyopathy (DCM) for evaluating its clinical presentation and correlation with electrocardiography and echocardiography. In Bihar, India, Saha et al[9] had conducted cross-sectional study in 30 cases of DCM for studying their clinical profile and ECG and echocardiography profile. In current study, majority of the patients (75%) were males with male – female ratio of 3:1. Similarly male predominance was seen in studies conducted by Saha et al[9] (M:F ratio 1.3:1), Kamble and Bobade[5] (M:F ratio 1.5:1), Ganesh et al[11] (M:F ratio 1.6:1). However, Saxena and Mehta[11] had found equal distribution of both male and female (M:F ratio 1:1).

Breathlessness was the most common symptom that was found in all patients in a study conducted by Saxena and Mehta[11]. Other symptoms in their studies were paroxysmal nocturnal dyspnoea (60%), tachycardia (46.6%), chest pain (40%) and syncope (16.6%). Sonowal and Rao[12] had seen commonest clinical features were dyspnea (70.97%), palpitation (64.52%), swelling of legs (32.26%), cough (12.9%) and others. In Kumar et al[44] study exertional dyspnea was present in all the patients, while easy fatigability present in 83.3% subjects, pedal edema present in 70% of patients. Other symptoms such as PND, cough, palpitation, orthopnea, chest pain, abdominal pain and syncope were also common.

In current study ECG findings had LVH in 46.2% cases, ST segment elevation in 21.2% cases, T wave (tall/inverted) in 13.5% cases and right or left bundle branch block in 11.5% cases, broad QRS complex in 3.8% cases. Most common ECG changes in Saha et al[9] study was ventricular ectopic (46.6%). Other changes were Sinus tachycardia and left bundle branch blocks (40%), non-specific ST-T changes (26.6%), LV hypertrophy (20%), right bundle branch block (13.3%), atrial fibrillation (13.3%), and left atrial enlargement (13.3%). Commonest ECG findings in a study conducted by Ganesh et al[10] were Left axis deviation (70%), sinus tachycardia (48%), and ST–T changes (34%), ventricular premature complexes (32%). Studies by Roberts et al had found left atrial enlargement more commonly than right atrial or biatrial enlargement. Among patients with cardiomegaly of unknown cause, the presence of LBBB supplementary supports the diagnosis of primary myocardial disease.

The electrocardiographic profile in a study done by Kumar et al[13] had found abnormalities of rate, rhythm, axis and chamber enlargement. The commonest abnormalities were ventricular ectopics (46.6%), Sinus tachycardia and left bundle branch blocks (40%), RBBB (13.3%). Other ECG abnormalities were Non-specific ST-T changes, atrial fibrillation, LVH and left and right atrial enlargement, Left axis deviation was seen in 13.3% and right axis deviation in 6.6%.

In present study, 90.4% cases with moderate systolic dysfunction followed by 9.6% cases with severe systolic dysfunction. In a study conducted by Rana et al[15] had found that 38.6% patients had EF in range of 21-25%, 30% patients had EF in range of 26-30% and 26.6% patients had EF in range of 31-35%. Sonowal and Rao[12] had found mean FS was 8.1%, mean EF was 29.5%. In present study, 69.2% cases had grade 1 diastolic dysfunction, 17.3% cases had Grade 2 diastolic dysfunction and 13.5% patients had Grade 3 diastolic dysfunction. However, by using cardiac echography LVID was recorded at the end of systole [$LVID_{(S)}$] and end of diastole [$LVID_{(D)}$]. Majority of the patients (90.4%) had $LVID_{(S)}$ in abnormal range (>4 cm), while $LVID_{(D)}$ was also in abnormal range (>5.6 cm) among 90.4%.

2D Echo findings in a study conducted by Rana et al[15] had found that most common 2D echo finding was left ventricular diastolic dimension >5.2 cm found in 93.3% patients followed by left ventricular systolic dimension >3.9 cm seen in 91.6% patients. Saxena and Mehta[11] had found that mean LV end diastolic diameter was 5.86 cm, while majority (53%) of patients had LV end diastolic diameter >6 cm. The mean LV end systolic diameter was 4.75 cm, though majority of patients (66%) had end systolic diameter >5 cm.

CONCLUSION

In present study, the commonest ECG abnormalities were LVH (46.2%), ST segment elevation (21.2%), T wave abnormalities (13.5) and right or left bundle branch block (11.5%), broad QRS complex (3.8%).

On echocardiography, LVEF <30% found in more than two third patients (71.1%) having severely abnormal LVEF (<30%); 27% had moderate abnormal LVEF (30% - 40%) and 1.9% had mild abnormal LVEF (41% - 51%) while none of the patients had LVEF in normal range (52% to 72%).

Patients of DCM suffer from LVH, ST and T segment abnormalities and bundle branch blocks with severely reduced ejection fraction in over two thirds of patients and none of the patients have LVEF in normal range.

It suggests that the periodic assessment by echocardiography should be done in patients with more dilated ventricles with larger $LVED_{(D)}$ and lower EF which will make their management easier.

Abbreviations

HF	Heart failure
LV	Left Ventricle
ECG	Electrocardiography
LVEF	Left ventricular ejection fraction
WHO	World Health Organization
DCM	Dilated cardiomyopathy
ECHO	Echocardiography
RA	Right atrium
RV	Right Ventricle
LVH	Left ventricle hypertrophy
PND	Paroxysmal nocturnal dyspnea
OPD	outpatient department
IPD	inpatient department
RMCH	Rohilkhand Medical College and Hospital
CHF	Congestive heart failure
LVED	Left ventricular end diastole

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