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A RETROSPECTIVE STUDY ON PERIPARTUM CARDIOMYOPATHY, RECENT TRENDS, AND DISEASE PROFILE, STUDY AT THE TERTIARY CENTER OF BIHAR.

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ABSTRACT

Background

Peripartum Cardiomyopathy (PPCM) is a rare but serious cardiovascular condition that affects women in the peripartum period. This study aims to comprehensively investigate the recent trends and disease profile of PPCM among patients at a tertiary center in Bihar.

Methods

A retrospective study was conducted which included 50 female participants who met specific inclusion criteria, such as being aged 18 years or older, having a confirmed PPCM diagnosis, and having complete medical records available for analysis. Data collection encompassed demographic information, clinical presentation, diagnostic criteria, echocardiographic findings, laboratory results, and treatment modalities employed. Statistical analysis involved descriptive statistics, categorical and continuous variable presentations, and the use of SPSS ver. 18 for data analysis.

Results

The mean age at PPCM diagnosis was 32.5 years, with 60% being parous and 40% nulliparous. Clinical symptoms included dyspnea (84%), fatigue (76%), and edema (70%). Echocardiographic findings revealed compromised cardiac function, with a mean LVEF of 35%. Laboratory results demonstrated elevated BNP and troponin levels. Treatment approaches were diverse, including medications, interventions, and lifestyle modifications. Complications included arrhythmias (20%), thromboembolic events (10%), and cardiogenic shock (14%). The overall survival rate was 84%, with a mortality rate of 16%.

Conclusion

The study provides valuable insights into the clinical profile, diagnosis, treatment, and outcomes of PPCM in a retrospective cohort. The findings highlight the complex nature of PPCM and the importance of early recognition and comprehensive management strategies in improving patient outcomes. Further research and awareness efforts are needed to enhance the understanding and management of this challenging condition.

Recommendations

Medical practitioners should be educated about PPCM to aid in early diagnosis. Obstetricians, cardiologists, and other professionals collaborate for multidisciplinary treatment. Frequent cardiac monitoring for high-risk pregnant and postpartum women. More research on risk factors and innovative PPCM treatments.

Keywords: *Peripartum Cardiomyopathy, Diagnosis, Treatment, Outcome, Multidisciplinary Care.*
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INTRODUCTION

Without any other known cause, peripartum cardiomyopathy (PPCM) is an uncommon but dangerous kind of heart failure that develops in the final month of pregnancy or the five months following delivery. The dilatation and compromised systolic function of the left ventricle are its defining characteristics. The illness comes at a time in life when people are usually full of hope and happiness, and its inconsistent clinical presentation—which can range from asymptomatic to severe heart failure—makes it extremely challenging [1]. The etiology of PPCM remains largely unknown, although recent research suggests a multifactorial origin, including genetic predisposition, inflammation, autoimmunity, and the maladaptive response to the hemodynamic stresses of pregnancy.

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In recent years, there has been a notable increase in research focused on understanding the pathophysiology, diagnosis, management, and outcomes of PPCM. Advances in diagnostic techniques, particularly in cardiac imaging such as echocardiography, have improved the early detection of the disease. Studies have explored the role of biomarkers, immune system activation, and the impact of cardiotoxic substances like prolactin metabolites, offering new insights into its pathogenesis [1, 2].

The disease profile of PPCM has been further refined through large-scale registries and multicenter studies, providing valuable data on its incidence, risk factors, and geographical variations [3]. There is a growing recognition of the importance of early diagnosis and the implementation of tailored therapeutic strategies, including the use of standard heart failure medications, novel therapies like bromocriptine, and, in severe cases, mechanical circulatory support devices [4].

Moreover, the management of PPCM has seen a shift towards a more multidisciplinary approach, involving obstetricians, cardiologists, and heart failure specialists, to optimize maternal and fetal outcomes. Research into long-term outcomes has underscored the potential for recovery of ventricular function in many patients, though some may progress to persistent heart failure or require heart transplantation [5, 6].

Despite these advances, PPCM remains a condition with significant morbidity and mortality, highlighting the need for continued research and awareness to improve outcomes for affected women. The recent trends in PPCM research and the evolving disease profile are promising, pointing towards better diagnostic, therapeutic, and prognostic capabilities shortly.

This study aims to comprehensively investigate the recent trends and disease profile of Peripartum Cardiomyopathy (PPCM) among patients at a tertiary center in Bihar. This research seeks to provide an up-to-date understanding of the clinical characteristics, diagnostic criteria, treatment modalities, and outcomes of PPCM.

METHODOLOGY

Study Design

A retrospective study.

Study Setting

The study was conducted at ANMMCH, Gaya, during the study period from April 2022 to September 2023.

Participants

The study included a total of 50 participants, consisting of women diagnosed with PPCM.

Inclusion Criteria

1. Female patients aged 18 years or older.
2. Diagnosed with PPCM according to established diagnostic criteria during the study period.
3. Medical records available for retrospective analysis.

Exclusion Criteria

1. Male patients.
2. Patients with incomplete or missing medical records.
3. Patients with alternative cardiac conditions or underlying heart disease not consistent with PPCM.

Bias

Efforts were made to minimize bias through rigorous data collection and analysis. Selection bias was minimized by including all eligible patients within the specified time frame.

Variables

Variables included demographic information, clinical presentation and symptoms at the time of PPCM diagnosis, echocardiographic (ECG) findings, laboratory results, and treatment modalities employed (medications, interventions, etc.).

Data Collection

In the data collection process for demographic information, key details from the medical records of the participants were gathered. This included recording the age of each participant at the time of PPCM diagnosis in years. Additionally, the parity of each participant was documented, distinguishing between parous and nulliparous individuals. Gestational age at the time of PPCM diagnosis was noted in weeks. Any relevant medical history, such as pre-existing cardiovascular conditions, hypertension, diabetes, or previous pregnancies with PPCM, was carefully collected and recorded.

The clinical presentation and symptoms reported by each participant at the time of PPCM diagnosis were documented. This included common symptoms such as dyspnea, fatigue, chest pain, edema, tachycardia, and elevated jugular venous pressure. Specific details about the onset and severity of these symptoms were meticulously recorded to provide a comprehensive clinical picture.

To ensure consistency and accuracy in diagnosis, the data collection process also focused on the diagnostic criteria used for PPCM diagnosis. This involved documenting the specific criteria employed, such as those defined by the Heart Failure Association of the European Society of Cardiology (HFA-ESC) [7]. These criteria typically involved a combination of clinical and echocardiographic parameters that aided in confirming PPCM diagnosis.

Echocardiographic (ECG) findings played a vital role in characterizing PPCM. The data collection process included gathering information related to ECG findings, encompassing variables such as left ventricular ejection fraction (LVEF), left ventricular end-diastolic diameter (LVEDD), left ventricular end-systolic diameter (LVESD), the presence of wall motion abnormalities, and

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valvular function assessment. These findings provided essential insights into the cardiac status of the participants. Laboratory results were another critical component of data collection. Relevant laboratory data were documented, including but not limited to brain natriuretic peptide (BNP) levels, troponin levels, complete blood count (CBC), basic metabolic panel (BMP), liver function tests, and thyroid function tests. These results contributed to the overall assessment of the patient's health and assisted in tailoring appropriate treatment strategies.

The treatment modalities employed to manage PPCM were thoroughly documented. This included details about medications prescribed, including types, dosages, and duration of medications such as beta-blockers, angiotensin-converting enzyme inhibitors (ACEIs), diuretics, and anticoagulants. Any surgical or interventional procedures undertaken, such as implantation of cardiac devices or mechanical circulatory support, were recorded. Additionally, information on other therapies, including dietary and lifestyle modifications, was included in the data collection process.

Outcomes were a critical aspect of the study, providing insight into the progression and management of PPCM among participants. Data related to outcomes included the duration and frequency of hospital admissions related to PPCM, any complications that arose during the condition (e.g., arrhythmias, thromboembolic events, or cardiogenic shock), and the mortality status of participants, including the date and cause of death if applicable.

Statistical Analysis

The study population's clinical and demographic features were compiled using descriptive statistics. Frequencies and percentages were used to represent categorical data, while means with standard deviations or medians with interquartile ranges, depending on the distribution, were used to represent continuous variables. A significant threshold of $p < 0.05$ was established. With the proper software, a statistical analysis was carried out (SPSS ver. 18).

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

RESULT

Table 1: Clinical characteristics of study population

Parameters	Values [N (%)]
Mean Age at PPCM Diagnosis	32.5 years (±4.2)
Nulliparous Participants	20 (40%)
Parous Participants	30 (60%)
Mean Gestational Age at PPCM Diagnosis	31.7 weeks (± 5.1)
Pre-existing Cardiovascular Conditions	10 (20%)
Hypertension	15 (30%)
Diabetes	8 (16%)
Previous PPCM Pregnancies	5 (10%)
Clinical Presentation and Symptoms)	
Dyspnea	42 (84%)
Fatigue	38 (76%)
Chest Pain	12 (24%)
Edema	35 (70%)
Tachycardia	28 (56%)
Elevated Jugular Venous Pressure	18 (36%)
Sudden Onset of Symptoms	22 (44%)
Gradual Symptom Development	28 (56%)

A retrospective study was conducted and a total of 50 females were included in the study. Demographic data revealed that the mean age at PPCM diagnosis was 32.5 years (± 4.2), with 60% being parous and 40% nulliparous. The mean gestational age at diagnosis was 31.7 weeks (± 5.1). Additionally, 20% of participants had pre-existing cardiovascular conditions, 30% had hypertension, 16% had diabetes, and 10% had a history of previous pregnancies with PPCM.

Common symptoms reported at PPCM diagnosis included dyspnea (84%), fatigue (76%), edema (70%), tachycardia (56%), and elevated jugular venous pressure (36%). Chest pain was reported by 24% of participants. Notably, 44% of participants experienced a sudden onset of symptoms, while 56% reported gradual symptom development.

Regarding diagnostic criteria, 76% of participants met the criteria defined by the HFA-ESC, and an additional 24% met clinical and echocardiographic criteria for PPCM diagnosis.

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Echocardiographic findings indicated a mean LVEF of 35% (±7), with mean LVEDD of 55.2 mm (±4.8) and mean LVESD of 45.6 mm (±3.9). Wall motion abnormalities were observed in 48% of participants, and 32% exhibited impaired valvular function.

Laboratory results showed a mean BNP level of 620 pg/mL (±280) and a mean troponin level of 0.08 ng/mL (± 0.03). CBC, BMP, liver function tests, and thyroid function tests contributed to patient assessment.

Treatment modalities varied, with 64% of participants prescribed beta-blockers, 56% receiving ACEIs, and 80% receiving diuretics. Additionally, 28% of participants were prescribed anticoagulants, and 16% underwent surgical or interventional procedures. Dietary and lifestyle modifications were recommended for 52% of participants.

Outcomes provided valuable insights into PPCM management. The average duration of hospital admissions related to PPCM was 12.4 days (±4.6). Complications included arrhythmias in 20% of participants, thromboembolic events in 10%, and cardiogenic shock in 14%. The majority of participants (84%) survived, while 16% succumbed to PPCM, with an average time from diagnosis to death of 28 days (±12). Causes of death included heart failure (6) and thromboembolic events (2).

DISCUSSION

In this retrospective study involving 50 female participants diagnosed with PPCM, several key findings emerged. The average age at PPCM diagnosis was 32.5 years, with a notable prevalence of 60% being parous individuals. Symptoms at PPCM diagnosis were common, with dyspnea and fatigue being highly prevalent. Interestingly, while 76% of participants met the diagnostic criteria established by the Heart Failure Association of the European Society of Cardiology, an additional 24% were diagnosed using clinical and echocardiographic criteria.

Echocardiographic findings revealed compromised cardiac function, with a mean LVEF of 35%, and a significant proportion of participants displaying wall motion abnormalities and impaired valvular function. Laboratory results further supported the assessment, with elevated BNP levels and troponin levels. The treatment approach was multifaceted, with a substantial portion of participants receiving beta-blockers and ACEIs. Outcomes highlighted the challenges of managing PPCM, with complications such as arrhythmias and thromboembolic events and a mortality rate of 16%. These findings underscore the complexity of PPCM and the importance of early diagnosis and comprehensive management strategies.

The study underscores its prevalence in early-thirties women, particularly those who have been pregnant, with symptoms like dyspnea and fatigue being common. Echocardiography and elevated BNP and troponin levels are crucial for diagnosis and monitoring. Despite treatments involving beta-blockers and ACE inhibitors, PPCM presents significant management challenges, including a 16% mortality rate, emphasizing the need for early diagnosis and tailored care.

Recent studies on PPCM have highlighted various aspects of its diagnosis, management, and outcomes. A study emphasizes the importance of close cardiologist follow-up for women with PPCM, though the optimal duration of medical therapy post-recovery remains unknown [8]. Another research focuses on the long-term outcomes of PPCM patients treated with LVAD, demonstrating its feasibility and positive prognosis in advanced heart failure cases [9]. The relationship between PPCM and preeclampsia is also explored, suggesting a common origin and the need for combined clinical trials [10]. Case series on severe PPCM requiring mechanical circulatory support show promising recovery and social reintegration outcomes [11]. Significant progress in understanding, diagnosing, and treating PPCM has been reported, with new investigations into immune system activation and cardiotoxic prolactin metabolites [12]. Lastly, a study using a national inpatient database recommends intensive care and Prolactin blockade therapy during the acute phase of PPCM [13], underscoring the complexity and varied approaches to managing this condition.

CONCLUSION

In conclusion, this retrospective study provides valuable insights into the multifaceted nature of Peripartum Cardiomyopathy among women. It highlights diverse clinical presentations, diagnostic criteria significance, and the importance of tailored treatments. While PPCM poses challenges, appropriate interventions yield positive outcomes. To enhance care, increased awareness among healthcare providers, multidisciplinary collaboration, and regular cardiac monitoring for high-risk individuals during pregnancy and the postpartum period are crucial. Further research is needed to identify risk factors and innovative treatments for PPCM, aiming to reduce its impact on affected individuals.

Limitations

The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of a comparison group also poses a limitation for this study's findings.

Recommendations

PPCM education and awareness should be raised among medical professionals to support early diagnosis. Cooperation for interdisciplinary care between obstetricians, cardiologists, and other specialists. Frequent cardiac monitoring for high-risk people during pregnancy and the postpartum phase. More investigation into possible risk factors and cutting-edge PPCM treatment plans.

Acknowledgment
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List of abbreviations
PPCM- Peripartum Cardiomyopathy
ECG- echocardiographic
HFA-ESC- Heart Failure Association of the European Society of Cardiology
LVEF- left ventricular ejection fraction
LVEDD- left ventricular end-diastolic diameter
LVESD- left ventricular end-systolic diameter
BNP- brain natriuretic peptide
CBC- complete blood count
BMP- basic metabolic panel
ACEIs- angiotensin-converting enzyme inhibitors

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Conflict of interest
The authors have no competing interests to declare.

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