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Original Research Article

Peripartum Cardiomyopathy in Indian Women: Clinical Spectrum and Outcomes

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Abstract

Objective: To describe clinical profile and outcomes in women with PPCM at a tertiary centre in Bihar, India.

Methods: Retrospective cohort (Aug 2024–Jul 2025). PPCM defined as HF with LVEF < 45% arising in the last month of pregnancy or within 5 months postpartum, without other causes. Outcomes: maternal composite (ICU/vasopressors/inotropes/ventilation/death) and fetal death (IUFD or neonatal death ≤28 days).

Results: Among 25 women (mean age 24.8 ± 2.34 years; gestational age34.6±1.9weeks), 56% were primigravidae and 12.7% had twin gestations. Maternal deaths occurred in 5/25 (20%); fetal deaths in 6/25 (24%).

Conclusion: Lower LVEF and cardiogenic shock independently predicted adverse maternal outcomes, while non-severe maternal anaemia was associated with fetal death. These data support early risk stratification and multidisciplinary care.

Keywords: Peripartum Cardiomyopathy, Heart Failure, Pregnancy.

Introduction

Heart failure (HF) and a decreased left ventricular ejection fraction (LVEF) in women who were previously healthy are the hallmarks of peripartum cardiomyopathy (PPCM), a potentially fatal illness. Although this condition's hazards and repercussions are well established, its precise pathogenesis remains incompletely understood. Although PPCM and dilated cardiomyopathy (DCM) have comparable clinical traits, PPCM is regarded as a unique condition apart from other types of cardiomyopathies. The timing of symptoms in relation to pregnancy and the elimination of other cardiomyopathies are key factors in the diagnosis of PPCM. Even with a greater understanding of PPCM, many questions remain.[1,2]

The paucity of information about PPCM has been influenced by epidemiological research. There is evidence that Africans and African Americans are more likely to acquire PPCM. Incidences were greater in Germany than Denmark among Caucasian populations. According to US reports, the postpartum hospitalization rate for cardiomyopathy was 0.46 per 1000 deliveries. Incidence varies substantially across ethnicities and geographies.[3–10] The prevalence of PPCM in Asian communities is not well documented. A number of PPCM risk factors have been found. Given that not all women with preeclampsia go on to develop PPCM and since many of these women are young and pregnant for the first time, it is crucial to recognize that the illness process is heterogeneous. Differences in estimation could be the cause of the variations in incidence across various populations and ethnic groups.[4,11–17].

Black women, who have a 6.4-fold higher risk of dying than white women, women who have had at least four live babies, and maternal age have all been linked to a rising trend in mortality, according to studies. Most adverse events occur within the first 6–12 months after diagnosis. Women having a baseline LVEF of 25% or less had a greater mortality rate. Increased mortality has also been linked to delayed PPCM diagnosis.[18, 19]. A study on PPCM in India by Mandal et al. concentrated on the relationships and results for women. The development of methods for diagnosing, treating, and following up with women has been hampered by the paucity of literature from the Indian population.[20, 21] Thus, our goal was to determine any noteworthy correlations between maternal and fetal outcomes and the incidence of PPCM in a population residing in the state of Bihar.

Materials and Methods

Women who were admitted Jawahar Lal Nehru Medical College & Hospital, Bhagalpur, Bihar, between August 2024 and July 2025 were the subject of this retrospective, observational study. The institutional research and ethics committee gave its approval to the study. Information was taken from medical records.

Heart failure (HF) symptoms have to appear in the final four weeks of pregnancy or within the first five months after giving birth. They also needed to be free of valvular lesions or other known causes of HF. Additionally; women had to have left ventricular (LV) systolic dysfunction on echocardiography and be free of heart failure symptoms before the final month of pregnancy. A left ventricular ejection fraction (LVEF) of less than 45%, a fractional shortening of less than 30%, or both were considered indicators of LV systolic dysfunction. Left-ventricular end-diastolic dimension indexed to body surface area (LVEDD/BSA) > 2.7 cm/m² was recorded when available; it was not a mandatory diagnostic criterion. Incomplete baseline patient information, pre-existing heart failure, valvular heart disease, chronic obstructive pulmonary disease, blood pressure of 170/100 mmHg or greater, or severe anemia were all excluded in the study. Predictors of poor maternal and fetal outcomes, illness features, and risk variables were the main outcomes of interest in this study. Fetal death or Intrauterine fetal demise (IUFD) was defined as IUFD≥28 weeks and neonatal deaths ≤ 28 days. The statistical analysis was conducted using version 21.0 of the Statistical Package for Social Sciences. The data was tabulated in Microsoft excel spread sheet.The data were described using standard descriptive statistics. While continuous data were given as mean ± standard deviation, categorical variables were provided as frequency (percentages). A value of $P < 0.05$ was deemed statistically significant.

Results

25 women with PPCM who satisfied the inclusion and exclusion criteria were included in the analysis. Primigravidae made up the majority of them. The average gestational age was 34.6±1.9 weeks. 3 of the 25 ladies were pregnant more than once, and these were all twin gestations.

Fetal deaths occurred in 6/25 (24%) pregnancies; 19/25 (76%) survived. Patient characteristics were recorded and displayed in [Tables 1 and 2] to compare maternal and fetal outcomes. Hemorrhage, puerperal sepsis, and hypertension collectively accounted for the majority of maternal deaths, according to earlier research that emphasized the multiple causes of maternal and fetal mortality.

Table 1: Maternal outcomes and patient characteristics

Characteristics	Survivors, total (N=20) (%)	Non-survivors (N = 5) (%)	P Value
Mean age (years)	24.8 ± 2.34	23.6 ± 2.72	0.72
Parity			
Primigravida	12 (60%)	4 (80%)	0.54
Multiparous	8 (40%)	1 (20%)	
Mean gestational age (weeks)	34.6±1.9	38.2±2.1	0.23
Multiple pregnancies	3 (15%)	0	0.05
Mode of delivery			
Normal delivery	6 (30%)	2 (40%)	0.82
Caesarean section	12 (60%)	3 (60%)	0.91
Operative vaginal delivery	2 (10%)	0	0.06
Maternal comorbidities			
Hypertensive disorders	10 (50%)	1 (20%)	0.05
Anaemia	8 (40%)	2 (40%)	0.55
Hypothyroidism	2 (10%)	1 (20%)	0.92
Echocardiography findings			
Mean ejection fraction (%)	38.7±2.6	27.8±3.9	0.04
LV thrombus	2 (10%)	1 (20%)	0.93
Cardiogenic shock	1 (5%)	2 (40%)	0.01
Postpartum haemorrhage	1 (5%)	0	0.25

Exertional dyspnea was the most prevalent symptom at presentation. About half of the women reported symptoms of NYHA class IV, whereas the majority had indications of NYHA class III. A few women experienced cardiogenic shock, which is characterized by hypotension, chilly and clammy extremities, and poor cardiac contractility, while the majority of women displayed symptoms of pulmonary edema during the clinical examination.

Table 2: Fetal outcomes and the characteristics of the patient

Characteristics	Survivors, total (N=19) (%)	Non-survivors (N = 6)(%)	P Value
Mean age (years)	25.9±2.6	23.8±2.1	0.08
Parity			
Primigravida	11 (58%)	4 (67%)	0.34
Multiparous	8 (42%)	2 (33%)	
Mean gestational age (weeks)	36.3±2.3	34.7±2.1	0.06
Maternal comorbidities			
Hypertensive disorders	10 (53%)	3 (50%)	0.70
Anaemia	8 (42%)	2 (33%)	0.05
Hypothyroidism	1 (5%)	1 (17%)	0.48
Echocardiography findings			
Mean ejection fraction (%)	36.4±4.3	29.5±6.2	0.28
LV thrombus	2	0	0.08
Cardiogenic shock	3	4	0.41

Not a single woman reported having syncope. The number of women with recorded thromboembolism events was significantly lower. Every woman had sinus tachycardia, with an average heart rate of 103 beats per minute. Women were seen to exhibit ischemic alterations, including poor R wave progression and ST-T abnormalities. The mean ejection fraction on the baseline echocardiography was 36.4±4.3% among survivor (N=19) and 29.5±6.2% among non-survivors (N=6).

Tenwomen had surgical vaginal births with either a suction cup or forceps, and 66women had lower segment caesarean sections (LSCS). The group with poor maternal outcomes had a considerably lower mean ejection fraction (EF) than the group with favorable maternal outcomes, according to an evaluation of the primary outcome of maternal death. Those with cardiogenic shock had a much-increased chance of having a bad maternal outcome.

Poor fetal outcomes were found to be predicted by mild-to-moderate anemia. The left ventricular ejection fraction (LVEF) was considerably lower in the group with poor maternal outcomes, and a greater percentage of people had cardiogenic shock than in the group with favorable maternal outcomes.

Discussion

The precise cause of PPCM, a rare condition that manifests in late pregnancy or early puerperium, is yet unknown. Race and geographic region have an impact on the occurrence of PPCM. The results of a research by Pandit et al. [21], that found one case for every 1374 live births are comparable to this. Several theories have been put out, despite the fact that the exact cause of PPCM is unknown[23]. It is crucial to remember that idiopathic DCM and PPCM are not the same. Infectious viral triggers, pregnancy-related aberrant hemodynamic response, myocarditis, autoimmune factors, inflammatory mediators, extended tocolysis, and selenium deficiency are some of the hypothesized reasons[24, 25].

Certain risk factors for PPCM have been established by earlier research. These include maternal behaviors and abuse, smoking, gestational hypertension, preeclampsia, advanced maternal age, numerous gestations, African descent, and multiparity [26]. Although PPCM can happen at any age, Elkayam et al. have found that women 30 years of age and older are more likely to experience it[27]. Our cohort was comparatively younger, as seen by the study's mean age at presentation of 23.7 years. We found no significant correlation between PPCM and conventional risk factors, such as diabetes mellitus, hypothyroidism, or gestational hypertension. We did note, nevertheless, that anemia was linked to fetal death.

The clinical course of PPCM varies and diagnosing and treating it can be difficult. The clinical manifestations, such as exertional dyspnea, tiredness, syncope, and edema, are comparable to those observed in other types of DCM[28]. Echocardiographic analysis, which shows LV systolic dysfunction after ruling out other causes of heart failure like valvular heart disease, restrictive cardiomyopathy, and hypertrophic cardiomyopathy, is the main technique for diagnosing and predicting PPCM[29]. Non-specific features such as sinus tachycardia, non-specific ST-T changes, and indications of left atrial or ventricular enlargement are commonly seen on electrocardiography. Nonetheless, it is helpful in locating and treating aggravating conditions such cardiac arrhythmias.30 The ECG findings of our sample included ischemia alterations in a small number of women and sinus tachycardia with a mean rate of 103.8 beats per minute. To confirm or rule out additional forms of cardiomyopathies, an endomyocardial biopsy may be required in certain situations. Similar to other forms of heart failure, PPCM is managed based on the functional class; NYHA class III and IV cases are best treated in a

hospital[30]. Women should be made aware of the possibility of developing recurring peripartum cardiomyopathy (PPCM) in future pregnancies. Obstetricians and cardiologists should both offer advice on the safest and most efficient forms of birth control. Women who intend to get pregnant in the future should also think about having rest and stress echocardiograms to evaluate their baseline left ventricular performance.

Conclusion

Lower LVEF and cardiogenic shock were associated with poor maternal outcomes, according to a study done on women with PPCM. Negative fetal outcomes have been linked to mild-to-moderate anemia. Given recurrence risk, women should receive individualized preconception counseling; subsequent pregnancy is generally discouraged if LV function has not recovered.

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