

**CLINICAL PROFILE OF PATIENTS WITH DILATED CARDIOMYOPATHY IN A TERTIARY CARE CENTER IN NORTH EAST INDIA**Naruttam Sonowal<sup>1</sup>, Vanamali Dharma Rao<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: BACKGROUND:** Dilated cardiomyopathy (DCM) is a severe illness with high mortality in the young adult population in resource limited settings. In north-east part of India, clinicians still continue to face the challenges of identifying and treating the dilated cardiomyopathy to improve quality of life due to various reasons. In India, there have been few investigations focusing on the dilated cardiomyopathy patients. But from this part of the country, there is paucity of data. Therefore, the present study was undertaken to examine the clinical characteristics of dilated cardiomyopathy patients who presented to our hospital. **MATERIALS AND METHODS:** This prospective observational study was carried out in the Department of General Medicine, Jorhat Medical College and Hospital, Jorhat, Assam, from January 2013 to December 2013. Total 31 consecutive patients fulfilling the criteria of dilated cardiomyopathy were studied. Dilated Cardiomyopathy was diagnosed if enlarged left ventricle with decreased systolic function as measured by left ventricular ejection fraction characterized dilated cardiomyopathy. Patients were excluded from the study if they have one or more of the following; systemic hypertension (>160/100 mm Hg), evidence of coronary artery diseases, pericardial diseases, congenital heart disease, valvular heart diseases, cor pulmonale and rapid, sustained supraventricular tachycardia. Detailed informed consent from the patients and ethical permission from the concerned authorities were taken. **RESULTS:** Thirty one patients were diagnosed with dilated cardiomyopathy during the study period who fulfilled the inclusion and exclusion criteria of the study. Twenty-nine (92%) of 31 patients presented with clinical features of congestive heart failure as their initial presentation and majority presented with dyspnea (70.97%), followed by palpitation (64.52%). The mean cardio thoracic ratio was (0.61). Majority of the patients (70.97%) were in sinus rhythm and commonest abnormality detected in ECG was QRS abnormality (54.84%), followed by left axis deviation (48.39%). **CONCLUSION:** In majority of cases the cause of dilated cardiomyopathy is idiopathic, followed by alcohol consumption. Secondary causes occur with less frequency. Patients present with features of heart failure during the initial presentation associated with QRS abnormalities on ECG.

**KEYWORDS:** Cardiomyopathy, clinical feature, north-east India.

**INTRODUCTION:** Cardiomyopathy is a heterogeneous group of disorders of varying etiology. Heart failure from systolic and/or diastolic cardiac dysfunction is common to all. The reported incidence of DCM varies annually about 5 to 8 cases per 100,000 of the population. The true incidence may be underestimated due to underreporting or under detection of asymptomatic cases of DCM. The clinical characteristics and natural history of adults with idiopathic dilated cardiomyopathy are well described.<sup>1-3</sup>

However, the prevalence, cause, and prognosis of dilated cardiomyopathy can differ according to the geographical location and sociodemographics of the affected populations.

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For example, in Western developed countries, dilated non-ischemic cardiomyopathy accounts for approximately 30% to 40% of the heart failure population, of which idiopathic cardiomyopathy is the most frequent cause. The prevalence of DCM in Japan appears to be about half, and in Africa and Latin America approximately double that of the Western populations.<sup>1</sup> As populations go through epidemiological, socioeconomic transitions, and health care modifications, the features of DCM will continue to change.

Reports focused on dilated cardiomyopathy from north eastern part of India are very rarely documented. Therefore, the purpose of this report is to clinical features and demographic profile of patients with dilated cardiomyopathy from north east India.

**MATERIALS AND METHODS:** This prospective observational study was carried out in the Department of General Medicine, Jorhat Medical College and Hospital, Jorhat, Assam, from January 2013 to December 2013. Total 31 consecutive patients fulfilling the criteria of dilated cardiomyopathy were studied.

Dilated Cardiomyopathy was diagnosed if enlarged left ventricle with decreased systolic function as measured by left ventricular ejection fraction characterized dilated cardiomyopathy. (Echocardiography criteria for decreased systolic function: Left ventricular ejection fraction <45%; Left ventricular end diastolic dimension > 3 cm/ body surface area; Global hypokinesia; dilatation of all the chambers of heart in absence of valvular heart disease and congenital heart disease).

Patients were excluded from the study if they have one or more of the following; systemic hypertension (>160/100 mm Hg), evidence of coronary artery diseases, pericardial diseases, congenital heart disease, valvular heart diseases, cor pulmonale and rapid, sustained supraventricular tachycardia. Detailed informed consent from the patients and ethical permission from the concerned authorities were taken.

**Diagnostic Criteria** for peripartum cardiomyopathy considered in this study (all must be present) are<sup>2</sup>:

- Cardiac failure developing in the last month of pregnancy or within 5 months of delivery
- No identifiable cause of the cardiac failure
- No recognizable heart disease before the last month of pregnancy
- An ejection fraction of less than 45%, or the combination of an M-mode fractional shortening of less than 30% and an end-diastolic dimension greater than 2.7 cm/m.<sup>2</sup>

Alcohol associated cardiomyopathy was diagnosed if features of dilated cardiomyopathy in patient with chronic alcoholic.

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. To obtain a stable baseline hemodynamic state, subjects rested in the supine position for 10 min before undergoing the imaging examination.

LV fractional shortening was calculated by dividing the difference between the end-diastolic and the end-systolic dimensions by the end-diastolic dimension.

LV volumes were measured at end-systole and end-diastole using parasternal long axis, short axis, apical four-chamber and apical long-axis views.

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The LV EF was calculated by dividing the difference between the end-diastolic and the end-systolic volumes by the end diastolic volume.

Statistical analysis was done in Microsoft excel. Data were expressed in number, percent or mean±SD as appropriate.

**RESULTS:** A total of 37 patients were admitted from Jan 2013 to Dec 2013 with diagnosis of cardiomyopathy. Six patients were excluded as they fulfilled the exclusion criteria.

The baseline clinical characteristics of 31 patients with DCM are listed in (Table 1). The age ranged from 18 years to 80 years. Most of the patients were in the age group of (35-65 years). 61.29% were male and 38.71% were female. The male: female was 1.6:1. Most of the patients were presented with dyspnea (70.97%) followed by palpitation (64.52%).

Twenty-nine (92%) of 31 patients presented with clinical features of congestive heart failure as their initial presentation. The two exceptions included one patient with a ventricular arrhythmia and another with asymptomatic cardiomegaly (cardiothoracic ratio 0.57).

Variables	Numbers	Percent (%)
<b>Age (in years)</b>		
18-27	02	6.45
28-37	05	16.13
38-47	07	22.58
48-57	10	32.26
58-67	05	16.13
>67	02	6.45
<b>Sex</b>		
Male	19	61.29
Female	12	38.71
<b>Presenting Features</b>		
Dyspnea	22	70.97
Palpitation	20	64.52
Chest pain	01	3.23
Cough	04	12.90
Swelling of legs	10	32.26
Oliguria	04	12.90
Asymptomatic	00	00
Non-specific	02	6.45
<b>NYHA Class</b>		
Class I	00	00
Class II	07	22.58
Class III	15	48.39
Class IV	09	29.03

**Table 1: Baseline characteristics and clinical presentation of the patients (N=31)**

Electrocardiographic observations revealed different types of arrhythmias; conduction disturbances and chamber enlargements (Table 2) Majority of the patients (70.97%) were in sinus rhythm. In the present study, the commonest abnormality detected in ECG was QRS abnormality (54.84%), followed by left axis deviation (48.39%).

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Variable	Number	Percent
<b>Rhythm</b>		
Sinus	22	70.97
Non Sinus	09	29.03
<b>QRS axis abnormality</b>		
Left axis deviation	15	48.39
Right axis deviation	02	6.45
<b>Atrial abnormality</b>		
Left atrial enlargement	08	25.81
Right atrial enlargement	03	9.68
Both atrial enlargement	02	6.45
<b>Ventricular hypertrophy</b>		
LVH	13	41.94
RVH	02	6.45
Biventricular enlargement	01	3.23
<b>Conduction abnormalities</b>		
Prolonged PR interval	01	3.23
2 <sup>o</sup> atrioventricular block	05	16.13
Bundle branch block	09	29.03
<b>Arrhythmias</b>		
Atrial fibrillation	07	22.58
Premature atrial complexes	02	6.45
Premature Ventricular complexes	03	9.68
Ventricular tachycardia	01	3.23
<b>Sinus tachycardia</b>		
	04	12.90
<b>Nonspecific ST-T wave changes</b>		
	14	45.16

Table 2: ECG changes of the patients (N=31)

Parameters	Mean ± SD
Diastolic dimension, mm	64.58
Systolic dimension, mm	56.94
FS (%)	8.08
EF (%)	29.50
PW diastolic/systolic thickness, mm	8.23/10.99
IVS diastolic/systolic thickness, mm	8.93/8.95
LA diameter, mm	35.98
RV diastolic diameter, mm	33.35

Table 3: Echocardiographic findings of the patients (n=31)

FS fractional shortening, EF-ejection fraction, PW-LV posterior wall-Left ventricle, IVS Interventricular septum, LA-left atrium

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Primary/ Idiopathic	13 (41.94%)
Alcohol	7 (22.58%)
Peripartum	7 (22.58%)
Post-viral	2 (6.45%)
Hypoalbuminaemia	1 (3.22%)
Rheumatoid arthritis	1 (3.22%)

**Table 4: Etiology of DCM**

PA view of chest revealed cardiomegaly in 30 (96.77%) of patients. Mean cardio thoracic ratio was (0.61). Minimal pleural effusion was present in only one patient.

Albuminuria was found in 10 (33.33%) patients. Liver function tests were abnormal in 4 patients with non-specific increase in Serum bilirubin, SGOT and SGPT.

**DISCUSSION:** Dilated cardiomyopathy spares no age. The middle age group is more commonly affected. The present study also reflected the same 24 of 31 patients (77.41%) were mostly between third and sixth decade. Various studies.<sup>1,2</sup> reported the highest incidence in the middle age group. The mean age of DCM patients of the present series was 50.17 which is similar (45 years) as reported by Flower et al in their study of 29 patients.<sup>1</sup> The mean age of some of the studies were 44 ±10 years by Kuhn et al.<sup>2</sup>

In the present series of 31 cases of dilated cardiomyopathy males were affected more than the female population similar to other studies.<sup>1,2</sup> The ratio of male to female patients in the present study was found to be 1.6:1 which was supported by 1.4:1 by various other studies.<sup>1,3</sup> However, somewhat higher male-female ratio viz 4:1 is reported by Kuhn.<sup>2</sup>

Symptoms of dilated cardiomyopathy are mainly due to heart failure. These include symptoms from left sided failure, right-sided failure or both and arrhythmias. The present study also reflected the similar type of clinical presentation. In the present study, exertional dyspnea was the most common initial symptom (70.9%), followed by palpitation (64.52%), leg swelling (32.26%), cough (12.90%) and oliguria (12.90%).

Thus it was seen that symptoms of left ventricular failure were more initially than those due to right heart failure. In the series by Fowler et al it was found that dyspnea (89%), dependent edema (89%) and PND (11%) were the initial symptoms.<sup>1</sup>

In the present study of 31 patients of DCM, secondary causes/ risk factors were found in (58.06%) while no cause/ risk factors could be documented (Idiopathic) in (41.93%) [Vide Table no. 4].

The 41.93% incidence of idiopathic DCM in the Present series was lower than 52% reported by Fuster et al.<sup>4</sup> This may be due to better technique, advancement of science and availability of more sophisticated methods of diagnosis of cardiomyopathy.

Amongst the secondary causes of DCM, alcoholic DCM was the most common cause (23.33%), which was almost similar to 20% reported by Fowler et. al and Fuster et al.<sup>1,4</sup> Much higher incidence of 60% have been reported by Massumi et al<sup>5</sup> and 45% by Roberts et al<sup>6</sup>, while quite low incidence of 4% has been reported in the series by Ghosh and Gupta et al.<sup>7</sup>

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In the present study peripartum cardiomyopathy was found in 7 (22.58%) patients which was relatively much higher than 2.8% reported by Fuster et al<sup>4</sup>, 8.5% by Robert et al<sup>6</sup> and 17% by Ghosh and Gupta.<sup>7</sup> 58.33% of the female DCM was found to be peripartum. This result is comparable to 42% reported by Ghosh and Gupta<sup>7</sup> but was very high compared to by Fuster et al<sup>4</sup> and higher than 33.33% by Roberts et al.<sup>6</sup>

Infection could be attributed to one patient (03.33%) who was post viral and given a history of having flu like fever with measles like rashes 2 months earlier. Preceding viral infection has been reported by different authors viz 55% by Fowler et al,<sup>1</sup> 20% by Fuster et al.<sup>4</sup> Viral infection producing myocarditis ultimately ending up with DCM has been reported by many authors viz 10% by Mason and O Connel,<sup>8</sup> 1-67% by various studies.<sup>3, 4, 7, 9</sup> All these facts point towards possible role of infections/ inflammation/ immunologic type risk factors of DCM.

Hypoalbuminaemia was found in 03.33% patients in present series. Massumi et al reported higher incidence (36%) in their series.<sup>5</sup>

In the present series three patients with DCM gave family history of similar heart disease in 1st degree relatives. As there was paucity of contributory health documents concerning the illness nor any genetic studies were undertaken, they could not be included under the heading of "familial cause". However DCM is well reported to be familial in some series. The percentage of familial causes in different series were 5.5% by Fowler et al<sup>1</sup> and 6% by Robert et al.<sup>6</sup> However the intrinsic mechanism in the genesis of familial cardiomyopathy remains unknown.

Electrocardiographic findings in DCM patients are usually abnormal; however, it may be remarkably normal. In the present series the commonest abnormality found was QRS axis abnormality (54.84%). In various studies, the commonest ECG abnormality varies as shown in table 5. This is mainly due to variation in the etiological agents depending on the geographical location, socio-economic conditions and other factors.

Study (year)	Commonest abnormality	%
1. N. Fowler et al <sup>1</sup>	Minor T wave abnormality	50
2. Massumi et al <sup>5</sup>	Extra systole	84
3. Walsh et al <sup>10</sup>	Left ventricular hypertrophy	100
4. Horst Kuhn et al <sup>2</sup>	Left bundle branch block	40
5. Sanderson et al <sup>3</sup>	T wave inversion	44
6. V. Fuster et al <sup>4</sup>	Left ventricular conduction delay	51
7. W. C. Roberts et al <sup>6</sup>	QRS abnormality	50
8. Ghosh and Gupta <sup>7</sup>	Atrial abnormality	50.4

**Table 5: Commonest ECG findings in various studies**

In the present study QRS abnormality was higher with prominent left axis deviation (48.39%) and ventricular hypertrophy (48.39%) with predominant left ventricle (41.9%), and conduction abnormality (48.39%) patients with LBBB alone 19.35%. Atrial abnormality and arrhythmias were in (41.9%) patient's each. Non-specific ST-T wave changes and atrial fibrillation was found in (45.16%) and (22.58%) accordingly.

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Various ECG abnormalities observed in various studies are compared in the Table 6.

	ECG abnormality (%)	Present study (%)	Fowler et. al <sup>1</sup>	Massumi et. al <sup>5</sup>	Sanderson et. al <sup>3</sup>	Fusteret. al <sup>4</sup>	Roberts et. al <sup>6</sup>	Ghosh & Gupta <sup>7</sup>
1	Atrial fibrillation	22.58	07	30	-	19	25	6.3
2	LAD	48.39	19	18	-	-	43	21.2
3	RAD	06.45	19	02	-	-	07	10.6
4	Atrial abnormality	41.9	-	-	-	-	49	50.4
5	LVH	41.94	19	52	-	14	38	19.7
6	RVH	06.45	06	04	-	-	05	25.2
7	LBBB	19.35	-	10	6.98	36	41	23.4
8	PAC	06.45	-	84	4.65	-	12	4.2
9	PVC	9.68	-	-	-	-	41	25.2
10	Ventricular tachycardia	03.23	02	-	-	-	05	8.4
11	Poor progression Of R wave	03.23	-	-	-	-	22	23.4
12	Nonspecific ST Wave changes	45.16	50	68	44	-	12	14.8

**Table 6: Comparison of ECG abnormalities with various studies**

LAD=left axis deviation, RAD=Right axis deviation, LVH=left ventricular hypertrophy, RVH=right ventricular hypertrophy, LBBB=left bundle branch block, PAC=premature atrial complex, PVC=premature ventricular complex

The present series is similar to that of William C. Roberts et.al with QRS axis abnormality as the commonest finding with higher incidence of atrial fibrillation, LVH and atrial abnormality. (6)The conduction abnormality mainly LBBB (19.35%) was similar to Ghosh and Gupta<sup>7</sup> (23.4%) but lower than those reported by Fuster<sup>4</sup> (36%) and Roberts et. al<sup>6</sup> (41%).

Echocardiographic findings were compared with various studies and are shown in Table 3.

Mean Dimension	Present study	Sanderson et. al <sup>3</sup>	Ghosh & Gupta et. al <sup>7</sup>
Left atrium (mm)	35.98	42 ± 7	40.3
LVIDd (mm)	64.54	57 ± 6	67.5
LVIDs (mm)	56.94	45 ± 7	58.5
EF (%)	29.50	50 ± 13	32.5

**Table 7: Comparison of Echocardiographic findings with other studies**

LVIDd= Left ventricle internal diameter (diastole), LVIDs=Left ventricle internal diameter (systole), EF=Ejection Fraction.

In the present study, Doppler echocardiography showed mitral regurgitation in 30 patients (96.77%), which was comparable to 98% by G. Singh et. al<sup>13</sup> Tricuspid regurgitation was found to in 12.90, which was lower than G. Singh series (33%). The present study also shows a lower incidence

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of aortic regurgitation (3.23) compared to G. Singh et al (15%). Pulmonary regurgitation was seen in 3.23% of patients, which was similar to G. Singh et al (21%).

In this study mitral inflow velocity and tissue Doppler imaging showed a range of findings, which was attributable to diastolic dysfunction. The mean early velocity  $E_m$  during diastole (0.50m/s) and late flow velocity  $A_m$  during diastole (0.82 m/s). The mean  $E/A$  ratio was altered (0.62). Similarly Doppler tissue imaging of mean mitral annular flow early velocity  $E_a$  during diastole (0.29 m/s) and late flows velocity  $A_a$  during diastole 0.40 m/s. The  $E/A$  ratio was 0.73. which were similar to different studies

Comparing the male: female echocardiographic findings with Gupta and Ghosh<sup>9</sup> studies there was no significant difference in the findings (vide Table8).

Dimension	Male		Female	
	Present study	Ghosh & Gupta et al <sup>9</sup>	Present Study	Ghosh & Gupta et. al <sup>9</sup>
Left atrium (mm)	36.89	40.30	34.66	40.30
LVIDd (mm)	64.69	60.80	64.30	65.80
LVIDs (mm)	56.70	60.50	57.22	55.80
EF (%)	29.23	31.97	29.92	33.85

**Table 8: Comparing Echo findings in male and female with studies**

EF= Ejection fraction

**CONCLUSION:** The study was small and single centered. Therefore, a large population based multi-center prospective study is needed which will be more accurate and will reflect the true picture and magnitude of the problem in the North East part of India.

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