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Research Article

Study of Clinical Profile of Dilated Cardiomyopathy

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ABSTRACT

BACKGROUND: Cardiomyopathy is a disease of the heart muscle that makes it harder for the heart to pump blood to the rest of the body. Cardiomyopathy can lead to heart failure. The main types of cardiomyopathies include dilated, hypertrophic and restrictive cardiomyopathy. Treatment — which might include medications, surgically implanted devices, heart surgery or, in severe cases, a heart transplant — depends on the type of cardiomyopathy and how serious it is[1]. Dilated Cardiomyopathy (DCM) is a disease of the heart muscle characterized by enlargement and dilation of one or both of the ventricles along with impaired contractility defined as left ventricular ejection fraction (LVEF) less than 40%. Patients have systolic dysfunction and may or may not have overt symptoms of heart failure. A previous prominent classification of cardiomyopathies (1995) was represented in a very brief document under the auspices of the World Health Organization (WHO)[2], The natural history of DCM remains incompletely understood. This is because this diagnosis clearly contains a variety of causes and patients have highly variable presentations. The prognosis of DCM may be much more variable than previously appreciated. Several features of the clinical presentation may be valuable in predicting patient outcome. In view of high prevalence of heart failure and also lack of data on dilated cardiomyopathy this study was undertaken. The ECG and echocardiography were also evaluated in the present study. **METHODS** - A cross sectional study on 60 patients with dilated cardiomyopathy was conducted in a teaching hospital in Vadodara, Gujarat. **RESULTS** - In our study the most common type of dilated cardiomyopathy was idiopathic dilated cardiomyopathy being present in 60% of our patients, followed by alcoholic cardiomyopathy seen in 15 %. Diabetic cardiomyopathy was found to be the third most common type seen in 13.3% of patients while Peripartum cardiomyopathy were seen in 11.6%. n our study 32 % of patients had anemia, most of the patients had mild anemia (i.e., Hb between 8.5 – 11 gm %). In a study done by A. Justin et al anemia was found in 27% of patients with congestive heart failure. The prevalence of anemia in our study is similar. Anemia is known to be associated with adverse outcome in patients with heart failure. Among alcoholic's alcohol plays a significant etiological role (p value <0.0001). Biventricular failure was present in 70% of patients and isolated LV failure was seen in 27%, 3% patient in our study had RV failure. The cardio thoracic ratio was more than 0.7 in 22%, it was between 0.6 to 0.7(moderate) in 43% and 35% of patients had mild cardiomegaly i.e., between 0.5 to 0.6 **CONCLUSION**- The major cause of dilated cardiomyopathy in our study was found to be idiopathic followed by alcoholic, diabetic and peripartum cardiomyopathy. The most common clinical presentation is biventricular failure. Almost all patients showed cardiomegaly in chest x-ray.

Key Words: *Dilated cardiomyopathy, heart failure.*

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INTRODUCTION

Cardiomyopathies are an important and heterogeneous group of diseases for which an understanding in both the public and medical community has historically been impaired by confusion surrounding definitions and nomenclature. Most cases of heart failure are caused by heart muscle disease (cardiomyopathy). Within the classification of cardiomyopathies[3,4], the most common cause of the clinical syndrome of heart failure is a secondary (ischemic, valvular, hypertensive, and so on) or a primary (genetic, nongenetic, acquired) DCM, defined as a ventricular chamber exhibiting increased diastolic and systolic volumes and a low (<45%) ejection fraction[5]. Classification schemes, of which there have been many, are useful in defining and drawing relationships or distinctions between these complex diseases for the purpose of promoting greater clarity. In adult population the prevalence of heart failure is estimated to be about 1 to 1.5%. The mortality and morbidity remain high (median survival of 3.2 years for women and 1.7 years for men). Up to 25% of all cases of CHF is caused by Dilated cardiomyopathy. The incidence and prevalence of CHF due to cardiomyopathy appears to be increasing. The incidence of DCM is reported to be 5 to 8 cases per 1,00,000 population per year. When compared to females DCM is 3 times more common in males. The frequency of occurrence is also more common in blacks. Many classifications in the literature are to some degree contradictory in design, and indeed none of the proposed schemes can be regarded as ideal. The dilemma is caused by the heterogeneity in the presentation of this diverse group of diseases. A previous prominent classification of cardiomyopathies (1995) was represented in a very brief document under the auspices of the World Health Organization (WHO)[6], however, with the identification of new

diseases over the past decade, and dramatic advances in cardiovascular diagnosis and knowledge regarding etiology, some disease definitions have become outdated and the WHO classification rendered essentially obsolete. Indeed, the past several years has witnessed a rapid evolution in the molecular genetics of cardiology. In particular, ion-channelopathies have emerged as conditions predisposing to potentially lethal ventricular tachyarrhythmias, caused by mutations in proteins leading to dysfunctional sodium, potassium, calcium, and other ion channels. Recently, under the auspices of the American Heart Association, a contemporary classification of cardiomyopathies has been presented, relying substantially on recent advances in the characterization of diseases affecting the myocardium. The new classification scheme affords a large measure of clarity to this area of investigation and facilitates interaction among the clinical and research communities in assessing the diagnosis, prognosis, and management of these complex diseases[7]. The natural history of DCM remains incompletely understood. This is because this diagnosis clearly contains a variety of causes and patients have highly variable presentations. The presentations of patients can range from asymptomatic left ventricular dysfunction to mild, moderate, or severe congestive heart failure. Different studies report wide-ranging estimates of annual mortality that are between 10% and 50%. Traditionally, it is held that symptomatic heart failure is invariably progressive. However, several factors suggest that this concept should be re-examined and that biological factors may determine favorable or unfavorable long-term outcomes[8]. The prognosis of DCM may be much more variable than previously appreciated. Several features of the clinical presentation may be valuable in predicting patient outcome3. In addition, the underlying etiology of the cardiomyopathy clearly has a substantial impact on the natural history, thus warranting an exhaustive search for causes. Some cardiomyopathies have excellent long-term survival, whereas others, particularly amyloidosis and human immunodeficiency virus (HIV) –related disease, carry grave prognoses. 3 With the advancement in molecular genetics and identification of underlying etiologies, dilated cardiomyopathy is being mentioned as a specific diagnosis and not by exclusion. The most common indication for cardiac transplantation in west is DCM.4,5 In view of high prevalence of heart failure and also lack of data on dilated cardiomyopathy this study was undertaken. The ECG and echocardiography were also evaluated in the present study

MATERIALS AND METHOD

Place of Study: Shri Sayaji General hospital, Vadodara Study Design: Cross sectional study
Ethical Committee Clearance: Obtained

Institutional Ethics Committee for Biomedical and Health Research (IECBHR)

Medical College & SSG Hospital, Baroda

Chairperson Dr. Rashmin Sompura		Member Secretary Dr. Sandeep Nanda
Dr. Sheila Aiyer Dr. Ramavtarram Dr. Minal Shastri Dr. Samir Kacheriwala	Dr. Neeta Bose Dr. Purvi Patel Dr. Anand Patel Dr. Vikas Doshi	Dr. Chirag Mistry Dr. Kavita Sindhav Mr. Rasesh Shah Mr. R. B. Gaekwad

No. IECBHR/ 27-2020 **Date:-27/02/2020**

To,

Dr. Kaushal Patel, Dr. Aniruddh Ambaliya,
Department of Medicine,
Medical College & SSG Hospital, Baroda.

Subject:- Ethics Committee Approval of the study.

Reference: "Study of Clinical profile of dilated Cardiomyopathy".

Dear Doctor,

Your application to conduct the above mentioned study was received by IECBHR, Medical College & SSG Hospital Baroda.

Your proposal was reviewed and discussed on both scientific and ethical aspects by the Ethics Committee while its meeting held on 13/02/2020. Neither you nor any of your study team members were present during the decision making process and did not vote for the approval of the study.

We approve the trial to be conducted in its presented form. Any changes in the protocol, study design and informed consent documents can be done after obtaining approval from ethics committee.

The Ethics committee expects to be informed about the progress of the study, any SAE occurring in the course of the study. You are asked to submit a copy of final report of analysis of the study.

Dr. Sandeep Nanda
Member Secretary,
IECHR-PG Research,
Medical College,
Baroda.

Period of Study: Jan 01 2020 to Oct 31 2020

SELECTION CRITERIA

Inclusion criteria

1. Clinical criteria: Patients with symptoms and signs of heart failure. 2. ECHO criteria: Left ventricular ejection fraction < 45% Global hypokinesia of LV Dilatation of all the chambers of heart Left ventricular end diastolic dimension > 3 cm / body surface area.

Exclusion criteria

1. Pericardial disease 2. Corpulmonale with CHF. 3. Hypertrophic cardiomyopathy 4. Restrictive cardiomyopathy 5. Congenital heart disease

STUDY POPULATION

The subjects for the study were selected from cases admitted to the medical wards of Shri Sayaji General hospital, Vadodara during the period from January 01 2020 to October 31 2020 who fitted in the criteria described above. The diagnosis of dilated cardiomyopathy was made on the basis of history, physical findings and echocardiographic features.

METHODOLOGY

60 representative cases of dilated cardiomyopathy which fitted in the criteria were selected. A detailed history was obtained from them and symptom analysis was done. A detailed clinical examination was also done. A 12-lead electrocardiogram was obtained and analyzed. A chest radiograph which comprised of a posteroanterior chest film was obtained. In all cases the cardio thoracic ratio, pulmonary infiltrates, pulmonary plethora, pleural effusion was looked for. Echocardiogram was done for all patients. In all patients chamber dimension, EF, global hypokinesia were looked for and the results are interpreted. Peripartum cardiomyopathy was diagnosed by using criteria laid down by Demakis et al which includes (1) Development of heart failure in the last month of pregnancy or within 5 months of delivery. (2) absence of identifiable heart disease prior to the last month of pregnancy. (3) Echocardiogram demonstrates classical left ventricular dysfunction. (4) Absence of other identifiable causes of heart failure. The diagnosis of diabetic cardiomyopathy was made in patients with long standing (>10 years) diabetes mellitus and in whom no other cause was obvious. Similarly, patients with echocardiography proven dilated cardiomyopathy with history of long term (> 10 years) alcohol consumption in whom no other causes were found were diagnosed as alcoholic cardiomyopathy. If no obvious cause was found they are categorized as idiopathic DCM. The clinical profile along with the probable etiology, radiological and electrocardiographic findings were summarized and compared with existing data.

RESULTS

1 -AGE AND SEX DISTRIBUTION IN PATIENTS WITH CARDIOMYOPATHY

Sixty adult patients who attended the medical O.P.D. or admitted with cardiomyopathy in different wards of Shri Sayaji General Hospital, Baroda were studied in the present study. The required data was collected as per details outlined in proforma.

Table: 1 Age And Sex Distribution In Patients With Cardiomyopathy

AGE	MALE	FEMALE	TOTAL
1-19	1(2%)	0(0%)	1(2%)
20-39	3(5%)	10(17%)	13(22%)
40-59	20(33%)	6(10%)	26(43%)
>60	14(23%)	6(10%)	20(33%)
TOTAL	38(63%)	22(37%)	60(100%)

The demographic indicators collected were age and gender of the patients. As can be seen from table 1, male patients outnumbered the female patients. Male: Female ratio was found to be 1.72:1. If we look at the age-wise distribution almost three fourth of the patients are from the 40 plus age group.

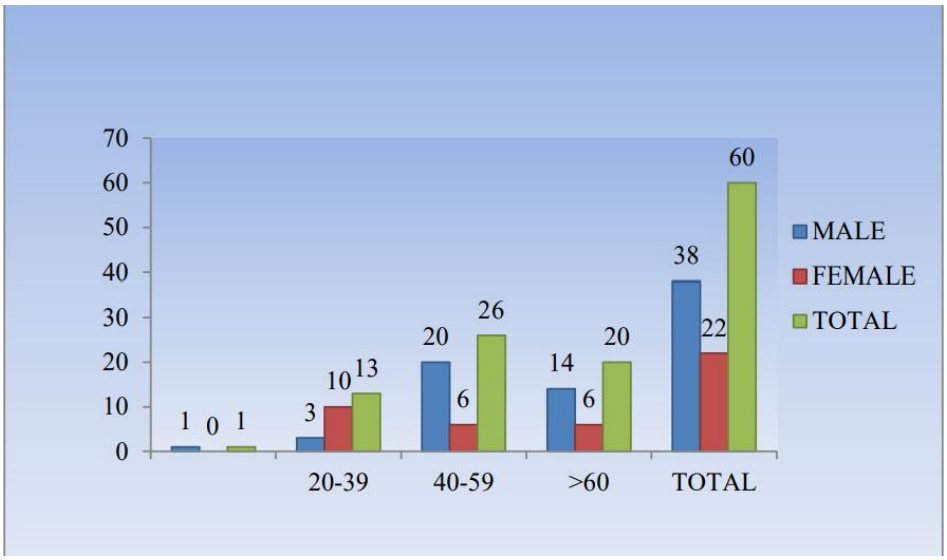


Figure 1 : Graph Showing Age And Sex Distribution

2 -DILATED CARDIOMYOPATHY AND PRESENTING SYMPTOMS OF IT

TABLE: 2

PRESENTING SYMPTOMS IN PATIENTS OF CARDIOMYOPATHY (N=60)

SR. NO.		TOTAL PATIENTS	PERCENTAGE
1	EXERTIONAL DYSPNOEA	60	100%
2	EASY FATIGUABILITY	52	87%
3	ORTHOPNEA	38	63%
4	COUGH	36	60%
5	PND	32	53%
6	PALPITATION	30	50%
7	CHEST PAIN	29	48%
8	ABDOMINAL PAIN	14	23%
9	SYNCOPE	9	15%
10	ASYMPTOMATIC	0	0%

When we look at the presenting symptoms for these patients, we observe that almost all patients presented with three basic symptoms i.e., exertional dyspnea, easy fatigability and orthopnea. Cough, Palpitation and PND was also reported by almost half of the patients as shown in table-2

FIGURE : GRAPH SHOWING SYMPTOMS

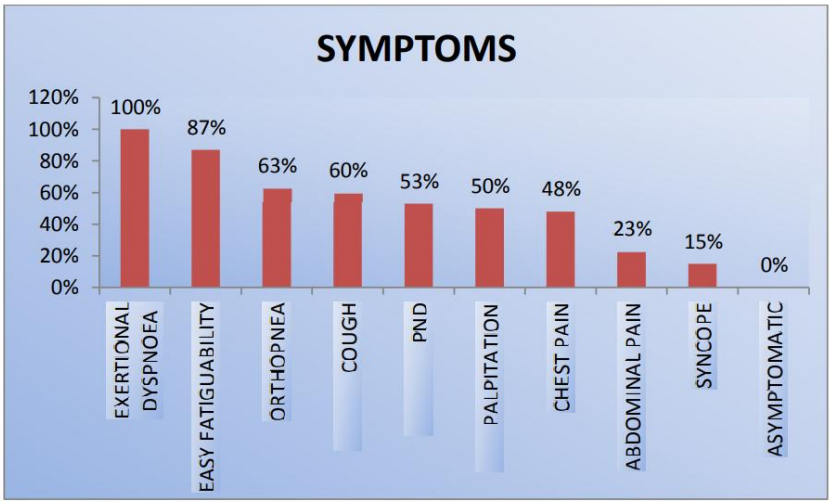


FIGURE 2

3 **SIGNS OF PHYSICAL EXAMINATION**

TABLE 3

	N=60(%)
Basal crepitations	50(84%)
Pedal edema	48(80%)
Raised JVP	41(68%)
Hepatomegaly	28(46%)
Pan systolic murmur at apex (MR)	26(43%)
LVS3	25(42%)
SBP < 100 mmhg	15(25%)
Pan systolic murmur at tricuspid area (TR)	06(10%)

Table 3 shows that basal crepitations were seen in almost 84% of the subjects. Pedal edema was present in 80%. Raised JVP was seen in 68% and hepatomegaly in 46%. LVS3 was present in 42% while apical pan systolic murmur seen in 43%. Systolic blood pressure < 100 mmHg was seen in 25%. Pan systolic murmur in tricuspid area (TR) was seen in 10%

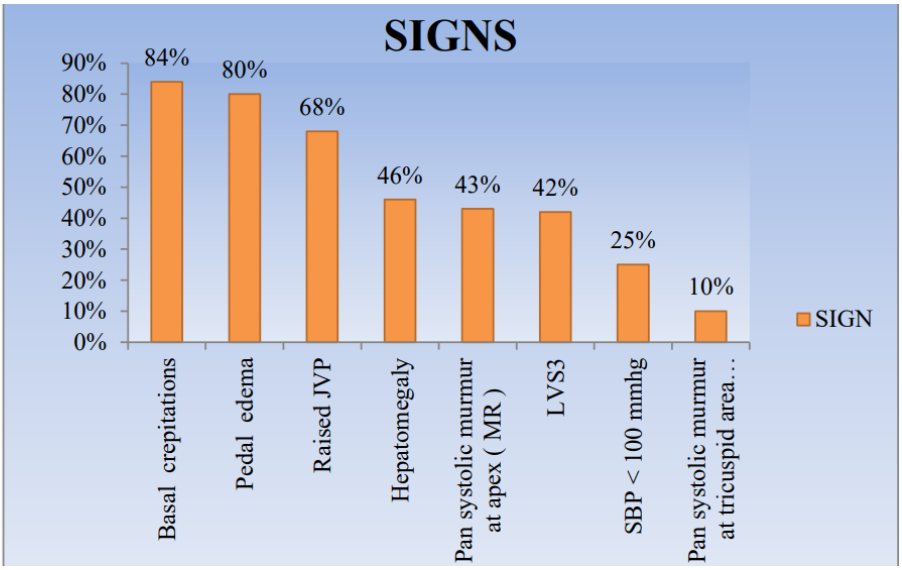


FIGURE3

4 ETIOLOGY FOR DILATED CARDIOMYOPATHY

TABLE 4

	MALE	FEMALE	TOTAL
IDOPATHIC	24	12	36(60%)
ALCHOLIC	9	0	9(15%)
PERIPARTUM	0	7	7(12%)
DIABETIC	5	3	8(13%)

Table 4 shows the gender segregated etiological factors for DCM among the study patients. Overall, in 60 % of the cases we could not find any cause, labelled as idiopathic dilated cardiomyopathy. The major etiological causes among males in decreasing order of frequency are; idiopathic, alcoholic and diabetic. Among female patients idiopathic DCM was the most common etiology followed by peripartum and diabetic. No female patient in this study was found to have alcoholic DCM. Patients who have fulminant lymphocytic myocarditis have excellent long-term prognosis after short-term hemodynamic support; listed for heart transplantation; and those with idiopathic cardiomyopathy (suggested by the absence of myocardial inflammation on biopsy) should be aggressively supported and converted to conventional therapy once stabilize

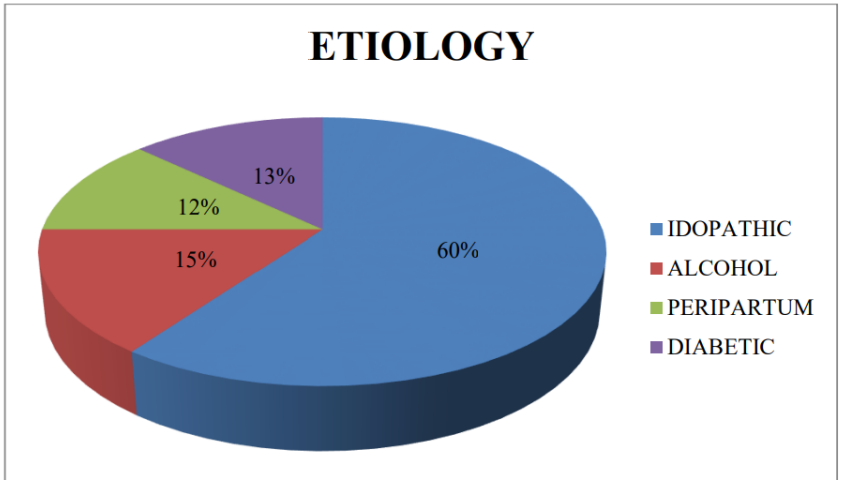


FIGURE 4

5 ALCOHOL DURATION AND ITS RELATION WITH DILATED CARDIOMYOPATHY

TABLE 5 ALCOHOL DURATION

	NO. OF CASE	PERCENTAGE
<20 Years	09	15%
10-20 Years	05	8%
>20 Years	04	7%

Table 5 shows effect of alcohol duration on DCM. In our study total 18 males are alcoholic. Among these 9 of them used to take alcohol for less than 20 years. Among these 5 of them used to take alcohol for l0-20 years. Among these 4 of them used to take alcohol for less than 20 years

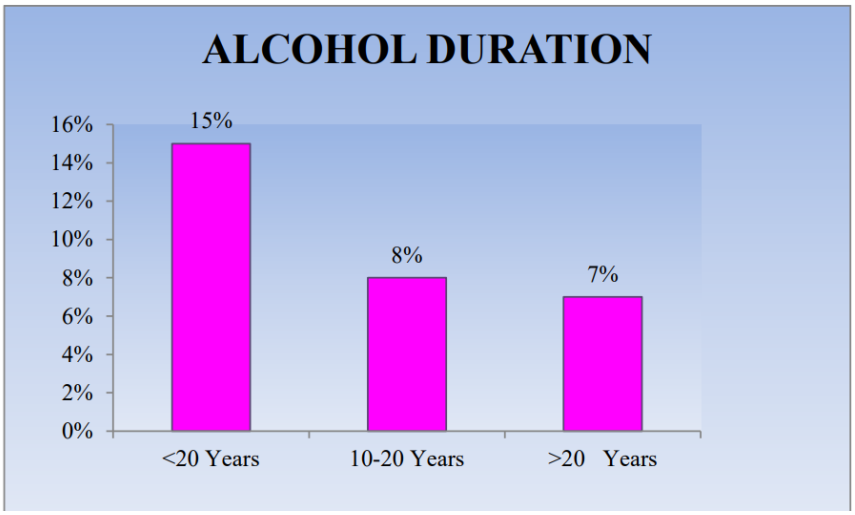


FIGURE 5 – GRAPH SHOWING ALCOHOL DURATION

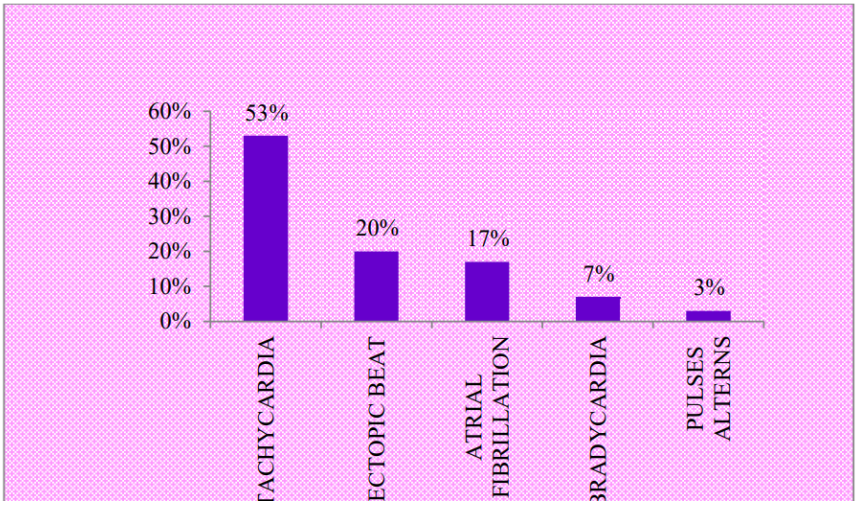
6 PERIPHERAL PULSE AND DILATED CARDIOMYOPATHY

TABLE 6

	NO. OF CASE	PERCENTAGE
TACHYCARDIA	32	53%
ECTOPIC BEAT	12	20%
AF	10	17%
BRADYCARDIA	4	7%
PULSES ALTERNS	2	3%

Abnormalities of peripheral pulse included, tachycardia, bradycardia, AF, Ectopic beat, pulses alterns. Ectopic beats were present with 20% , tachycardia observed in 53% , bradycardia seen in 7% of patients. A trial fibrillation was seen in 10% and pulses alterns was seen in 3% of subjects

FIGURE 6 GRAPH SHOWING PERIPHERAL PULSE



7-IMAGING AND DILATED CARDIOMYOPATHY

TABLE 7

RADIOLOGICAL FEATURES

CHEST X-RAY		NO. OF CASE	PERCENTAGE
CT RATIO	50-60%	21	35%
	60-70%	26	43%
	>70%	13	22%
PLEURAL EFFUSION		17	28%
PULMONARY PLETHORA		33	55%

Almost all patients showed cardiomegaly in chest x-ray. The cardio thoracic ratio was more than 0.7 in 22%, it was between 0.6 to 0.7(moderate) in 43% and 35% of patients had mild cardiomegaly i.e., between 0.5 to 0.6. Pulmonary plethora was observed in 55% of subjects while pleural effusion was noticed in 28%. Cardiac magnetic resonance imaging (CMR) and multidetector computed tomography are relatively new imaging modalities that are likely to become increasingly useful to evaluate patients with cardiomyopathies[10] Specific cardiomyopathic disorders in which CMR has proved particularly valuable include ARVD/C[11], endocardial fibroelastosis, myocarditis, amyloidosis, and sarcoidosis. CMR evaluation is also emerging as a critical tool to understand DCM pathophysiology and may contribute to identification of patients at particular risk for complications, such as sudden cardiac death (e.g., within DCM subsets, those with or without areas of replacement fibrosis that may predispose to electrical instability and sudden cardiac death)

8 DILATED CARDIOMYOPATHY AND CHANGES IN ECG

TABLE 8 ECG CHANGES

PARAMETER		N	PERCENTAGE
QRS AXIS	NORMAL	45	75%
	LAD	11	18%
	RAD	4	7%
ARRYTHMIAS	SINUS TACHYCARDIA	26	43.3%
	ATRIAL ECTOPICS	4	6.6%
	ATRIAL FIBRILLATION	7	11.6%
	SVT	2	3.3%
	VENTRICULAR ECTOPICS	27	45%
	VENTRICULAR TACHYCARDIA	1	1.66%
	COMPLETE HEART BLOCK	1	1.66%
	LBBB	26	43.33%
	RBBB	6	10%
ST-T CHANGE		14	23.33%
ATRIAL ENLARGMENT	LAE	10	16.66%
	RAE	3	5%
VENTRICULAR HYPERTROPHY	LVH	16	26.6%
	RVH	2	3.33%
	BOTH	1	1.66%

The electrocardiographic profile includes abnormalities of rate, rhythm, axis and chamber enlargement. The most common abnormality noticed was ventricular ectopics seen in 45% of patients. Sinus tachycardia was seen in 43.3 % of subjects. Left bundle branch block was seen in 43.33% of patients. Right bundle branch block was seen in 10 %. Non specific ST-T changes were noticed in 23.33 % whereas AF was present in 11.6 %. Left ventricular hypertrophy was

seen in 26.6 % and LAE in 16.66 % of subjects. Complete heart block was present in only 1 patient. The axis was almost normal in majority of patients. Left axis deviation was observed in 18.3% and right axis deviation in 7 %[10]

9- ECHO CHANGES AND DILATED CARDIOMYOPATHY

TABLE 9

PARAMETER	RANGE	NO. OF CASE	PERCENTAGE
EF	40-45%	9	15%
	30-39%	23	38%
	20-29%	25	42%
	<20%	3	5%
LVEDD	4.5 - 4.9 cm	8	13%
	5.0- 5.9 cm	20	33%
	>6.0 cm	32	54%
LVSD	3.5-4 cm	12	20%
	4-4.9 cm	19	33%
	>5 cm	29	47%
MR		40	67%
TR		8	13%
PERICARDIAL EFFUSION		5	8%

The mean left ventricular ejection fraction was found to be 31.6%.The LV ejection fraction was less than 20% in 5% of patients. It was between 20-29% in 42 %, between 30-39% in 38 % of patients and between 40 to 45% in 15 % of patients. The mean LVEDD was 6.04 ± 0.74 cm with majority i.e. 54 % of subjects having LV end diastolic diameter more than 6 cm. The mean LVESD was 4.92 ± 0.62cm; with majority of patients (47 %) having end systolic. diameter more than 5 cm. Global hypokinesia and dilatation of all 4 chambers were seen in almost all the patients. In our study 67 % of patients had mitral regurgitation, 13% of patients had tricuspid regurgitation and 8% of patients had pericardial effusion[11].

10-DILATED CARDIOMYOPATHY CORELATION WITH NYHA CLASSIFICATION AND HEART FAILURE

TABLE 10 NYHA CLASS

	NO. OF CLASS	PERCENTAGE
CLASS I	2	3.3%
CLASS II	11	18.3%
CLASS III	18	30%
CLASS IV	29	48.3%

Majority of the patients in our study were in NYHA class 3 and 4 group.

FIGURE 10: GRAPH SHOWING NYHA CLASS

TABLE 11 HEART FAILURE

	NO. OF CASE	PERCENTAGE
LVF	16	27%
RVF	2	3%
BIVENTRICURAL FAILURE	42	70%

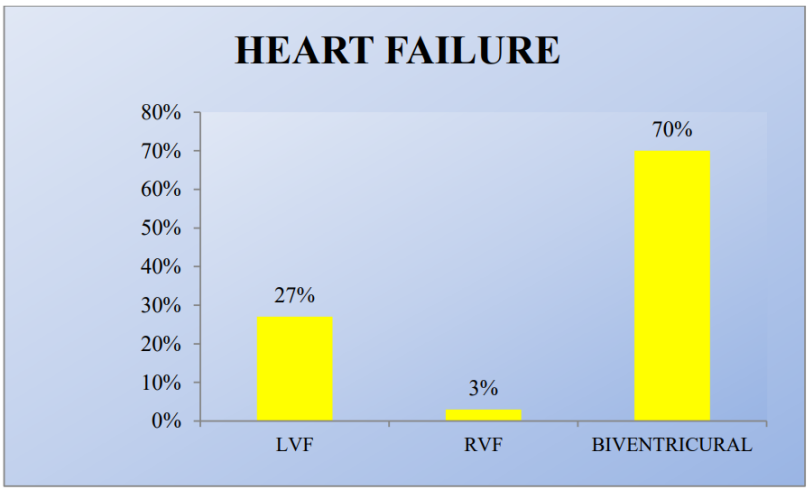


FIGURE11 : GRAPH SHOWING HEART FAILURE

11- ALCOHOL AND DILATED CARDIOMYOPATHY

TABLE 12

	ALCOHOLIC DCM	NON ALCOHOLIC DCM	TOTAL
PRESENT	9	9	18
ABSENT	0	42	42
TOTAL	9	51	60

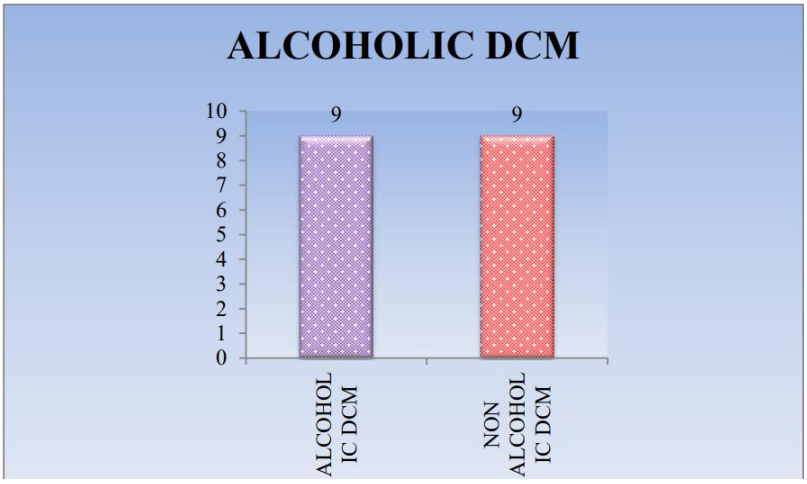


FIGURE12 : GRAPH SHOWING ALCOHOL AND DCM

DISCUSSION

The most common presentation in our study was found to be biventricular failure which was seen in 70 % of cases. Isolated left ventricular failure was seen in 27% of patients Rapidly advancing knowledge in four areas is shedding light on pathophysiologic mechanisms that may contribute to DCM and may in turn lead to new therapeutic approaches. These areas include (1) familial and genetic factors[6], (2) inflammatory and infectious factors, particularly viral infection[7], (3) cytotoxicity, and (4) cell loss and abnormalities in endogenous repair mechanisms[12]. Predominant right ventricular failure was seen in two patients with alcoholic cardiomyopathy. Most of the patients were in NYHA class IV (48.3%) and class III (30%) while 18.3 % were in NYHA class II. Dyspnea was the most common symptom found in almost all the patients. Paroxysmal nocturnal dyspnea was seen in 32 patients (53%) while orthopnea was noticed in 38 patients (63%). Cough was present in 38% of our patients, probably due to pulmonary congestion. Four patients in our study had respiratory infections like acute bronchitis and bronchopneumonia. Easy fatigability was the second most common

symptom found in 87 % of our subjects. Palpitation was noticed in 30 patients (i.e., 50 %) in our study. Sinus tachycardia was seen in 43.3% of patients secondary to chronic heart failure. Palpitation was also attributed due to atrial fibrillation, atrial / ventricular ectopic, and supra ventricular tachycardia etc. The QRS axis was normal in 75 % of our subjects with left axis deviation in 18 % and right axis deviation in 7% which were in concordance with all the other studies. Other ECG parameters like ventricular ectopic, LBBB, Atrial fibrillation, atrial ectopic were comparable to those in all the other studies. However, RBBB, and SVT were more commonly present in our study as compared to other studies

CONCLUSION

The major cause of dilated cardiomyopathy in our study was found to be idiopathic followed by alcoholic, diabetic and peripartum cardiomyopathy. The most common clinical presentation is biventricular failure. Chest radiography showed cardiomegaly in most patients. The common abnormality in ECG consists of ventricular ectopics, sinus tachycardia, LBBB, ST-T changes, AF. ECHO showed reduced EF and global hypokinesia in almost all the patients. Mitral regurgitation and pericardial effusion were present in a significant number of patients.

Human Ethics: The local ethics committee approval was taken. IECBHR 27 2020.

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