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Original Research Article

Peripartum cardiomyopathy in preeclampsia with severe features and eclampsia: a prospective observational study from a tertiary care center

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ABSTRACT

Background: Hypertensive disorders of pregnancy remain a major cause of maternal morbidity and mortality worldwide. Cardiovascular involvement is increasingly recognized as an important determinant of disease severity and maternal outcome. The present study evaluated the clinical presentation, echocardiographic characteristics, management strategies, and maternal outcomes of peripartum cardiomyopathy in patients with preeclampsia with severe features and eclampsia.
Methods: A prospective observational study was conducted at a tertiary care center from January 2025 to December 2025. Pregnant and postpartum women with preeclampsia with severe features or eclampsia presenting with newly detected left ventricular systolic dysfunction suggestive of peripartum cardiomyopathy were included. Clinical, echocardiographic, management, and outcome data were analyzed.
Results: The mean age was 27.3±5.8 years. The overall incidence of peripartum cardiomyopathy was 0.24% among total deliveries. Cardiac dysfunction occurred in 5% of patients with preeclampsia with severe features and 20% of patients with eclampsia. No mortality was observed among patients with LVEF ≥30%, whereas mortality occurred in patients with very severe systolic dysfunction (LVEF <30%). A progressive increase in case detection was observed over time.
Conclusions: Peripartum cardiomyopathy associated with preeclampsia with severe features and eclampsia represents a serious complication with significant prognostic implications. Very severe left ventricular systolic dysfunction (LVEF <30%) is a strong predictor of maternal mortality. Early echocardiographic evaluation and multidisciplinary management are essential for improving maternal outcomes.

Keywords: Peripartum cardiomyopathy, Preeclampsia, Eclampsia, Left ventricular ejection fraction

INTRODUCTION

Hypertensive disorders of pregnancy remain one of the leading causes of maternal morbidity and mortality worldwide and contribute substantially to preventable maternal deaths.[1,2] Preeclampsia and eclampsia represent severe manifestations of these disorders and are characterized by multisystem involvement affecting maternal and fetal outcomes.[3]

Recent evidence has highlighted the importance of cardiovascular involvement in determining disease severity and prognosis. Structural and functional myocardial changes may occur during preeclampsia and can progress from subclinical cardiac dysfunction to overt heart failure.[4,5] Despite increasing awareness, cardiac involvement frequently remains underrecognized because respiratory symptoms are often attributed to pulmonary or obstetric causes alone.[6]

Pulmonary edema and respiratory distress are common complications in severe hypertensive disorders of pregnancy and may represent underlying myocardial dysfunction. Contemporary European Society of Cardiology guidelines emphasize the importance of cardiovascular assessment in pregnant women presenting with severe hypertensive disorders.[7]

The present study was undertaken to evaluate the incidence, clinical profile, echocardiographic characteristics, management strategies, and maternal outcomes of peripartum cardiomyopathy among patients with preeclampsia with severe features and eclampsia managed at a tertiary care center.

METHODS

Prospective observational study conducted in the Department of Obstetrics and Gynecology, Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR), Mullana, Ambala, Haryana, India, from January 2025 to December 2025. Pregnant or postpartum women diagnosed with preeclampsia with severe features or eclampsia with newly detected left ventricular systolic dysfunction suggestive of peripartum cardiomyopathy were included.

Inclusion criteria

Inclusion criteria were the patients with preeclampsia with severe features, eclampsia, respiratory distress or breathlessness, newly detected left ventricular systolic dysfunction on echocardiography, and no previous history of cardiac disease.

Exclusion criteria

Exclusion criteria were patient with structural heart disease, congenital heart disease, previously diagnosed cardiomyopathy, rheumatic or significant valvular heart disease, and ischemic heart disease.

Diagnostic criteria for peripartum cardiomyopathy

Peripartum cardiomyopathy was defined as: Development of heart failure toward the end of pregnancy or within the postpartum period as absence of another identifiable cause of heart failure and newly detected left ventricular systolic dysfunction on echocardiography.

Definition of severe preeclampsia

Preeclampsia with severe features was defined according to the American College of Obstetricians and Gynecologists Practice Bulletin criteria and included severe hypertension (≥160/110 mmHg), neurological symptoms, pulmonary edema, renal impairment, hepatic dysfunction, thrombocytopenia, or evidence of end-organ dysfunction.[4]

Classification of Left Ventricular Ejection Fraction (LVEF)

Left ventricular ejection fraction (LVEF) was categorized as normal (≥50%), mild dysfunction (40-49%), reduced systolic function (30-39%), and very severe dysfunction (<30%).

Statistical analysis

Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages.

Ethical considerations

Institutional Ethics Committee approval was obtained prior to initiation of the study. Informed written consent was obtained from all participants.

RESULTS

During the study period, 4,075 deliveries were conducted. Preeclampsia without severe features was observed in 120 patients (2.9%), preeclampsia with severe features in 80 patients (2.0%), and eclampsia in 30 patients (0.7%).

A total of 10 patients developed peripartum cardiomyopathy, resulting in an overall incidence of 0.24% among total deliveries. No cases were observed among patients with preeclampsia without severe features. Cardiac dysfunction occurred in 4 of 80 patients with preeclampsia with severe features (5%) and 6 of 30 patients with eclampsia (20%). The combined incidence among severe preeclampsia and eclampsia was 9.1% (Table 1).

The mean age of affected patients was 27.3 ± 5.8 years. Six patients were primigravida and four were multigravida. Most patients were unbooked (70%) and referred from peripheral centers (80%). Anemia was present in 40% of patients (Table 2).

Breathlessness was the most common presenting symptom and occurred in all patients. Pulmonary edema was observed in 50%, convulsions in 60%, headache in 70%, visual symptoms in 50%, altered sensorium in 30%, severe hypertension in 80%, and oliguria in 30% of cases (Table 3).

Echocardiographic assessment revealed a mean LVEF of 38±10%. Two patients had LVEF ≥50%, three had LVEF between 40-49%, three had LVEF between 30-39%, and two patients had LVEF <30%. Global hypokinesia was observed in 50% and left ventricular dilatation in 30% of patients (Table 4).

Nine patients survived, while one maternal death occurred, giving an overall mortality rate of 10% (Table 5).

Mortality was concentrated among patients with very severe systolic dysfunction. Among patients with LVEF <30%, mortality was 50%, whereas no mortality occurred in patients with LVEF ≥30% (Table 6).

Table 1: Incidence of peripartum cardiomyopathy among total deliveries and hypertensive disorders of pregnancy.

Category	Total cases (n)	Incidence among total deliveries, %	PPCM cases	Incidence of PPCM cases, %
Total deliveries	4075	100	10	0.24
Pre-eclampsia without severe features	120	2.9	0	0
Pre-eclampsia with severe features	80	2.0	4	5
Eclampsia	30	0.7	6	20
Total severe pre-eclampsia with severe features and eclampsia	110	2.7	10	9.1

Table 2: Sociodemographic characteristics.

Variable	Total (n=10)
Mean age	27.3±5.8 years
Primigravida	6
Multigravida	4
Antenatal	8
Postpartum	2
Unbooked	7
Referred	8
Anemia	4

Table 3: Clinical features of patients with peripartum cardiomyopathy.

Feature	Total (n=10)
Breathlessness	10
Pulmonary edema	5
Convulsions (eclampsia)	6
Headache	7
Visual symptoms	5
Altered sensorium	3
SBP ≥160 mmHg	8
Oliguria	3

Table 4: Echocardiographic findings among study participants.

Parameter	Total (n=10)
Mean LVEF, %	38±10
LVEF ≥50%	2
LVEF 40-49%	3
LVEF 30-39%	3
LVEF <30%	2
Global hypokinesia	5
LV dilatation	3

Management included antihypertensives and magnesium sulfate in all patients. Diuretics were used in 80%, oxygen therapy in 70%, non-invasive ventilation in 40%, mechanical ventilation in 20%, inotropic support in 20%, ICU admission in 40%, and multiorgan dysfunction syndrome in 40% of patients (Table 7).

Table 5: Maternal outcomes of patients with peripartum cardiomyopathy.

Outcome	Number of patients
Survivors	9
Non-survivors	1

Table 6: Relationship between LVEF severity and outcome.

Severity	LVEF, %	Total	Mortality, %
Mild	≥50	2	0
Moderate	40-49	3	0
Severe	30-39	3	0
Very severe	<30	2	50

Table 7: Management strategies.

Intervention	Total (n=10)
Antihypertensives	10
Magnesium sulfate	10
Diuretics	8
Oxygen therapy	7
Non-invasive ventilation	4
Mechanical ventilation	2
Inotropes	2
ICU stay	4
MODS	4

Table 8: Temporal trend in detection of peripartum cardiomyopathy cases during the study period.

Period	Cases	Percentage
January-March	1	10
April-June	2	20
July-September	3	30
October-December	4	40

A progressive increase in case detection was observed during the study period, with 10%, 20%, 30%, and 40% of cases identified during the first, second, third, and fourth quarters of the year, respectively (Figure 1).

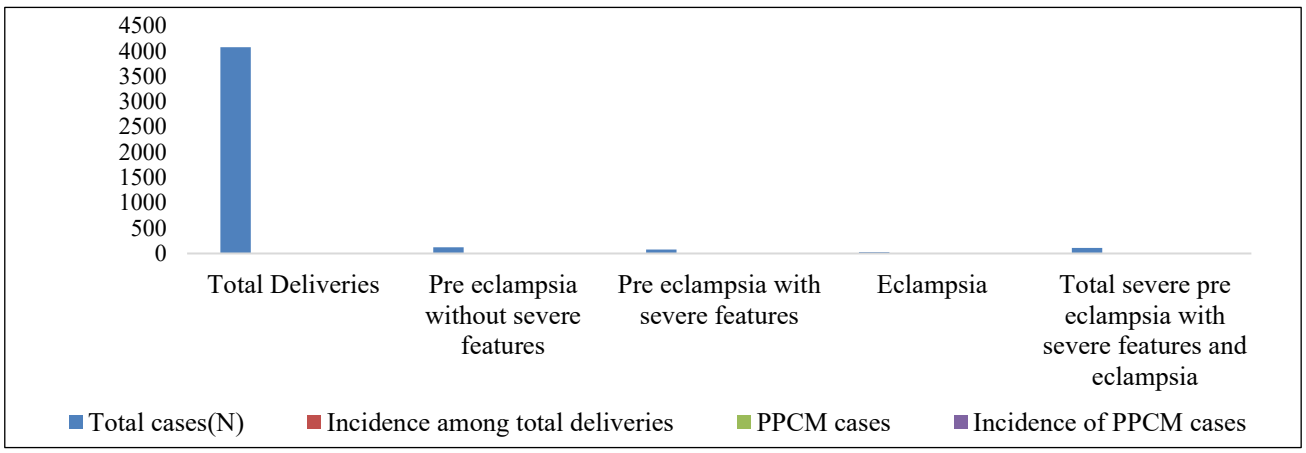

Figure 1: Incidence of peripartum cardiomyopathy among total deliveries and hypertensive disorder of pregnancy.

DISCUSSION

This prospective observational study evaluated peripartum cardiomyopathy among patients with preeclampsia with severe features and eclampsia. The overall incidence of peripartum cardiomyopathy was 0.24% among total deliveries. No cases occurred among women with preeclampsia without severe features, while the incidence increased substantially among patients with severe preeclampsia and eclampsia, indicating a close association between disease severity and myocardial involvement.

Most affected patients were young primigravida women who were unbooked and referred from peripheral centers. Breathlessness and pulmonary edema were the most common clinical manifestations, emphasizing the importance of considering cardiac dysfunction in patients presenting with respiratory symptoms during pregnancy and the postpartum period.[6,10]

The mean LVEF in our study was 38±10%, and severe ventricular dysfunction was associated with poor maternal outcomes. Patients with LVEF <30% demonstrated the highest mortality risk. Similar findings have been reported by Elkayam et al who identified severe systolic dysfunction as an important determinant of adverse maternal outcomes in high-risk cardiac conditions.[8]

Melchiorre et al described the continuum of cardiovascular remodeling and myocardial dysfunction in preeclampsia, ranging from subclinical abnormalities to overt heart failure.[5] Our findings extend these observations by demonstrating clinically significant systolic dysfunction among patients with severe hypertensive disorders of pregnancy and particularly among those with eclampsia.

The increasing trend in case detection observed during the study period likely reflects improved clinical awareness and greater utilization of echocardiography rather than a true increase in disease incidence. Similar observations regarding improved recognition of severe maternal morbidity have been reported previously.[9]

Distinguishing cardiomyopathy associated with severe preeclampsia from classical idiopathic peripartum cardiomyopathy remains important. While peripartum cardiomyopathy is considered an idiopathic condition, myocardial dysfunction in severe preeclampsia appears to be related to endothelial dysfunction, increased afterload, and acute hemodynamic stress.[11,12] The findings of this study support routine cardiovascular assessment and early echocardiographic evaluation in women with severe hypertensive disorders of pregnancy presenting with respiratory distress, pulmonary edema, or hemodynamic instability.

This study has several limitations. It was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of the findings. The observational design precludes causal inference, and long-term maternal cardiac follow-up was not available. Larger multicenter studies with extended follow-up are needed to validate these findings and better define prognostic factors.

CONCLUSION

Peripartum cardiomyopathy is an important cardiovascular complication among women with preeclampsia with severe features and eclampsia, particularly in those presenting with respiratory distress or pulmonary edema. Early echocardiographic assessment, prompt multidisciplinary management, and timely referral to specialized centers may improve maternal outcomes.

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REFERENCES

1. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. Lancet Glob Health. 2014;2(6):e323-33.
2. World Health Organization. WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia, 2019. Available at: https://www.who.int/publications/i/item/9789241548335. Accessed 01 January 2026.
3. Sibai BM. Diagnosis and management of gestational hypertension and preeclampsia. Obstet Gynecol. 2003;102(1):181-92.
4. American College of Obstetricians and Gynecologists. Gestational hypertension and preeclampsia. Practice Bulletin No. 222. Obstet Gynecol. 2020;135(6):e237-60.
5. Melchiorre K, Sharma R, Thilaganathan B. Cardiovascular implications in preeclampsia: an overview. Circulation. 2014;130(8):703-14.
6. Dennis AT. Heart failure in pregnancy. Heart. 2019;105(16):1183-90.
7. Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, Blomström-Lundqvist C, Cífková R, De Bonis M, et al. 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy. Eur Heart J. 2018;39(34):3165-241.
8. Elkayam U, Goland S, Pieper PG, Silversides CK. High-risk cardiac disease in pregnancy: part II. J Am Coll Cardiol. 2016;68(5):502-16.
9. Knight M, Bunch K, Tuffnell D, Shakespeare J, Kotnis R, Kenyon S, et al. Trends in maternal mortality and severe maternal morbidity in high-income countries. Lancet. 2019;394(10204):1456-66.
10. Dennis AT, Solnordal CB. Acute pulmonary oedema in pregnant women. Anaesthesia. 2012;67(6):646-59.
11. Bauersachs J, König T, van der Meer P, Petrie MC, Hilfiker-Kleiner D, Mbakwem A, et al. Pathophysiology, diagnosis and management of peripartum cardiomyopathy. Eur Heart J. 2019;40(15):1188-97.
12. Sliwa K, Hilfiker-Kleiner D, Petrie MC, Mebazaa A, Pieske B, Buchmann E, et al. Current state of knowledge on aetiology, diagnosis, management, and therapy of peripartum cardiomyopathy. Eur J Heart Fail. 2010;12(8):767-78.
13. McDonagh TA, Metra M, Adamo M, Gardner RS, Baumbach A, Böhm M, et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J. 2021;42(36):3599-726.
14. Heidenreich PA, Bozkurt B, Aguilar D, Allen LA, Byun JJ, Colvin MM, et al. 2022 AHA/ACC/HFSA Guideline for the management of heart failure. Circulation. 2022;145(18):e895-1032.

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