

## Original Article

# Electrocardiographic and Echocardiographic Profile of Dilated Cardiomyopathy Patients

Rabindra Nath Barman<sup>1</sup>, Shakil Ghafur<sup>2</sup>, Haripada Sarkar<sup>3</sup>, Md. Abu Zahid<sup>4</sup>,  
Md. Abdullah Al-Mahmud<sup>4</sup>, Md. Mahbubur Rahman<sup>4</sup>, Md. Hasanul Islam<sup>5</sup>

Department of Cardiology, Rangpur Medical College, Rangpur

## Abstract:

### Key Words :

Dilated  
Cardiomyopathy,  
Electrocardiographic  
profile,  
Echocardiographic  
profile

**Background:** Cardiomyopathy is a primary disorder of heart muscle with abnormal myocardial performance. It is an important cause of heart failure and accounts for upto 25% of causes of heart failure. In view of the high prevalence of chronic heart failure due to underlying dilated cardiomyopathy and the lack of data on DCM, the study was undertaken.

**Methods:** A total of 100 patients (71 males and 29 females) of dilated cardiomyopathy were taken who was undergone Echocardiography at popular Diagnostic centre, Rangpur. ECG and echocardiography was done among all these patients using standard techniques.

**Results:** Majority of the patient was above the age 50 years with male to female ratio is 2.4 :1. Sinus tachycardia, non specific ST-T change, LVH, non progression of R in v1-v5 were common ECG abnormalities.

**Conclusion:** ECG may be normal in patients with DCM though sinus tachycardia and non specific ST-T abnormalities were common.

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## Introduction:

Cardiomyopathy is a disease of the heart muscle that leads to deterioration of myocardial function.<sup>1</sup> 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).<sup>2-3</sup> Among these DCM is the most common form, comprising 90% of all cases causing sudden cardiac death.<sup>4</sup> 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 unpredictable and the long-term prognosis is not good. The prevalence of heart failure is about 1 to 1.5 of adult population. The incidence of DCM is reported to be 5 to 8 cases per

100,000 populations per year. It occurs 3 times more frequently in males as compared to females. However, DCM is considered to be an important cause of heart failure and accounts for up to 25% of all cases of CHF.<sup>5</sup> The Framingham study has reported 10% annual mortality rate for subjects having DCM with heart failure.<sup>6</sup> Hence the increasing incidence of DCM is also associated with significant morbidity and mortality.

There is no available data on heart failure in Bangladesh.<sup>7</sup> Currently, there is paucity of data on DCM in Bangladesh. But because of the rising prevalence of chronic heart failure in the country and on the other hand due to the increasing use of ECG and Echocardiography, the incidence of DCM is also showing rising trend. The present study is therefore undertaken to study the electrocardiographic and echocardiographic findings in patients with DCM.

**Address of Correspondence:** Dr. Rabindra Nath Barman, Department of Cardiology, Rangpur Medical College, Rangpur, Bangladesh.

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**Methods:**

The present study was an observational study and was performed in 100 patients of DCM attending in Popular Diagnostic Centre, Rangpur for Echocardiography from January 2018 to July 2018 and diagnosed as dilated cardiomyopathy were enrolled.

ECG and Echocardiography have been performed on the on the patients using standard method. Echocardiographic evaluation was performed according to the standards of American society of Echocardiography in all patients using Vivid 7pro ultrasound Machine by GE medical system with 3s prob and colour Doppler facilities. Patients having left ventricular dilatation and ejection fraction less than 45% were diagnosed as dilated cardiomyopathy and included in this study. Patients excluded from the study by echocardiography were ischaemic heart disease (scars & akinetic), rheumatic valvular heart

disease, congenital heart disease and pericardial disease.

Standard 12 lead ECG were recorded at 25mm/sec and 1mv/cm. ECG findings of every patient were noted carefully.

The primary objective of this study was to understand the electrocardiography and echocardiographic profile of the patients with dilated cardiomyopathy.

**Results:**

The following section shows the results of the analysis of ECG and Echocardiographic findings.

In present study, dilated cardiomyopathy was more common after the age 50 years. Males were more commonly affected than female (M: F=2.4:1).

The most common ECG abnormalities was sinus tachycardia (49%). Loss of R in v1- v5 and

**Table-I**  
*Demographic profile of the study population (n=100).*

Age (years)	Male	Percentage	Female	Percentage	Total %
<20	1	1	1	1	2
20-29	2	2	3	3	5
30-39	4	4	4	4	8
40-49	8	8	6	6	14
50-59	25	25	10	10	35
>60	31	31	5	5	36
	71	71	29	29	100

**Table-II**  
*ECG changes in study population (n=100).*

ECG Changes	Number (n)	Percentage (%)
Normal	16	16
ST-T change	40	40
Sinus Tachycardia	49	49
Loss of R-in V <sub>1</sub> to V <sub>5</sub>	45	45
Atrial Premature Contractions	6	6
Ventricular Premature Contractions	3	3
Atrial Fibrillation	2	2
Supra Ventricular Tachycardia	3	3
Right Bundle Branch Block	3	3
Left Bundle Branch Block	8	8
Right Ventricular Hypertrophy	1	1
Left Ventricular Hypertrophy	23	23
Left Atrial Enlargement	2	2
Right Axis Deviation	3	3
Left Axis Deviation	11	11

N.B: More than one variable in study population.

**Table-III**  
*Echocardiography findings in study population (n=100).*

Parameters	Range (mm)	Number (n)	Percentage (%)
LVEDD	50-59	45	45
	>60	55	55
LVESD	40-49	37	37
	>50	63	63
LVEF	40-45	3	3
	30-39	34	34
	20-29	60	60
	<20	3	3
Mitral regurgitation		65	65
Tricuspid regurgitation		15	15
Aortic regurgitation		8	8
Pericardial effusion		2	2

nonspecific ST-T change were seen in 43% and 40% respectively. Normal ECG was seen in 16% of patients. LVH was seen in 23% of patients. Left axis deviation and left bundle branch block were seen in 11% and 8% respectively.

The left ventricular ejection fraction <20% is 3% of patients. It was between 20-29% in 60%, 30-39% in 34%, and between 40- 45% in 3% of patients.

The majority of the patients' (55%) having end diastolic volume more than 6 cm. 63% patients having end systolic volume more than 5cm. Global hypokinesia and dilatation of all four chambers were seen in all patients. In our study 65% had mitral regurgitation, 15% had tricuspid regurgitation, 8% had aortic regurgitation and 2% had pericardial effusion.

#### Discussion:

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

In our study DCM was predominantly seen in the elderly male population with male to female ratio 2.4:1. Similar findings were also reported by Saxena et al and Aref Albakri in their respective studies.<sup>8,9</sup>

Electrocardiographic characteristics of DCM have not been specifically defined and may be remarkably normal. But abnormalities ranging from isolated T wave abnormalities and sinus tachycardia to LBBB and ventricular ectopics may be observed. In the current study the most common ECG changes were

sinus tachycardia (49%) and non specific ST- T changes (40%). Similar findings were also reported by Rana et al., Yadab et al. and Sachin et al., in their respective studies.<sup>10,11</sup> In our study left ventricular hypertrophy was seen in 23%, left axis deviation 11%, left bundle branch block was seen in 8%. Similar findings were observed in Rana et al in his study.<sup>10</sup>

In the present study majority (60%) of the patients had ejection fraction was less than 30% (20-29%). Similar findings were reported by Rana et al in his studies.<sup>10</sup> Mitral regurgitation (65%) was more commonly seen compared to tricuspid regurgitation (8%) which similar to other study groups. In this study 2% patient had pericardial effusion but Rana et al showed 13% cases had pericardial effusion in his study.<sup>10</sup>

#### Conclusion:

Dilated cardiomyopathy is an important cause of heart failure affecting all age group and both sexes. Predominantly elderly male is more affected. Non specific ST- T changes and Sinus tachycardia is the most common ECG findings of DCM patients. But ECG may be within normal limit. So normal ECG does not exclude DCM.

#### Conflict of Interest - None.

#### References:

1. Hare JM. The dilated, restrictive, and infiltrative cardiomyopathies. In: ZipesD, Libby P, Bonow R, Braunwaid E. Eds. *Braunwald's heart disease- A Textbook of Cardiovascular Medicine*. 9<sup>th</sup> Ed. Philadelphia: Elsevier Saunders, 2012: 1563-1569.

2. Richardson P, McKenna W, Bristow M, Maisch B, Mautner B, O, Connell J, et al. Report of the 1995 WHO/International society and Federation of Cardiology (ISFC) Task Force on the Definition and Classification of cardiomyopathies. *Circulation* 1995; 93:841-842.
3. Maron BJ, Towbin JA, Thiene G, Antzelevitch C, Corrado D, Amett D, et al. cardiomyopathy definitions and classification of the cardiomyopathies. *Circulation* 2006; 13: 1807-1816.
4. Cohn JN, Bristow MR, Chien KR. Report of the national heart lung and blood institute special emphasis panel on heart failure research. *Circulation* 1997; 95: 766-770.
5. Anderson KM, Kannel WB. Prevalence of congestive heart failure in Framingham Heart study subjects. *Circulation* 1994; 13: 5107-5112.
6. Kalon KL, Anderson KM, Kannel WB, Grossman W, Levy D. Survival After the Onset of Congestive Heart Failure in Framingham Heart Study Subjects. *Circulation* 1993; 88:107-115.
7. Islam A, Mohibullah A, Paul T. Cardiovascular disease in Bangladesh: A Review. *Bangladesh Heart Journal* 2016; 31(2):80-99.
8. Saxena NK, Mehra D. Study of Dilated Cardiomyopathy in Correlation with Electrocardiography in Patients less than 40 Years Age. *ICJMR* 2018; V 5.
9. Albakri A. Dilated cardiomyopathy: A review of literature on clinical status and meta-analysis of diagnostic and clinical management. *J Clin Invest Stud* 2018; 1(1):1-13.
10. Rana HM, Chavda P, Rathod CC, Mavani M. Electrocardiographic and Echocardiographic Profile of DCM patients attending tertiary care hospital in Vadodara. *Ntl J of Community Med* 2015; 6(4):571-574.
11. Yadav NA, Rangu K, Krishna LSR, Goutham V, Jyotsana M, Seshagiri Rao, et al . Clinical profile of Dilated cardiomyopathy. A Tertiary Care Centre Study. *Indian Heart J* 2003; 55: 165-178.