Factors Affecting Outcome of Patients Diagnosed with Cardiomyopathy

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Abstract

Introduction: Cardiomyopathies are a heterogeneous group of heart diseases. The present study aimed to assess the clinical profile of patients diagnosed with cardiomyopathy and factors affecting their clinical outcomes. *Methodology:* Diagnosed patients of cardiomyopathyadmitted in general medical ward in our department were included. Diagnosis of cardiomyopathy was made based on the history, clinical examination and echocardiography findings and classified as dilated or hypertrophic cardiomyopathy. *Results:* Dilated cardiomyopathy was seen in 92.5% of the patients. Ischemic etiology was observed in approximately half of all patients (47%). Other less common etiology of cardiomyopathy was peripartum, thyroid abnormality, HIV infection, alcoholism, infectious disease, tachycardia and drug induced. Breathlessness and fatigue were the two most common presenting complaints. Discharge from the medical ward was ordered 66% of the patients, 17% had to be transferred to ICU and 17% expired during the follow up period. Serum creatinine higher than 1.3 mg/dl and total bilirubin more than 1.2 mg/dl were found to be significantly associated with patient being either transferred to ICU or die during the follow up period. *Conclusions:* Non-ischemic etiology was more prevalent and higher serum creatinine and total bilirubin were associated with poor clinical outcomes. Future research is suggested from the clinical standpoint as well as those involving molecular techniques.

Keywords: cardiomyopathy; ischemia; mortality; Outcome.

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Introduction

Cardiomyopathies are an important and heterogeneous group of diseases for which an understanding has been impaired by the scarcity of literature and clinical understanding. The term cardiomyopathy was first introduced in the year 1957 by Wallace Brigden to refer collectively a primary myocardial disease.[1] Burch used the term ischemic cardiomyopathy when it was found that coronary artery disease can ultimately lead to myocardial dysfunction which is out of proportion to the level of ischemia or infarction.[2] Rubler *et al.* first identified the existence of a diabetic cardiomyopathy in patients who had no evidence

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of coronary atherosclerosis with congestive heartfailure.[3]

A syndrome of idiopathic heart failure in the early post-partum period was first described by Ritchie *et al.*, which was first described as post-partum cardiomyopathy and later known as peripartum cardiomyopathy.[4]

Therefore, numerous presentations of cardiomyopathy poses a diagnostic challenge, delaying treatment. The prognosis of cardiomyopathy may be much more varied than was previously thought of.[5]

Several features of the clinical presentation may be valuable in predicting patient outcome. Also, the underlying etiology of the cardiomyopathy clearly has a substantial impact on the natural history, thus warranting an exhaustive search for causes. The present study aimed to assess the clinical profile of patients diagnosed with cardiomyopathy and factors affecting their clinical outcomes.

Materials and Methods

Study Design and Sampling

This observation study was conducted in the Department of Medicine at a tertiary level care teaching hospital. Diagnosed patients of cardiomyopathy, aged 18 years or above, admitted in general medical ward in our department and willing to give written informed consent were included. Patients of congenital cardiac diseases. Patients of pericardial effusion, valvular heart diseases and acute coronary syndrome were excluded from the study. All consecutive admitted patients diagnosed with cardiomyopathy were approached for inclusion in the study and patients fulfilling the study criteria were included. Informed written consent was obtained from all patients participating in the study and approval of the Institutional Ethics Committee was sought before study enrolment.

Data Collection and Data Analysis

Diagnosis of cardiomyopathy was made based on the history, clinical examination and echocardiography findings and classified as dilated or hypertrophic cardiomyopathy. Using a pre-designed semi-structured study proforma, demographic information and personal details were noted from the medical records of the hospital. Chief complaints, past medical history and personal addictions if any were noted for all patients.

General physical examination and recording of vitals was conducted and findings were noted. Systemic cardiovascular examination was done in detail and the any remarkable findings were noted. New York Heart Association (NYHA) grading of dyspnoea was done for all patients. Routine and specific investigations were ordered by the treating physician as part of the management or part of the study. Echocardiography was done in all cases and cardiac Magnetic Resonance Imaging (MRI) was done as suggested by the treating physician. The final outcome of the patient was assessed as discharge, transfer to Intensive Care Unit and death.

The data were analyzed using standard statistical software SPSS statistical package version 23. For continuous outcome mean and standard deviations were calculated and for categorical outcome, proportion and percentage were calculated. Categorical variables were analysed using Chi square test or Fisher's exact test, *p* value < 0.05 being considered as statistically significant.

Results

During the study period, 53 patients were included. Approximately, 62% of the patients were males and 41% were aged more than 50 years **Table 1**. Dilated cardiomyopathy was seen in 92.5% of the patients. Ischemic etiology was observed in approximately half of all patients (47%). Other less common etiology of cardiomyopathy was peripartum (11%), thyroid abnormality (7.5%), HIV infection (5.6%), alcoholism (5.6%), infectious disease (3.7%), tachycardia (2.2%) and drug induced (2.2%). Breathlessness and fatigue were the two most common presenting complaints of the patients included in the study (92.5% and 79.2% respectively). Chest pain, lower limb swelling and fainting was observed among fewer cases. New York Heart Association (NYHA) Grade II, III and IV was observed in 28.3%, 32.1% and 39.6% respectively. Vitals on admission revealed hypotension among 83% of the patients, while 11.3% were normotensive and 5.7% were hypertensive (**Table 2**).

Systemic examination revealed murmur in two thirds, and gallop rhythm in half of all patients. Echocardiography revealed ejection fraction to be less than 30% in 64% of the patients. Global left ventricle wall motion abnormality was observed in about three fourths of the patients. Cardiac MRI was done in only 10 patients, 4 of which showed scars, 3 had biventricular failure and one had thrombus.

Table 1: Baseline Characteristics of the Patients Included in the Study

Variables	N	%
Age distribution (in years)		
≤ 30	12	22.6
31 to 50	19	36
> 50	22	41.4
Gender distribution		
Females	20	37.7
Males	33	62.3
Type of cardiomyopathy		
Dilated	49	92.5
Hypertrophic	04	07.5
Etiology		
Ischemic	25	47
Peripartum	06	11.3
Thyroid abnormality	04	07.5
HIV infection	03	05.6
Alcoholic	03	05.6
Infectious diseases	02	03.7
Tachycardia	01	02.2
Drug induced	01	02.2
Clinical features		
Breathlessness	49	92.5
Fatigue	42	79.2
Chest pain	26	49.1
Lower limb swelling	17	32.1
Fainting	10	18.9
New York Heart Association classification		
I	00	00
II	15	28.3
III	17	32.1
IV	21	39.6

Table 2: Examination and Investigation Findings of the Patients

Variables	N	%
Blood pressure		
Hypotension	44	83
Normotensive	06	11.3
Hypertensive	03	05.7
Cardiovascular system examination		
Murmur	35	66
Gallop rhythm	27	50.9
Loud P2	04	07.5
Ejection fraction (in %)		
< 30	34	64.2
30 to 45	15	28.3
46 to 50	00	00
51 to 55	00	00
56 to 60	04	07.5
Regional Wall Motion Abnormality		
Global left ventricle wall motion abnormality	39	73.6

Variables	N	%
Regional wall motion abnormality	10	18.9
No wall motion abnormality	04	07.5
Cardiac MRI (n = 10)		
No scar	06	60
Scar seen	04	40
Thrombus	01	10
Biventricular failure	03	30

Discharge from the medical ward was ordered for 66% of the patients **Fig. 1**, 17% had to be transferred to ICU and 17% expired during the study period.

Table 3 describes how various patient related variables are associated with the final outcome of the patients. Age, gender, etiology and ejection fraction was not significantly associated with the final outcome of the patients. Serum creatinine higher than 1.3 mg/dl and total bilirubin more than 1.2 mg/dl were found to be significantly associated with patient being either transferred to ICU or die during the follow up period. After 4 months of follow up of discharged patients, 60.0% cases showed EF finding <30 in Ischemic group which was significantly more as compared to 13.3% among Non-Ischemic group. This study indicates that, after four months of follow up of discharged patients, 23.3% of the cases had NYHA classification IV atadmission. After 4 months, 3.3% of the cases had NYHA classification IV which was significant change from admission and five patients were lost to follow up.
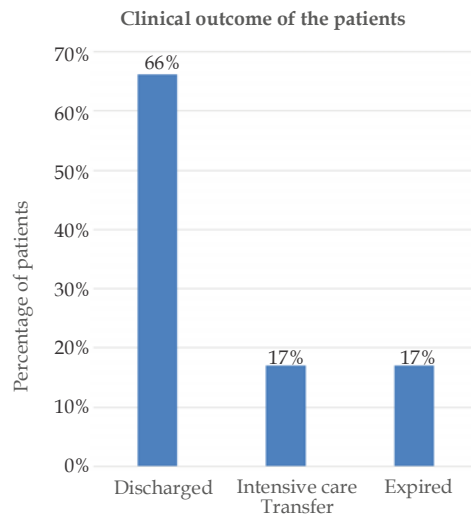

Fig. 1: Clinical outcomes of the patients included in the study

Table 3: Patient Factors Associated with Clinical Outcome of the Patients

| Variable | Outcome | | p value* |
	Discharged	Intensive Care transfer/Died	
Age group (in years)			
≤ 30	08	04	0.25
31 to 50	15	04	
> 50	12	10	
Gender			
Female	11	09	0.18
Male	24	09	
Etiology			
Ischemic	15	10	0.42
Non-ischemic	20	08	
Serum creatinine (in mg/dl)			
≤ 1.3	26	06	<0.05
> 1.3	09	12	
Total bilirubin (in mg/dl)			
≤ 1.2	30	10	<0.05
> 1.2	05	08	
Ejection fraction (in %)			
< 30	19	15	0.10
31 to 45	12	03	
46 to 50	00	00	
51 to 55	00	00	
56 to 60	04	04	

*analyzed using Chi-square or Fisher's exact test

Discussion

The present study included 53 patients diagnosed with cardiomyopathy. Majority of them were diagnosed as having dilated cardiomyopathy and only four patients had hypertrophic cardiomyopathy. Also, majority of the patients were aged 50 years or above. This is similar to that reported from the United States and Europe (mean age of 61 and 71 years respectively) and Europe (71.3 ± 12.7 years), however patients in studies from Ghana and Nigeria had relatively younger patients.[6] Ischemic cardiomyopathy was observed in 47% of the patients.

In contrast, Pacheco *et al.*[7] studied 91 new patients with the diagnosis of dilated cardiomyopathy, of which 37% had ischemic cardiomyopathy and an idiopathic etiology was found in 22% of the patients.

Similarly in a study by Virendra *et al.* 23.07% of the patients had ischemic cardiomyopathy.[8] Among non-ischemic cases in the present study, peripartum cardiomyopathy was diagnosed in 11.3%. The reported incidence of peripartum cardiomyopathy varies, mainly due to wide geographical variation, with reported incidences of 1:2289 to 1:4000 live births in the United States, 1:1000 in South Africa, 1:300 in Haiti, and 1:100 in Zaria, Nigeria.[9] In addition, the wide range in reported incidence may reflect a non-uniformdiagnostic criteria.

The clinical course is largely unpredictable in the individual patient and may depend in part upon the underlying cause of the heart disease. In our study, breathlessness and fatigue were the two most common presenting complaints, while chest pain, lower limb swelling and fainting was observed among fewer cases.

Saha *et al.* studied the clinical profileof 30 patients with dilated cardiomyopathy, in which all patients presented with exertionaldyspnea, 83% had easy fatigability and 70% had pedal edema.[10] Easy fatigability may be due to chronic heart failure itself in most cases, while factors like anaemia and cardiac cachexiamay also contribute to easy fatigability.

In the present study, 17% of the patients had to be transferred to ICU and 17% expired during the follow up period. Age, gender, etiology and ejection fraction was not significantly associated with the final outcome of the patients. However, serum creatinine higher than 1.3 mg/dl were found to be significantly associated with patient being either transferred to ICU or die during the study period.

Recently, Hueb *et al.* demonstrated that chronic kidney disease is associated with a poorer prognosis compared with the prognosis in patients with preserved renal function with a significant interaction with ventricular function.[11] Their multivariate analysis found creatinine clearance as an independent predictor of death (hazard ratio 0.97, 95% confidence interval 0.96–0.98, *p* < 0.001). Underlying mechanisms that have been attributed to these are metabolic disturbances; myocardial fibrosis, such as increases in angiotensin II, inflammatory cytokines, and small vessel disease.[12]

We also observed total bilirubin more than 1.2 mg/dl to be significantly associated with transfer to ICU or death in our patients. Allen and colleagues found that total bilirubin (adjusted HR 1.14, *p* < 0.0001) was among the most highly significant overall predictors of adverse cardiovascular outcome in patients with chronic heart failure.[13] After 4 months of follow up of discharged patients, 60.0% cases showed EF finding <30 in Ischemic group which was significantly more as compared to 13.3% among Non-Ischemic group.

Conclusion

The results of our study reiterated previously established fact that dilated cardiomyopathy is more common than hypertrophic cardiomyopathy. Non-ischemic etiology was more prevalent and higher serum creatinine and total bilirubin were associated with poor clinical outcomes. Non-ischemic CMP have good outcome in the form of NYHA class & LVEF. There is very limited literature available on cardiomyopathy from Indian studies. Future research is suggested from the clinical standpoint as well as those involving molecular techniques.

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Conflict of interest: None

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