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RESEARCH ARTICLE

PREGNANCY OUTCOME IN PERIPARTUM CARDIOMYOPATHY

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Abstract

Background: Peripartum cardiomyopathy(PPCM) is characterized by the onset of heart failure due to left ventricular systolic dysfunction in late pregnancy or shortly after delivery. The incidence of PPCM varies widely globally, with reports ranging from 1 in 100-15000 pregnancies This study aims to evaluate the incidence, clinical characteristics, and outcomes of PPCM in a cohort of women at Basaweshwara General and Teaching Hospital, Kalaburgi.

Methods:A retrospective observational study was conducted over one year (January 1 to December 31, 2023). Inclusion criteria were based on NHLBI standards for diagnosing PPCM, while patients with preexisting cardiac conditions, liver disorders, and malignancies were excluded. Data were collected from hospital records, focusing on demographics, clinical presentations,echocardiographic findings, complications, and outcomes. Statistical analysis was performed using SPSS version22.

Results: Among 2,200 deliveries, 12 cases of PPCM were identified, yielding an incidence of 0.55%. The mean age of affected women was 26.33 years, with 66% being primigravida. A significant proportion (58.33%) presented with hypertensive disorders.Maternal outcomes included a 25% mortality rate and high rates of cesarean delivery (83.33%).Neonatal outcomes were concerning, with 58.33% of infants requiring NICU admission and 16.66% experiencing intrauterine death.

Conclusion:PPCM poses substantial risks to maternal and fetal health, particularly in younger and first-time mothers. Identifying women with risk factors such as hypertensive disorders and anemia is crucial for optimizing care and improving outcomes. Enhanced monitoring and intervention strategies are necessary to address the complexities of PPCM in pregnancy.

Introduction:-

Peripartum cardiomyopathy (PPCM) is marked by the sudden onset of heart failure due to left ventricular systolic dysfunction in the later stages of pregnancy or shortly after delivery[1]. Its global incidence varies widely, from 1 in 15,000 to 1 in 100 pregnancies[2], with a study from a tertiary care facility in South India reporting one case per 1,374

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live births[3]. The exact cause of PPCM is not fully understood, likely arising from multiple factors and a polygenic background, including genetic predisposition, inflammation, autoimmune responses, and oxidative stress[4]. Additionally, low selenium levels, viral infections, and antiangiogenic factors like the 16 kDa prolactin fragment may contribute by causing endothelial damage and promoting apoptosis[5].

Materials and Methods:-

This retrospective hospital based observational study was carried out over 1 year from 1st Jan 2023 to 31st Dec 2023 at Basaweshwara general and teaching hospital attached to M R medical college Kalaburgi.

Inclusion Criteria

The diagnosis of peripartum cardiomyopathy (PPCM) is based on the National Heart, Lung, and Blood Institute (NHLBI) criteria, which include the following:

1. Symptoms of heart failure emerging in the last month of pregnancy (after 36 weeks) or within the first five months postpartum.
2. No evidence of preexisting cardiac disease.
3. Other potential causes of heart failure must be excluded.
4. Systolic dysfunction of the left ventricle, indicated by an ejection fraction (EF) of less than 45% or a left ventricular end-diastolic size of 2.7 cm/m² or greater.

Exclusion Criteria

Exclusion criteria for the study were preexisting ischemic heart diseases, congenital heart diseases and prior known cardiomyopathy, liver disorders and malignancies

Study Methodology:-

Data were collected from hospital case files and medical records for patients diagnosed with peripartum cardiomyopathy (PPCM), managed by an interdisciplinary team of obstetricians, cardiologists, anesthesiologists, neonatologists, and chest physicians. In the high dependency unit (HDU), heart failure was treated with diuretics, beta-blockers, and vasodilators, with selective use of ACE inhibitors and anticoagulants in postpartum patients. Fluid and salt restrictions were also implemented to optimize blood pressure, and the mode of delivery was based on obstetric needs. The study analyzed demographic profiles, obstetric comorbidities, clinical presentations, laboratory investigations, echocardiography findings, complications, and clinical outcomes, using SPSS version 22 for data analysis.

Results:-

From January 1, 2023, to December 31, 2023, a total of 2,200 deliveries were recorded. Within this timeframe, 25 antenatal women experienced heart diseases that complicated their pregnancies, resulting in a prevalence rate of 1.14% (25 out of 2,200 deliveries). Specifically, the occurrence of Peripartum Cardiomyopathy (PPCM) during the same period was noted to be much lower, with a frequency of 0.55% (12 out of 2,200 deliveries)

Table 1-Three patients (25%) in the 18-20 age group highlight that heart disease can affect younger women, while the largest cohort consists of four patients (33%) aged 21-25, a demographic in their prime reproductive years. Another four patients (33%) are aged 26-30, indicating a consistent prevalence of heart complications in women nearing childbearing age. With only one patient (8%) over 30, the lower prevalence in this group may suggest protective factors or differing clinical profiles for older women. The mean age of 26.33 years aligns with the predominant age groups.

Table 2 - Eight patients (66%) are classified as primigravida, indicating that first-time mothers are at a heightened risk for pregnancy complications, including heart disease. In contrast, four patients (33%) are multigravida, underscoring that the majority are first-time mothers. This highlights the importance of targeted prenatal care and intervention strategies to improve clinical outcomes and maternal health for primigravida pregnancies

Table 3- The NYHA classification reveals varying degrees of heart failure among patients, with 2 (16%) in Grade I, 3 (25%) in Grade II, 4 (33%) in Grade III, and 3 (25%) in Grade IV, indicating a significant burden. Additionally, 5 patients (41.6%) have anemia, 4 (33%) are multigravida, 7 (58.33%) have hypertensive disorders, and 2 (16%) are

carrying twins, highlighting the necessity for comprehensive monitoring and proactive management to optimize maternal and fetal health..

Table 4 –Investigations reveal significant cardiac issues, with 8 patients (66.66%) exhibiting sinus tachycardia, indicating increased heart rates often linked to heart failure. Echocardiography shows reduced cardiac function in 5 patients (41.66%) with an ejection fraction of 26-35% and 7 patients (58.33%) in the 36-45% range, along with valvular abnormalities and left ventricular hypertrophy in 5 patients (41.66%), underscoring the need for targeted management strategies.

Table 5- Maternal outcomes indicate significant complications, with 2 patients (16.6%) experiencing abruption, 3 (25%) facing congestive heart failure, and a high cesarean delivery rate of 83.33%, resulting in a 25% maternal mortality rate and prolonged hospital stays for survivors, highlighting the need for comprehensive care in this high-risk population.

Table 6 - Fetal outcomes show significant complications, including neonatal mortality in 1 patient (8%), NICU admissions for 7 patients (58.33%), intrauterine growth restriction in 4 patients (33.33%), and intrauterine death in 2 patients (16.66%), highlighting the need for vigilant monitoring and intervention in this high-risk population.

Table 1:- Demographic data.

Age (Years)	**No of patients**	**Percentage**
18-20	3	25%
21-25	4	33%
26-30	4	33%
>30	1	8%
Mean	26.33	

Table 2:- Parity.

Parity		
Primigravida	8	66%
Multigravida	4	33%

Table 3:- Risk factors.

Presenting features and risk factors	**No of patients**	**Percentages**
NYHA grading		
1	2	16%
2	3	25%
3	4	33%
4	3	25%
Anemia	5	41.60%
Multiparity	4	33%
Hypertensive disease	7	58.33%
Twin pregnancy	2	16%

Table 4:- Investigations.

Investigations	**No of patients**	**Percentages**
Ecg changes		
Sinus tachycardia	8	66.66%
ECHO –EF		
26-35	5	41.66%
36-45	7	58.33%

Mean	36.78	
Trivial mitral regurgitation	7	58.33%
Trackside regurgitation	7	58.33%
Left ventricular hypertrophy	5	41.66%

Table 5:- Maternal outcome.

Maternal outcome	No of patients	Percentages
Abruption	2	16.60%
CCF	3	25%
Vaginal delivery	2	16.60%
Cesarean delivery	10	83.33%
Blood transfusion	5	41.66%
ICU admission	10	83.33%
Maternal mortality	3	25%
Prolonged stay of survived patients	9	100%

Table 6:- Fetal outcome.

Fetal outcome	No of patients	Percentages
Neonatal mortality	1	8%
NICU admission	7	58.33%
IUGR	4	33.33%
Respiratory distress	3	25%
IUD	2	16.66%

Discussion:-

Incidence

The incidence of peripartum cardiomyopathy (PPCM) varies significantly across different regions of the world, ranging from 1 in 100 to 1 in 15,000. The highest reported incidence is from Nigeria (1 in 102 deliveries), while the lowest is from Japan (1 in 15,533 births). In our study, the incidence of PPCM was found to be 12 in every 2,200 live births. While the exact incidence of PPCM in India remains unclear, research conducted in South India has indicated an incidence of 1 case per 1,374 live births6.

Sociodemographic Characteristics

A 2015 study by Davis et al. found that most affected individuals are over 30 years old7. Similarly, Demakis et al. identified multiparity and advanced age as significant risk factors8. However, our retrospective study indicates that PPCM is prevalent among primigravida, with a mean age of 26 years. This contrasts with findings by Fett et al., who suggested that multiparity and increasing age are less critical risk factors in the Haitian population compared to Western populations9. Additionally, Sliwa et al. reported that PPCM is more common in younger primigravida and white patients, rather than in older or black women10.

Medical and Obstetric Comorbidities

In our study, preeclampsia was identified as a significant risk factor for peripartum cardiomyopathy (PPCM), affecting 66.6% of participants, which aligns with the findings of Agarwal et al.11. In contrast, Prasad et al. reported that coexisting hypertension was present in 37% of patients at the time of presentation, while only 25% had preeclampsia12. Furthermore, a meta-analysis of 22 studies published in 2013 revealed a 22% prevalence of preeclampsia among women with PPCM, a rate that is four times higher than the global prevalence13.

Time of Clinical Presentation and NYHA Grading of Breathlessness

Our study revealed that most cases of peripartum cardiomyopathy (PPCM) were identified antenatally, with all patients experiencing breathlessness; notably, 44% were classified as NYHA grade III. A multicountry study found that 68.8% of PPCM patients presented with NYHA class III or IV symptoms[9]. Additionally, Binu et al. reported that dyspnea was the most common initial symptom, affecting 53.7% of women with NYHA class III and 25.9% with class IV15.

Investigations

Electrocardiographic findings in peripartum cardiomyopathy (PPCM) typically show sinus tachycardia and non-specific ST-T changes, with a mean ejection fraction of 34% on 2D echocardiography16. While cardiac MRI can accurately diagnose myocarditis, necrosis, and left ventricular thrombi, it is not recommended as a first-line tool due to the variable incidence of myocarditis17. An endomyocardial biopsy may be considered if there is a strong suspicion of myocarditis and no improvement after two weeks of heart failure treatment18. Currently, cardiac protein assays like N-terminal proBNP and cardiac Troponin T are not part of the standard management protocol for PPCM19.

Conclusion:-

Peripartum cardiomyopathy is associated with considerable morbidity and mortality of mothers and children. Attention should be paid to women with risk factors including gestational hypertensive disorders, multigestational pregnancy and anemia.

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