ORIGINAL ARTICLE
pISSN 0976 3325 | eISSN 2229 6816
Open Access Article
www.njcmindia.org

ELECTROCARDIOGRAPHIC AND ECHOCARDIOGRAPHIC PROFILE OF DILATED CARDIOMYOPATHY PATIENTS ATTENDING TERTIARY CARE HOSPITAL IN VADODARA

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Financial Support: None declared
Conflict of interest: None declared
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How to cite this article:
Rana HM, Chavda P, Rathod CC, Mavani M. Electrocardiographic and Echocardiographic profile of Dilated Cardiomyopathy patients attending tertiary care hospital in Vadodara. Ntl J of Community Med 2015; 6(4):571-574.

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Date of Submission: 22-08-15
Date of Acceptance: 20-10-15
Date of Publication: 31-12-15

ABSTRACT

Background: Dilated cardiomyopathy is one of the important causes of congestive heart failure and attributes to 25% of all cases of CHF. Moreover, in majority of cases with DCM, no specific etiology is known. The increasing incidence of DCM is also associated with significant morbidity and mortality. So, the current study aimed at understanding the electrocardiographic and echocardiographic profile of DCM patients coming to tertiary care hospital in Vadodara.

Methods: A descriptive cross sectional study was conducted among 180 patients with dilated cardiomyopathy from the year 2011 to 2014. ECG and 2D Echocardiography was done among all these patients using standard techniques. The data entry and analysis was done in Microsoft excel sheet.

Results: Among the 180 study participants having DCM, almost all patients showed changes in ECG and 2D Echocardiography. The most common ECG changes observed were ST-T changes (93.8%) followed by sinus tachycardia (63.3%). The most common 2D Echo findings observed were left ventricular diastolic dimension > 5.2cm (93%) followed by left ventricular systolic dimension >3.9cm (91%) and reduced left ventricular contractility (85%).

Conclusion: Regular echochardiographic and electrocardiographic screening of patients with dilated cardiomyopathy is very important to identify and prevent complications among them.

Key words: Dilated Cardiomyopathy, Electrocardiographic profile, Echocardiographic profile, Arrhythmias, Tertiary care center

INTRODUCTION

Cardiomyopathy is a disease of the heart muscle that leads to deterioration of myocardial functioning.[1] According to the World Health Organization (WHO) and American Heart Association (AHA), cardiomyopathy is categorized as dilated cardiomyopathy (DCM), hypertrophic cardiomyopathy (HCM), restrictive cardiomyopathy (RCM), obliterative cardiomyopathy (OCM) and arrhythmogenic right ventricular cardiomyopathy (ARVC).[2-3] Out of all these, DCM is the most common form comprising over 90% of all cases causing sudden cardiac death.[4] The natural history of DCM is still not well established. Many patients have either minimal or no symptoms and the progression of the disease is also unpredictable and the long term prognosis is not good. However, DCM is considered to be an important cause of heart failure and accounts for up to 25% of all cases of CHF.[5] The Framingham study

has also reported 10% annual mortality rate for subjects having congestive cardiac failure.[6] Hence, the increasing incidence of DCM is also associated with significant morbidity and mortality.

Currently there is paucity of data on dilated cardiomyopathy in India. But, because of the rising prevalence of chronic heart failure in the country and on the other hand due to the increasing use of electrocardiogram (ECG) and 2D echocardiography, the incidence of dilated cardiomyopathy is also showing rising trend. The present study is therefore undertaken to study the electrocardiographic and echocardiographic findings in patients with dilated cardiomyopathy.

MATERIALS AND METHODOLOGY

The current study was a descriptive cross sectional study. A total of 180 patients of dilated cardiomyopathy admitted to a tertiary care hospital named GMERS General Hospital, Gotri, Vadodara were enrolled in the study after taking written informed consent. The study participants were recruited over a period of 4 years from 2011 to 2014.

All patients of DCM were advised for Electrocardiogram (ECG) and two dimensional Echocardiography (2D Echo) with color doppler at the centre itself. ECG and 2 D Echo have been performed on the patients by using standard methods. A two-dimensional echocardiographic evaluation was performed according to the standards of American Society of Echocardiography in all patients using a commercially available ultrasonic system (Siemens Acuson CV70). Technically satisfactory echocardiographic images were obtained in all patients.

The primary objective of this study was to understand the electrocardiographic and echocardiographic profile of the patients with dilated cardiomyopathy. A detailed history was recorded in each patient. Apart from complete blood count, ESR, FBS / PPBS, renal function tests, X-ray chest (PA view), ECG and 2D Echocardiography with colour doppler was done in all patients. All the patients were treated for congestive cardiac failure by using diuretics, ACE inhibitors, cardioselective betablockers, nitrates and cardiac glycosides. In some patients anticoagulants and anti arrhythmic drugs were also used.

The data thus collected were entered and analyzed in Microsoft Office Excel. The study reports proportions of the variables under study in percentages.

RESULTS

The following section shows the results of the analysis of the ECG and 2D Echo findings 180 patients with dilated cardiomyopathy.

Table 1: ECG changes in study participants (n=180)

ECG changes	Cases (%)
ST-T changes	169 (63.00%)
Sinus Tachycardia	114 (63.33%)
Sinus Braducardia	03 (01.66%)
Q-wave	24 (13.33%)
Atrial Premature Contractions	06(03.33%)
Ventricular Premature Contractions	24(13.33%)
Right Bundle Branch Block	21(13.16%)
Left Bundle Branch Block	09(05.00%)
Right Ventricular Hypertrophy	00(00.00%)
Left Ventricular Hypertrophy	24(13.33%)
Right Axis Deviation	00(00.00%)
Left Axis Deviation	12(06.66%)
Tall T Waves	00(00.00%)
Atrial Fibrillation	06(03.33%)
Ventricular Tachycardia	06(03.33%)
Supra Ventricular Tachycardia	06(03.33%)

Table 2: 2D Echocardiography findings in study participants (n=180)

2D ECHO Findings	Cases (%)
LV Diastolic Dimension > 5.2cm	168 (93.33)
LV Systolic Dimension >3.9cm	165 (91.66)
Reduced Left Ventricular Contractility	153 (85.00)
Mitral Regurgitation	87 (48.66)
Tricuspid Regurgitation	114 (63.33)
Aortic Regurgitation	00 (00.00)
Enlarged Left Atrium	66 (36.66)
Left Ventricular Outflow Obstruction	00 (00.00)
Ventricular Thrombus	00 (00.00)
Pericardial Effusion	24 (13.66)
Ejection Fraction	
Less Than 15%	03 (01.66)
16-20 %	12 (05.16)
21-25 %	69 (38.66)
26-30 %	54 (30.00)
31-35 %	42 (26.66)

LV=Left Ventricular

As shown in figure 1, following ECG changes were observed among patients. ST-T changes was seen in 169 (93.8%), sinus tachycardia was seen in 114 (63.3%), Q waves, ventricular premature contractions and left ventricular hypertrophy was seen in 24 (13.3%), right bundle branch block was seen in 21 (11.6%), left axis deviation was seen in 12 (6.6%), left bundle branch block in 9 (5%), supraventricular tachycardia, ventricular tachycardia, atrial fibrillation and atrial premature contraction in 6 (3.3%) and sinus bradycardia was seen in 3 (1.6%) patients.

Figure 2 shows the 2D Echo findings among the study participants. The most common 2D echo finding was left ventricular diastolic dimension > 5.2 cm in 168 (93.3%) followed by left ventricular systolic dimension >3.9 cm in 165 (91.6%), reduced

left ventricular contractility in 153 (85%), tricuspid regurgitation in 114 (63.3%), mitral regurgitation in 87 (48.3%), enlarged left atrium in 66 (36.6%) and pericardial effusion in 24 (13.3%). Aortic regurgitation, left ventricular outflow obstruction and ventricular thrombus was seen in none of the patients. Ejection fraction was observed in 69 (38.6%) in range of 21-25%, followed by 54 (30%) in range of 26-30% and 42(26.6%) in range of 31-35%

DISCUSSION

The current study observed the various electrocardiographic and echocardiographic changes among patients with dilated cardiomyopathy.

The ECG in patients with DCM may be remarkably normal, but abnormalities ranging from isolated T wave changes to septal Q waves in patients with extensive left ventricular fibrosis, prolongation of atrioventricular (AV) conduction, and bundle branch block may be observed. In the current study, the most common ECG changes were ST-T changes observed in almost 94% cases followed by sinus tachycardia in 63% cases. Similar findings were also reported by Yadav et al and Sachin et al in their respective studies.[7-8]

A study by Yadav et al. in 2003 have also reported ECG changes of bifasicular block (RBBB + LAHB) (10%), unifasicular block (LAHB) (16.8%) and complete heart block (1.6%). (7) While in our study Q waves, ventricular premature contractions and left ventricular hypertrophy was seen in 13.3%, right bundle branch block was seen in 11.6%, left axis deviation was seen in 6.6%, left bundle branch block in 5%, supraventricular tachycardia, ventricular tachycardia, atrial fibrillation and atrial premature contraction in 3.3% and sinus bradycardia was seen in 3 1.6% patients. A bit different ECG findings were observed by Ganesh et al in Telangana, in which left axis deviation (70%), sinus tachycardia (48%), ventricular premature complexes (32%), ST-T changes (34%) atrial fibrillation (12%) and LBBB (20%) were seen among DCM patients.[9] While a study by Patil et al showed that the most common electocardiographic findings were LBBB, VPCs and QS pattern. [10]

2 D Electrocardiographic observation during the study period revealed different types of non sustained arrhythmias and conduction disturbances together with chamber enlargement as shown in Table 2. In the present study majority (68%) of the patients had Ejection fraction (EF) of less than 30% while tricuspid regurgitation in 63% and mitral regurgitation was observed in 48% of patients. These 2D echo findings are in line with studies conducted by Singh et al and Jain et al.[11-12]

A dilated and poorly contracting ventricle even in sinus rhythm predisposes to thrombus formation. Therefore periodic assessment by echocardiography should be done in patients with more dilated ventricles with larger LVEDD and lower EF. In our study ventricular clot/thrombus was not observed in any patients. Contradictory to this, study by Ganesh et al found LV clot in 4% DCM patients and Patil et al in 19% patients. [9-10]

In this study, enlarged left atrium in 66 (36.6%) and pericardial effusion in 24 (13.3%) patients of DCM. Similar finding was observed by Ganesh et al where 30% patients of DCM showed enlarged left atrium and 8% cases showed pericardial effusion.[9]

Hence, such regular echochardiographic screening of patients with dilated cardiomyopathy is very important to identify and prevent complications among them.

CONCLUSION

The most common ECG changes observed among 180 patients of DCM were ST-T changes (63%) followed by sinus tachycardia (53%). The most common 2D Echo findings observed were left ventricular diastolic dimension > 5.2cm (93%) followed by left ventricular systolic dimension >3.9cm (91%) and reduced left ventricular contractility (85%).

Acknowledgement

We are thankful to all the patients and their relatives for cooperating us. We are also very thankful to Dr. Bharat Kaji, Professor of Medicine, B.J.Medical College, Ahmedabad for his encouragement and guidance. We are grateful to medicine department, Head of Dept. Dr. Varsha Godbole, Dean, GMERS Medical College, Gotri, Vadodara, Dr. Minoo Patel and Medical Superintendent, GMERS general hospital, Dr. Bharat Pandya.

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