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Clinical Profile of Peripartum Cardiomyopathy

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Abstract

Background: Peripartum cardiomyopathy (PPCM) is an uncommon illness of uncertain aetiology that arises between one month antepartum and five months postpartum in women without preexisting cardiac disease. This condition is associated with certain demographic features. There is no data on PPCM prevalence or risk factors in Bangladesh. Clinical characteristics and risk factors for PPCM are the focus of this investigation. ***Objective****:* A description of the symptoms and signs associated with Peripartum Cardiomyopathy and to find out the risk factors (advanced age, multiparity, multiple gestation, obesity, preeclampsia and chronic hypertension). ***Materials and Methods:*** This was an observational cross-sectional study, carried out in Department of Medicine, Cardiology, Gynecology and Obstetrics of Rajshahi medical college hospital, Rajshahi during the period from 01 June 2015 to 30 November 2015. A total n=30 patients meeting selection criteria were included in this study. ***Results:*** Total 30 patients were included, 17(56.7%) primigravida and 13(43.3%) patients were multigravida. Nine patients (30%) presented during pregnancy and 21(70.0%) after delivery. All patients presented with heart failure and three (6.7%) were complicated with ventricular tachycardia (VT) at presentation. LV systolic dysfunction was present in all (100%) patients. Two patients had LV clot, and thromboembolic stroke occurred in another 3 patients. Echocardiography was repeated after 2 months and in 22(73.3%) patients LV functions recovered to near normal. All patients were discharged in stable condition. ***Conclusion:*** Peripartum cardiomyopathy is a disease in which predominantly left ventricular dysfunction occurs in the peripartum period in previously healthy woman. Advanced maternal age, low socioeconomic status, elderly primi gravida and previous abortion play as major risk factors. The clinical course varies between complete recovery to end stage heart failure. Women presented early with moderate left ventricular dysfunction show a very good outcome.

Keywords: Peripartum cardiomyopathy, PPCM, IDC, PPC, Tachycardia, Systolic dysfunction.

INTRODUCTION

As early as 19th century, The first to establish an association between cardiac failure and the puerperium [1]. It wasn't until 1937, when Gouley and colleagues characterized the clinical and pathological aspects of seven pregnant women with severe and frequently fatal heart failure, that the condition was recognized as a unique clinical entity. During the last months of their pregnancies, these ladies developed a dilated, nonischemic cardiomyopathy [2]. 'Postpartum Heart Failure' was coined by Hillel S *et al*., in 1938, when they documented 80 cases in New Orleans [3]. A number of studies have been done since then on people with heart failure during pregnancy. Toxicity-induced postpartum heart failure, idiopathic heart disease during pregnancy, postpartum cardiomyopathy [4], and postpartum myocardial degeneration are just few of the terminology used to characterize this condition.

In 1971, Demakis *et al*., described the natural history of 27 patients with pregnancy-associated cardiomyopathy observed between 1947 and 1967 at Cook County Hospital, Chicago, IL [5]. These investigators defined the condition as peripartum cardiomyopathy (PPCM) and established its diagnostic criteria, which were subsequently confirmed by consensus of the participants in the 'Peripartum Cardiomyopathy: National Heart Lung and Blood Institute and Office Rare Disease Workshop (2000) [6].

The criteria include (a) development of CHF secondary to deceased left ventricular systolic function in the last month of pregnancy or within 5 months after delivery; (b) absence of pre-exciting cardiac dysfunction; (c) absence of determinable cause of cardiomyopathy; and more recently, (d) left ventricular systolic dysfunction demonstrated by classic echocardiographic criteria: ejection fraction less than 45%, or M-mode fractional shortening less than 30%, or both, and end-diastolic dimension more than 2.7 cm/m2 [7]. Classic criteria for the diagnosis of PPCM as established by Demakis et al. limited the diagnosis to the last gestational month and first 5 months after delivery [5].

The real incidence of peripartum cardiomyopathy is unclear. An accepted incidence is 1 per 3000 to 1 per 4000 live births or between 1000 and 1300 women per year in the United States [6]. A reasonably high incidence and prevalence of PPCM occur in the developing and poorly developed nations but extremely rare in developed countries [8]. Risk factors for PPCM include advanced age (>30 years), multiparity, black race, multiple pregnancies, obesity, preeclampsia and chronic hypertension [9].

If you have PPCM, you may have a variant of IDC that manifests in the peripartum period [10]. Heart failure during pregnancy can be caused by the usual circulatory changes that occur during pregnancy, such as an increase in blood volume and resting cardiac output as well as an increase in heart rate. Symptoms might range from moderate heart failure to severe heart failure [3]. The diagnosis of PPCM should be investigated if a pregnant woman experiences heart failure symptom. Dyspnoea, orthopnoea, nocturnal cough, peripheral edema, palpitation, and weariness are the most prevalent PPCM symptoms [11].

Tachycardia increased jugular venous pressure, peripheral oedema, regurgitant murmurs, pulmonary rales [12], ascites, and hepatomegaly are all indications of both right and left heart failure. PPC is a diagnosis of exclusion (D/D include but are not limited to valvular heart disease; hypertension; unrecognized congenital heart disease; pulmonary emboli; pre-eclampsia; pregnancy-associated myocardial infarction; etc), which is distinguished by its rapid onset, occurrence in the pre-partum period, and significant improvement in up to 50% of affected women [13].

Objectives

General

- To describe the clinical profile of Peripartum Cardiomyopathy.

Specific

- To describe the clinical features at presentation in these patients.
- To find out the risk factors (advanced age, multiparity, multiple gestation, obesity, preeclampsia and chronic hypertension).
- To see the sociodemographic profile of patient of peripartum cardiomyopathy.
- To see treatment response and short-term outcome.

MATERIALS AND METHODS

This was an observational cross-sectional study, carried out in Department of Medicine, Cardiology, Gynecology and Obstetrics of Rajshahi medical college hospital, Rajshahi during the period from 01 June 2015 to 30 November 2015. Consecutive 30 (Thirty) admitted patients of PPCM who will fulfill the inclusion and exclusion criteria will be enrolled in this study. All data had been collected, resolved, and analyzed by SPSS version 22.

Inclusion Criteria

- Onset of heart failure in the last month of pregnancy or in first 5 months postpartum.
- Absence of determinable causes for heart failure.
- Absence of demonstrable heart disease before the last month of pregnancy.

Exclusion Criteria

- Onset of heart failure in early pregnancy.
- Previous history of heart disease.
- Presence of determinable causes for heart failure.

Sampling Method

Purposive sampling technique was applied for selecting the sample patients.

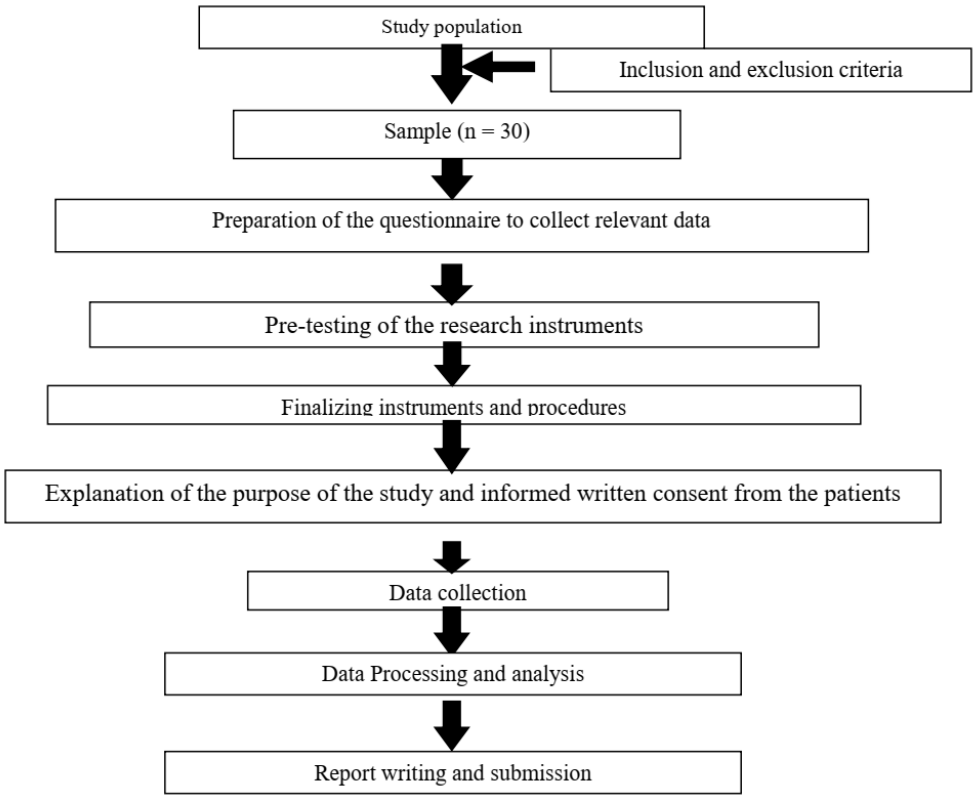
Operational Definition

Heart failure in the last month of pregnancy or within 5 months after birth without a known cause and without any known heart illness prior to this time period. Ejection fraction of <45% or fractional shortening of <30%, or both, in the left ventricle.

Main Outcome Variables

Dyspnoea or shortness of breath, chest pain, nocturnal cough, oedema regurgitant murmurs, pulmonary crackles, elevated jugular venous pressure and hepatomegaly were evaluated; also risk factors, sociodemographic variable and echocardiographic findings were studied.

Procedure of preparing and organizing materials:



All collected questionnaire was checked very carefully to identify the error in the data. The data processing job included creating registration schedules, updating computerization, creating a dummy table, assessing and matching data, and preparing a worksheet for the data.

Timetable

Activity	Months					
	1	2	3	4	5	6
. Literature review . Development of questionnaire . Pre-testing						
Data collection						
Data entry, editing and analysis						
Report writing and submission						

RESULTS AND OBSERVATIONS

This present hospital based observational study in the women with features of heart failure in the last month of pregnancy or within 5 months of delivery admitted into the Department of Cardiology, Medicine and Obstetrics and Gynaecololgy in Rajshahi Medical College Hospital, Rajshahi in a period of six months, different observations are shown as below.

Table 1: Age distribution of study patients (n=30)

Age in years	Frequency	Percentage (%)
< 20	5	16.7
20-29	7	23.3
30-39	18	60.0
Total	30	100.0
Mean ± SD Range	28.27±5.64 18-35 years	

Table-1 showed the age distribution of the study respondents, in this series age ranged from 18-35 years. Maximum patients 18(60.0%) were between 30-39 years, 7(23.3%) patients were in 20-29 years and 5(16.7%) patients were below 20 years. The mean age was 28.27±5.64 years.

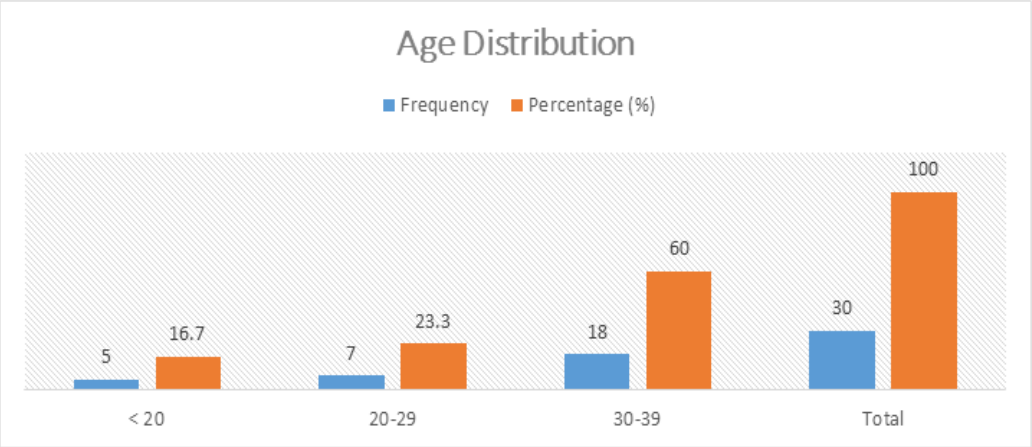


Fig 1: Showed the age distribution of the study respondents

Table 2: Distribution of study patients by religion (n=30)

Religion	Frequency	Percentage (%)
Islam	24	80.0
Hindu	6	20.0
Total	30	100.0

Table-2 showed the religion distribution of the study respondents, Maximum patients 80.0% were Muslim and 20.0% patients were Hindu.

Table 3: Distribution of study patients by education (n=30)

Education	Frequency	Percentage (%)
Illiterate	6	20.0
Primary	21	70.0
SSC	3	10.0
Total	30	100.0

Table 3 showed the educational status of the study respondents, Majority 21(70.0%) patients had completed primary education, 10% were complete SSC level and 20.0% patients were illiterate.

Table 4: Distribution of study patients by occupation (n=30)

Occupation	Frequency	Percentage (%)
Housewife	23	76.7
Service holder	7	23.3
Total	30	100.0

Table-4 showed the occupational distribution of the study respondents, Maximum respondents 23(76.7%) were housewife and rest of them 7(23.3%) patients were service holder.

Table-5: Distribution of the patients by parity (n=30)

Parity	Frequency	Percentage (%)
Primigravida	17	56.7
Multigravida	10	33.3
Gravida 2	3	10
Total	30	100.0

Table 5 shows the gravidae of the respondents, majority of the patients 17(56.7%) were primigravida, 10(33.3%) patients were multigravida and 3(10%) patients were gravida 2.

Table 6: Distribution of the studied patients according to associated risk factors of PPCM (n=30)

Associated risk factors	Frequency	Percentage (%)
Hypertension	2	6.7
Diabetes mellitus	3	10.0
H/O OCP	10	33.3
Family history of PPCM	1	3.3
H/O abortion	5	16.7
Preeclampsia	1	3.3
Eclampsia	1	3.3
Twin pregnancy	3	10.0
Single pregnancy	27	90.0

Table 6 shows the risk factors associated with PPCM, 6.7% patients had hypertension, 10.0% patients had diabetes mellitus, 33.3% had history of OCP, 3.3% patients had family history of PPCM, 16.7%b patients had history of abortion, 3.3% patients had preeclampsia, 3.3% patients had eclampsia, 3(10.0%) patients had twin fetuses, 27(90.0%) patients had single pregnancy.

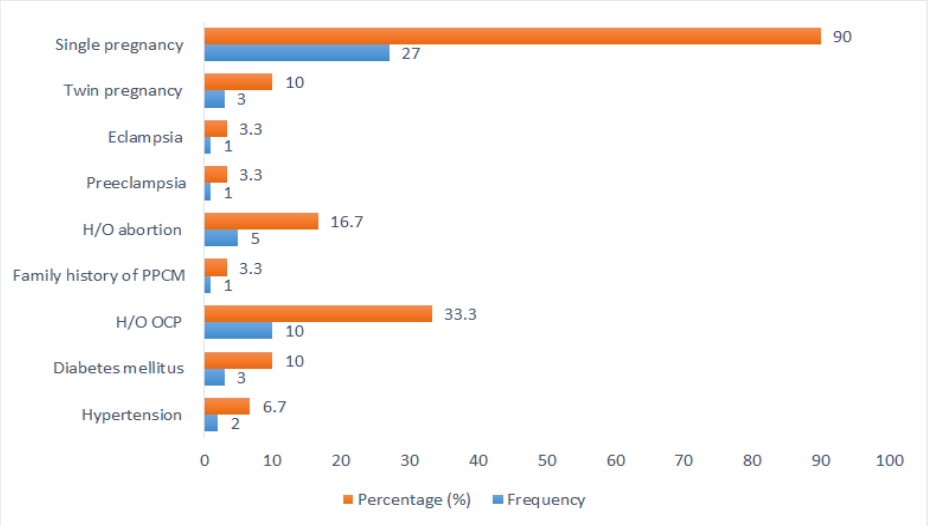


Fig 2: Risk factors associated with PPCM

Table 7: Distribution of the patients by features of presentation (n=30)

Features of presentation	Frequency	Percentage (%)
Shortness of breath	30	100
Nocturnal cough	11	36.7
Chest pain	3	10
Palpitation	30	100
Oedema	25	83.33

Table 7 shows the clinical features of studied patients, the major symptoms at onset were dyspnea in 100%, nocturnal cough in 36.7%, chest pain 10%, palpitation 100% and edema in 83.33%.

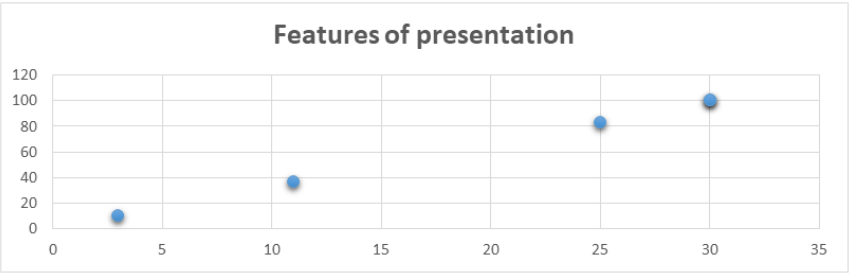


Fig 3: Shows the clinical features of studied patients

Table 8: Distribution of the patients by physical examination (n=30)

Physical examination	Frequency	Percentage (%)
Anaemia	18	60.0
Pulse		
90-109	13	43.3
110-149	17	56.7
Blood pressure		
SBP [mean±SD]	135.2±14.25	
DBP [mean±SD]	78.5±12.21	
Shifting of apex beat	30	100.0
Regurgitant murmur (MR)	17	56.7
Lung crepitation's	30	100
Liver palpable	14	46.7

Table 8 shows the physical findings of the PPCM patients, anaemia was found in 60.0% cases, 43.3% patients had pulse range within 90-109, 56.7% patients pulse range 110-149. Mean SBP were 135.2±14.25 mmHg, and DBP were 78.5±12.21 mmHg, 100% patients had shifting of apex beat, 56.7% patients had regurgitant murmur, 100% patients had lung crepitations and 46.7% patients had palpable liver.

Table 9: Distribution of the patients by presentation of PPCM (n=30)

Presentation	Frequency	Percentage (%)
Presentation during pregnancy	9	30.0
Presentation after delivery	21	70.0
Presentation (Average days after delivery)	(02 – 55) days	

Table 4.9 shows the presentation of PPCM, presentation after delivery ranged from two days to two months. All patients presented with symptoms and signs of heart failure. Maximum 70.0% patient presentation after pregnancy within two months and 30% presentation during pregnancy.

Table 10: Echocardiographic findings of the PPCM patients (n=30)

ECG findings	Frequency	Percentage (%)
Severe LV systolic dysfunction	24	80
Moderate LV systolic dysfunction	06	20
Severe MR	5	16.7
Moderate MR	12	40
Mild MR	10	33.3
RV dysfunction	10	33.3

Majority of the patients 80% had severe left ventricular systolic dysfunction (EF <30%) and 20% had moderate left ventricular systolic dysfunction (EF <45% and >30%). Similarly, 16.7% patients had severe mitral regurgitation (MR), 40% had moderate MR and 33.3% patients had mild MR. Right ventricular dysfunction in 33.3 patients.

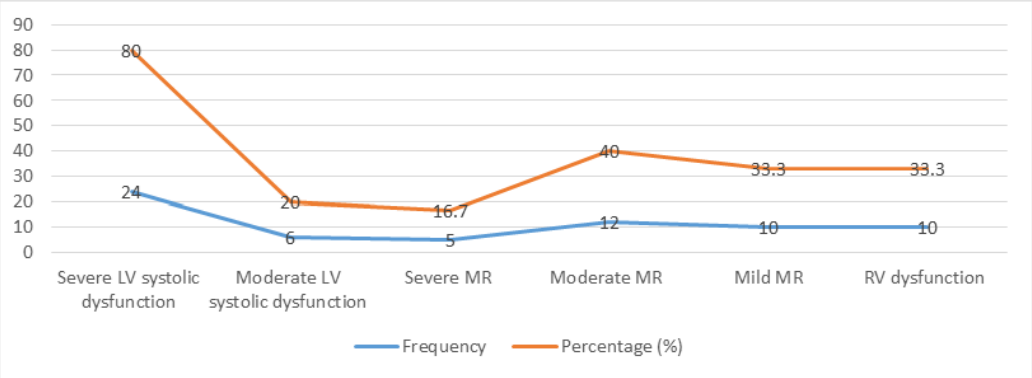


Fig 4: Echocardiographic findings

Table 11: Clinical presentation, complication, LV and RV improvement of the PPCM patients (n=30)

Clinical presentation	Frequency	Percentage (%)
CHF	30	100.0
Arrhythmias (VT)	02	6.7
Stroke (Ischemic)	1	3.3
LV clot	02	6.7
LV EF Improved (EF >50%)	6	20
RV Function improved (out of 10)	9	90
RV Dysfunction (out of 10)	1	10

Table 11 shows the clinical presentation of the PPCM patients, 100% patients were CHF, 2(6.7%) were complicated with ventricular tachycardia at presentation. 1(3.3%) patients had ischemic stroke, 6.7% patients LV clot, Echocardiograms were repeated after 2 months and 20% had recovered the LV functions (EF >50%). Right ventricular function improved in the majority of patients 90%, only 10% patient had residual RV dysfunction at two months.

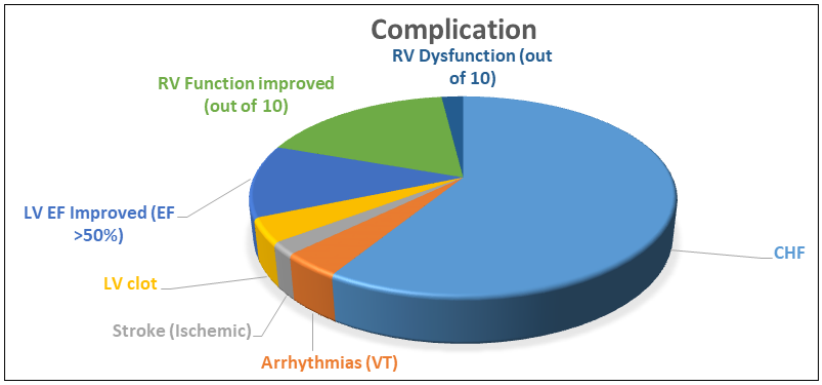


Fig 5: Shows the clinical presentation with complications of the PPCM patients

DISCUSSION

For six months, researchers at the Rajshahi Medical College Hospital conducted an observational cross-sectional study. Study participants were asked to identify the clinical characteristics and risk factors of PPCM. In this study mean age was 28.27(+5.64) years. Minimum age was 18 years and maximum age was 35 years. Majority of them 60% was 30 – 39 age group, followed by 23.3% patients was 20 – 29 age group and five patients were below 20 age group. Laghari *et al.*, [14] found mean age 27.4 ± 6.05 years, patient age range was between 19 and 40 years that is similar to our study.

In our study majority of the patient 17(56.7%) were primigravida, 3(10%) patients were gravida 2 and remaining 10(33.3%) patients were multigravida. Laghari *et al.*, (2013) study supports this result, they found 25 (55.5%) patients were primigravida and 8 (17.7%) patients were gravida 2, and 12 (26.6%) patients were multigravida. In our study maximum (70.0%) patients presented after delivery and 30% patients presented during pregnancy. The presentation after delivery ranged from four days to two months. Nearly all patients presented with symptoms and signs of heart failure, 1(3.3%) patients had preeclampsia and another one (3.3%) patient was diagnosed with eclampsia and 2(6.7%) patients were complicated with ventricular tachycardia at presentation. That result was approximately similar to Laghari *et al.*, they reported that 14 patients (31.1%) presented during pregnancy and the remaining 31 (68.8%) patients presented after delivery [14].

Presentation after delivery ranged from two days to two months. All patients presented with symptoms and signs of heart failure, four (8.8%) patients additionally had preeclampsia and one had eclampsia. Three (6.6%) were complicated with ventricular tachycardia at presentation.

In present study the risk factors associated with PPCM, 60% patients (majority of them were primi) had advanced age >30 years, 6.7% patients had hypertension, 10.0% patients had diabetes mellitus, 33.3% had history of OCP, 3.3% patients had family history of PPCM, 16.7% patients had history of abortion, 3.3% patients had preeclampsia, 3.3% patients had eclampsia, 3(10.0%) patients had twin fetuses, 27(90.0%) patients had single pregnancy. Showed advanced maternal age, multiparity, twin pregnancy, toxaemia or hypertension of pregnancy and obesity as risk factor [15]. The major symptoms of PPCM at onset were dyspnea in 100%, nocturnal cough in 36.7%, chest pain 10%, palpitation 100% and edema in 83.3% patients. The physical findings of the PPCM patients, anaemia were found in 60.0% cases, 43.3% patients had pulse range within 90-109, 56.7% patients pulse range

110-149. Mean SBP were 135.2±14.25 mmHg, and DBP were 78.5±12.21 mmHg, 100% patients had shifting of apex beat, 56.7% patients had regurgitant murmur, 100% patients had lung crepitations and 46.7% patients had palpable liver.

Echocardiography showed majority of the patients (80%) had severe left ventricular systolic dysfunction (EF <30%) and 20% patients had moderate left ventricular systolic dysfunction (EF <45% and >30%), 16.7% patients had severe mitral regurgitation (MR), 40% had moderate MR and 33.3% patients had mild MR and 6.7% patients LV clot. Echocardiograms were repeated after two months and 20% patients had recovered the LV functions (EF >50%). Right ventricular function improved in the majority of patients 90%, only 10% patients had residual RV dysfunction at two months. Laghari *et al*., (2013) study supports this result, they found majority of the patients (86.66%) had severe left ventricular systolic dysfunction (EF <30%) and 6 (13.3%) had moderate left ventricular systolic dysfunction (EF <45% and >30%). Similarly, 17 (37.7%) patients had severe mitral regurgitation (MR), 7 (15.5%) had moderate MR and 14 (31.1%) patients had mild MR. RV dysfunction was noted in 15 (33.3%) patients [14].

As a rule, an echocardiography will show that the heart has enlarged, but not hypertrophy [6]. We observed that the majority of our patients had left ventricular dysfunction, and a third had right ventricular dysfunction as well. Due to the hypercoagulable condition of pregnancy and the stagnation of blood due to LV failure, patients with PPCM are at high risk of thrombus development and thrombosis. One of our patients experienced an embolic ischemic episode, and two of our patients developed LV apical thrombosis [16].

In PPCM, only a limited amount of data is provided to determine the timing and method of distribution. If the maternal and fetal circumstances are stable, early delivery is not necessary, according to the 2010 European Society of Cardiology working group statement. Numerous researches have examined the long-term effects on women with PPCM [17]. It was shown that 54 % of patients with PPCM had LVEF above 50%, and those with a baseline LVEF of more than 30 % had the greatest degree of recovery [18]. In our study, 20% of PPCM patients who had an initial LVEF of 45% to 30% recovered after two months, and mitral regurgitation also decreased in this group, whose baseline LVEF was 45% [19].

CONCLUSION

Peripartum cardiomyopathy is a condition that mostly affects the left ventricle in previously healthy women during the peripartum period. Advanced maternal age, low socioeconomic status, elderly primi gravida and previous abortion play as major risk factors. The clinical course varies between complete recovery to end stage heart failure. Women presented early with moderate left ventricular dysfunction show a very good outcome. Majority of patients with associated right ventricular dysfunction have recovery in their RV function.

Limitations

This study was not without limitation. The limitations of the study were as follows:

- This study was conducted in only one center.
- The sample size was small and study period was short.

Recommendation: Large scale multi-centric studies should be taken.

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