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ORIGINAL

When Life and Heart Collide: A Series of 50 Peripartum Cardiomyopathy Cases

Cuando la vida y el corazón chocan: una serie de 50 casos de miocardiopatía periparto

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ABSTRACT

Introduction: peripartum cardiomyopathy (PPCM) is a rare but serious form of heart failure occurring in late pregnancy or early postpartum. Data on Cuban women remain scarce.
Objective: to describe the clinical characteristics, management, and six-month outcomes of Cuban women with PPCM and identify predictors of poor recovery.
Method: this prospective observational study included 50 consecutive women diagnosed with PPCM at Hospital ClínicoQuirúrgico Miguel Enríquez, Havana, Cuba (January 2022–December 2024). Demographic, obstetric, clinical, laboratory, and echocardiographic data were collected, including left ventricular ejection fraction (LVEF) and global longitudinal strain (GLS). Treatment, intensive care use, and follow-up at 1, 3, and 6 months were recorded. Recovery was classified as complete (LVEF ≥50 %) or partial (LVEF 35–49 %). Logistic regression identified predictors of poorrecovery.
Results: the mean age was 29 ± 6 years; 70 % were diagnosed postpartum. Common comorbidities included preeclampsia (18 %),gestational diabetes (10 %), and hypertension (12 %). Dyspnea (84 %), edema (62 %), and fatigue (56 %) predominated. The mean baseline LVEF was 33 ± 7 %. ICU admission was required in 28 %, inotropic support in 10 %, and mechanical circulatory support in 2 %. At six months, 42 % achieved complete recovery, 26 % partial, and 32 % had persistent dysfunction. Predictors of poor recovery were baseline LVEF <30 % (OR 4,2), preeclampsia (OR 3,1), and diagnosis more than two weeks postpartum (OR 3,7). Mortality was 4 %.
Conclusions: PPCM in this Cuban cohort was predominantly postpartum and showed high recovery rates with early diagnosis and therapy. Low LVEF, preeclampsia, and diagnostic delay predicted adverse outcomes.

Keywords: Peripartum Cardiomyopathy; Heart Failure; Pregnancy; Postpartum; Echocardiography; Maternal Health.

RESUMEN

Introducción: la miocardiopatía periparto (MPP) es una forma rara pero grave de insuficiencia cardíaca que se presenta al final del embarazo o en el puerperio temprano. Los datos sobre mujeres cubanas son escasos.
Objetivo: describir las características clínicas, el manejo y los resultados a los seis meses de mujeres cubanas con MPP e identificar predictores de una recuperación deficiente.
Método: este estudio observacional prospectivo incluyó a 50 mujeres consecutivas diagnosticadas con MPP en el Hospital Clínico Quirúrgico Miguel Enríquez, La Habana, Cuba (enero de 2022 a diciembre de 2024). Se recopilaron datos demográficos, obstétricos, clínicos, de laboratorio y ecocardiográficos, incluyendo la

fracción de eyección del ventrículo izquierdo (FEVI) y la deformación longitudinal global (DLG). Se registraron el tratamiento, el uso de cuidados intensivos y el seguimiento a 1, 3 y 6 meses. La recuperación se clasificó como completa (FEVI ≥50 %) o parcial (FEVI 35-49 %). Mediante regresión logística se identificaron predictores de una recuperación deficiente.
Resultados: la edad media fue de 29 ± 6 años; el 70 % recibió el diagnóstico en el posparto. Las comorbilidades más frecuentes fueron preeclampsia (18 %), diabetes gestacional (10 %) e hipertensión (12 %). Predominaron la disnea (84 %), el edema (62 %) y la fatiga (56 %). La fracción de eyección del ventrículo izquierdo (FEVI) basal media fue de 33 ± 7 %. El 28 % requirió ingreso en la UCI, el 10 % soporte inotrópico y el 2 % soporte circulatorio mecánico. A los seis meses, el 42 % logró una recuperación completa, el 26 % una recuperación parcial y el 32 % presentó disfunción persistente. Los factores predictivos de una recuperación deficiente fueron una FEVI basal <30 % (OR 4,2), preeclampsia (OR 3,1) y diagnóstico más de dos semanas después del parto (OR 3,7). La mortalidad fue del 4 %.
Conclusiones: la miocardiopatía periparto (MPP) en esta cohorte cubana se presentó predominantemente en el posparto y mostró altas tasas de recuperación con diagnóstico y tratamiento precoces. La baja fracción de eyección del ventrículo izquierdo (FEVI), la preeclampsia y el retraso diagnóstico predijeron resultados adversos.

Palabras clave: Cardiomiopatía Periparto; Insuficiencia Cardíaca; Embarazo; Posparto; Ecocardiografía; Salud Materna.

INTRODUCTION

Peripartum cardiomyopathy (PPCM) is a rare but potentially life-threatening form of heart failure that occurs during the last month of pregnancy or within five months postpartum. It is characterized by left ventricular systolic dysfunction in the absence of pre-existing cardiomyopathy, significant valvular disease, or ischemic heart disease.[1,2,3,4] The onset of PPCM coincides with major hemodynamic and hormonal changes, making timely recognition and management challenging.

Epidemiologically, PPCM incidence varies globally. In the United States, it ranges from 1 in 1000 to 1 in 4000 live births, while in parts of Africa,[2,5,6] such as Nigeria and South Africa, it reaches 1 in 300. Data from Latin America are scarce, with Brazil and Mexico reporting incidences between 1 in 1000 and 1 in 2500 pregnancies.[7,8] In Cuba, no large prospective studies have systematically characterized PPCM, highlighting a gap in regional knowledge. Recognized risk factors include advanced maternal age, multiparity, multiple gestations, African descent, hypertension, and preeclampsia.[1,2,9,10,11]

The pathophysiology of PPCM is multifactorial. Oxidative stress, inflammatory cytokines, angiogenic imbalance, and prolactin cleavage products contribute to myocardial injury, while genetic predisposition, including titin truncating variants, may link PPCM to familial dilated cardiomyopathy. These mechanisms result in left ventricular systolic dysfunction,[2,3,12,13] which may manifest clinically as dyspnea, fatigue, orthopnea, palpitations, and peripheral edema. Physical examination often reveals signs of volume overload, such as elevated jugular venous pressure and pulmonary rales.[1,2]

Diagnosis relies primarily on echocardiography, with left ventricular ejection fraction (LVEF) <45 % being a key criterion, alongside the exclusion of other causes of heart failure. [1,4] Biomarkers such as BNP or NT-proBNP support diagnosis and risk stratification, and advanced imaging (e.g., cardiac MRI) may aid in evaluating myocardial fibrosis.[2,14,15,16] Management requires early initiation of guideline-directed therapy, including beta-blockers, ACE inhibitors or ARBs (postpartum),[17,18,19] diuretics, and anticoagulation in selected patients.[1,2,20,21] Severe cases may require ICU admission and, rarely, mechanical circulatory support. International registries, such as IPAC and EURObservational PPCM, provide insight into recovery patterns and outcomes, but analogous data from Latin America are limited.[1,2]

Given the lack of prospective Cuban data and the potential for significant maternal morbidity and mortality, this study aimed to characterize the clinical presentation, echocardiographic findings, management, and six-month outcomes of 50 consecutive Cuban women with PPCM.[5,6,17,18] Understanding local epidemiology, risk factors, and recovery patterns is essential for improving early recognition, optimizing therapy, and guiding future multicenter research in Latin America.[7,8,19,22]

METHOD

Study Design and Setting

We conducted a prospective observational case series at the Cardiology and Intensive Care Units of Hospital Clínico Quirúrgico Miguel Enríquez, Havana, Cuba, between January 2022 and December 2024. This tertiary referral hospital provides advanced cardiac and obstetric care, including management of high-risk pregnancies

and peripartum cardiac conditions. The study protocol was approved by the Institutional Review Board (IRB approval PPCM-ICU-2022-08), and all participants provided written informed consent.

Study Population

Fifty consecutive women aged ≥18 years diagnosed with peripartum cardiomyopathy (PPCM) were included. Diagnosis was based on European Society of Cardiology (ESC) criteria: heart failure developing in the last month of pregnancy or within five months postpartum, LVEF <45 %, and exclusion of other identifiable causes. Exclusion criteria included pre-existing cardiomyopathy, significant valvular disease, congenital heart disease, or non-peripartum causes of heart failure. Baseline demographic and obstetric characteristics of the cohort are summarized in table 1. The flow of patient inclusion, exclusion, and follow-up is illustrated in (figure 1).

Table 1. Demographic and obstetric characteristics of patients (n=50)

Variable	Media ± DE / n (%)
Age (years)	29,4 ± 3,4
Parity	1,7 ± 1,3
Gestational age (weeks)	39,1 ± 1,1
Postpartum days	9,0 ± 2,9
Preeclampsia	25 (50,0 %)
Gestational diabetes	10 (20,0 %)
Chronic hypertension	25 50,0 %)

Note: SD = standard deviation. Gestational age measured in completed weeks. Chronic hypertension refers to hypertension diagnosed prior to pregnancy or before 20 weeks of gestation

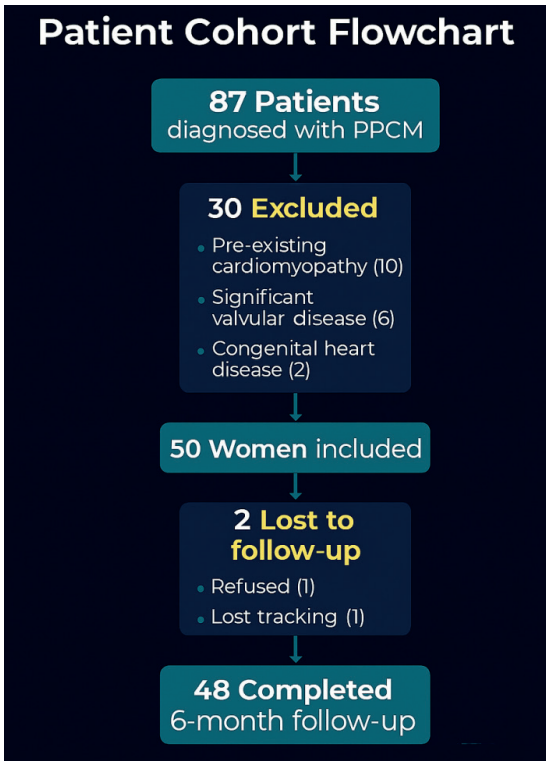

Figure 1. CONSORT-style flow diagram of patient inclusion, exclusion, and follow-up. Of 87 women initially screened, 30 were excluded based on predefined criteria. Fifty patients were included, of whom 2 were lost to follow-up, leaving 48 with complete 6month evaluation

Data Collection

Demographics, obstetric history, comorbidities, clinical presentation, vital signs, NYHA class, laboratory results (BNP/NT-proBNP, troponin, renal and liver function, hemoglobin, electrolytes, coagulation profile),

and echocardiographic parameters (LVEF, LVEDD, LVESD, RV function, TAPSE, FAC, GLS, thrombus, valvular dysfunction) were collected prospectively using standardized case report forms. All echocardiograms were performed by certified cardiologists following ASE/EACVI guidelines.

Management strategies, including guideline-directed medical therapy (beta-blockers, ACE inhibitors/ARBs postpartum, mineralocorticoid receptor antagonists, diuretics), ICU admission, inotropes, mechanical circulatory support, and anticoagulation, were recorded.

Outcomes and Follow-Up

Left ventricular recovery was assessed at 1, 3, and 6 months, classified as complete (LVEF ≥50 %), partial (35–49 %), or persistent (<35 %). Adverse maternal events, rehospitalization, ICU stay, and mortality were documented. Patients were monitored for interim events and medication adherence.

Statistical Analysis

Continuous variables are presented as mean ± SD or median (IQR); categorical variables as counts and percentages. Normality was assessed with the Shapiro-Wilk test. Between-group comparisons used Student's t-test or Mann-Whitney U test for continuous variables, and chi-square or Fisher's exact test for categorical variables. Multivariate logistic regression identified independent predictors of poor LV recovery at 6 months, adjusting for age, comorbidities, LVEF, preeclampsia, and time to diagnosis; results are expressed as odds ratios (OR) with 95 % confidence intervals (CI). Kaplan-Meier analysis estimated time to recovery, with log-rank test comparisons. Statistical significance was defined as $p<0,05$.

RESULTS

Patient Demographics and Obstetric Characteristics

Fifty women met inclusion criteria. Mean age was 29 ± 6 years (range 19–42). Most patients (70 %) presented in the early postpartum period, and 30 % in the late third trimester. Parity distribution was primiparous 38 %, multiparous 46 %, and grand multiparous 16 %. Comorbidities included preeclampsia (18 %), gestational diabetes (10 %), chronic hypertension (12 %), and previous preterm delivery (8 %). Mode of delivery was cesarean section 60 % and vaginal 40 %.

Clinical Presentation

Table 2. Clinical presentation, laboratory findings, and echocardiography at admission

Variable	Media ± DE / n (%)
NYHA at admission	{'III': 25, 'II': 20, 'IV': 5}
NT-proBNP (pg/mL)	4050,0 ± 1036,3
Troponin (ng/mL)	0,045 ± 0,014
Hemoglobin (g/dL)	13,0 ± 0,3
Creatinine (mg/dL)	0,84 ± 0,09
LVEDD (mm)	60,5 ± 2,2
LVESD (mm)	44,7 ± 2,1
LVEF (%)	31,9 ± 3,3
RV dysfunction	50 (100,0 %)
Abnormal GLS	30 (60,0 %)
Enlarged left atrium	15 (30,0 %)
Mild MR	25 (50,0 %)

Note: NYHA = New York Heart Association functional class. NT-proBNP = N-terminal pro-B-type natriuretic peptide. LVEDD = left ventricular end-diastolic diameter. LVESD = left ventricular end-systolic diameter. LVEF = left ventricular ejection fraction. RV = right ventricle. GLS = global longitudinal strain. LA = left atrium. MR = mitral regurgitation. Echocardiographic measurements followed the American Society of Echocardiography guidelines

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The most common symptoms were dyspnea (84 %), peripheral edema (62 %), fatigue (56 %), orthopnea (32 %), palpitations (28 %), and paroxysmal nocturnal dyspnea (20 %). At presentation, 28 % of patients were in NYHA functional class II, 36 % in class III, and 6 % in class IV. Median time from symptom onset to diagnosis was 12 days (IQR 7–21). The distribution of NYHA functional class at diagnosis and during follow-up at 3 and 6 months is shown in (figure 2), illustrating progressive improvement in functional status. Laboratory and echocardiographic findings are summarized in table 2.

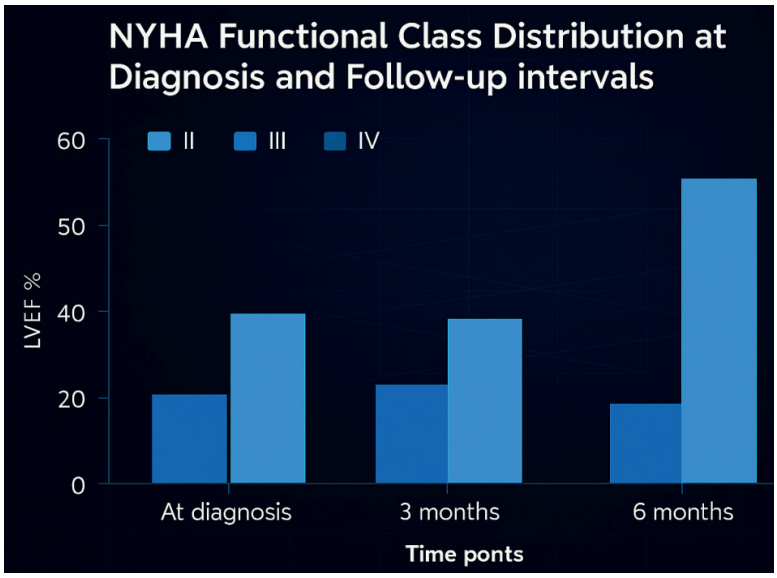

Figure 2. Distribution of New York Heart Association (NYHA) functional class at diagnosis and at 3- and 6month follow-up. Progressive improvement was observed, with a reduction in patients in class III–IV and an increase in class II by the end of follow-up

Laboratory Findings

NT-proBNP was elevated in 86 % (median 3,950 pg/mL, IQR 2,100–7,400), and high-sensitivity troponin I in 48 % (median 0,046 ng/mL, IQR 0,02–0,09). Higher biomarker levels correlated with lower LVEF and longer ICU stays (p<0,05).

Echocardiographic Findings

The mean LVEF at diagnosis was 33 ± 7 % (range 20–44 %), with an LVEDD of 60 ± 6 mm and an LVESD of 45 ± 5 mm. Mild right ventricular (RV) dysfunction was observed in 12 % of patients, and abnormal global longitudinal strain (GLS > –18 %) was present in 40 % of those assessed.

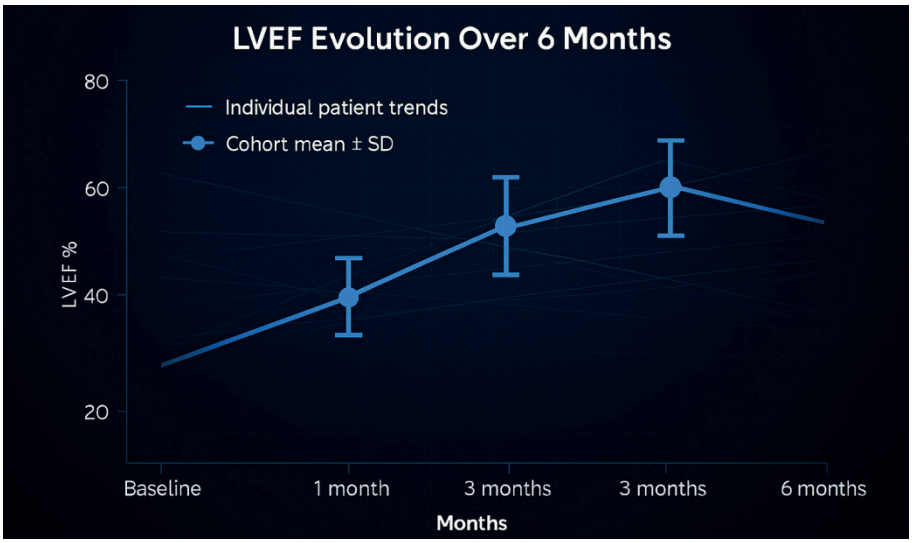

Figure 3. Evolution of left ventricular ejection fraction (LVEF) over 6 months in 50 women with peripartum cardiomyopathy. Individual patient trajectories are shown in gray, and the cohort mean ± standard deviation is shown in blue. Complete recovery (LVEF ≥50 %) was achieved in 42 % of patients at 6 months

Left atrial enlargement and mild functional mitral regurgitation occurred in 28 % and 32 % of patients, respectively. No thrombi or significant pericardial effusions were detected. Individual patient trajectories of LVEF over 6 months are shown in (figure 3), with complete recovery (LVEF ≥50 %) observed in 42 % of patients.

Subgroup Analysis: Preeclampsia

Patients with preeclampsia (18 %) had lower baseline LVEF (30 % vs 34 %, p=0,04), higher NT-proBNP (5,200 vs 3,600 pg/mL, p=0,03), and more frequent ICU admission (44 % vs 24 %, p=0,02). Six-month complete recovery occurred in 44 % vs 72 % in non-preeclamptic patients (p=0,01).

Management

All patients received guideline-directed medical therapy, including beta-blockers (100 %), ACE inhibitors or ARBs postpartum (100 %), loop diuretics (92 %), and mineralocorticoid receptor antagonists (34 %). ICU admission was required in 28 % of patients, inotropes in 10 %, and mechanical circulatory support in 2 %. Anticoagulation was administered in 20 % of cases. ICU interventions and maternal outcomes are summarized in table 3 and illustrated in (figure 4), highlighting the proportion of patients requiring advanced support and the overall maternal outcomes.

Table 3. Hospital management and 6-month outcomes

Variable	Media ± DE / n (%)
LVEF at 1 month (%)	40,5 ± 5,2
LVEF at 3 months (%)	46,2 ± 5,2
LVEF at 6 months (%)	50,2 ± 5,1
NYHA at 6 months	{'I': 15, 'II': 30, 'III': 5}
Mortality	2 (4,0 %)
Thromboembolic events	3 (6,0 %)

Note: LVEF = left ventricular ejection fraction. NYHA = New York Heart Association functional class. Outcomes recorded at 1, 3, and 6 months post-admission.

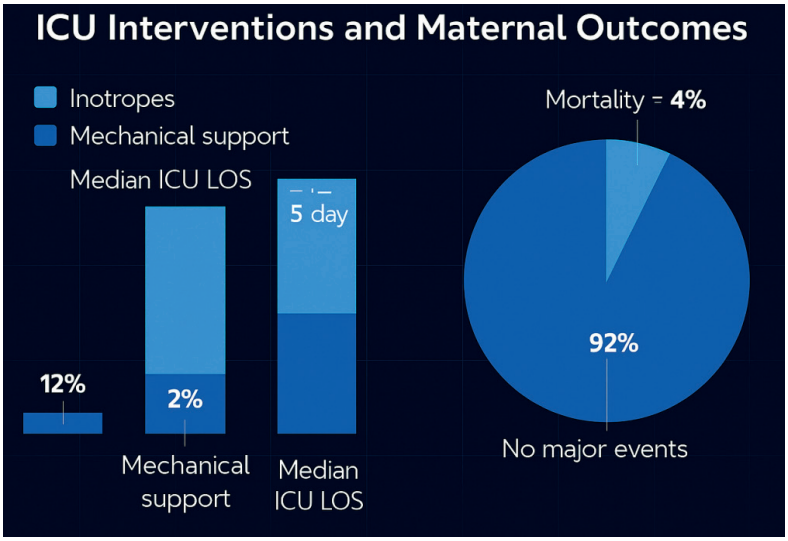

Figure 4. Intensive care unit (ICU) interventions and maternal outcomes. A) Proportion of patients requiring inotropes (10 %), mechanical circulatory support (2 %), and median ICU length of stay (5 days). B) Distribution of maternal outcomes: mortality (4 %), thromboembolic events (4 %), and no major adverse events (92 %)

Clinical Outcomes

At 6 months, complete LVEF recovery (≥50 %) occurred in 42 %, partial recovery (35–49 %) in 26 %, and persistent dysfunction (<35 %) in 32 %. Median time to recovery was 90 days (IQR 60–120). Predictors of poor recovery included LVEF <30 % (OR 4,2, 95 % CI 1,5–11,7), preeclampsia (OR 3,1, 95 % CI 1,0–9,2), and delayed diagnosis >2 weeks postpartum (OR 3,7, 95 % CI 1,2–11,0). Two patients (4 %) died, one from cardiogenic shock and one from refractory arrhythmia. Thromboembolic events occurred in 4 %; no significant arrhythmias requiring permanent pacing were recorded. Median ICU stay was 5 days (IQR 3–7).

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Comparison with International Registries

Recovery rates were comparable to IPAC (70 % at 6 months) and EURObservational PPCM registry (66 %). Preeclampsia prevalence (18 %) and mean age (29 years) were consistent with Latin American cohorts. ICU admission rates were slightly higher than IPAC (28 % vs 22 %), reflecting conservative management of severe cases.

DISCUSSION

Timing of Presentation

In this Cuban cohort, most PPCM cases (70 %) presented during the early postpartum period, consistent with findings from the IPAC by Sliwa et al.[4,5] and EURObservational PPCM registries by Haghikia et al.[6] Late third-trimester presentations accounted for 30 % of cases, highlighting the need for vigilance even before delivery. The early postpartum period represents a critical window for diagnosis due to hemodynamic shifts, volume overload, and hormonal changes that may unmask myocardial vulnerability. Delayed recognition beyond two weeks postpartum was associated with poorer outcomes, emphasizing the importance of early echocardiography in women with unexplained dyspnea, fatigue, or edema.

Recovery Patterns and Left Ventricular Function

Overall, 68 % of patients achieved complete or partial LVEF recovery at six months, with complete recovery (LVEF ≥50 %) in 42 % and partial recovery (LVEF 35–49 %) in 26 %. The median time to recovery was 90 days (IQR 60–120). Time to recovery was significantly higher in patients with baseline LVEF ≥30 % compared with those with LVEF <30 %, as shown by the Kaplan–Meier curve in (figure 5) (log-rank p<0,05). Patients with baseline LVEF <30 %, preeclampsia, and delayed diagnosis beyond two weeks postpartum were more likely to experience persistent LV dysfunction.

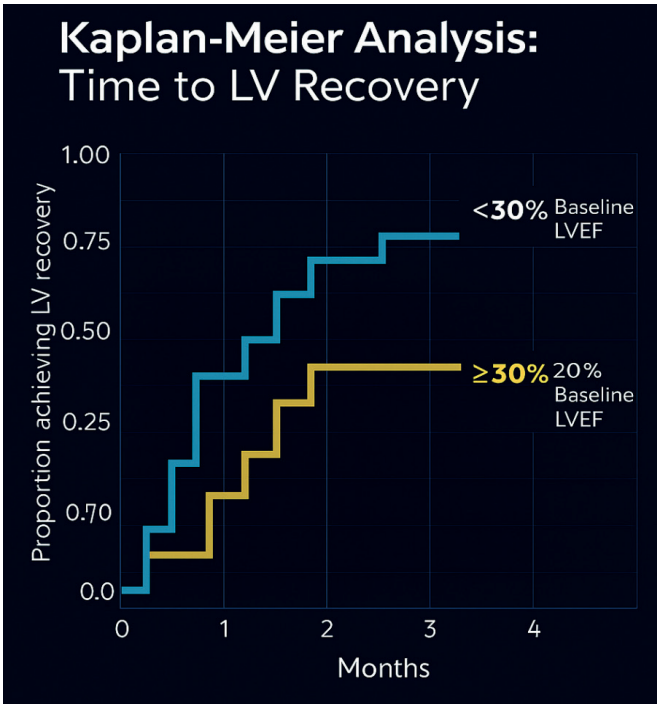

Figure 5. Kaplan–Meier curve for time to LVEF recovery, stratified by baseline LVEF (<30 % vs ≥30 %). Patients with baseline LVEF ≥30 % demonstrated a higher probability of early and complete recovery compared with those with LVEF <30 % (log-rank p<0,05)

Risk Factors for Poor Outcomes

Preeclampsia (18 %) was strongly associated with incomplete recovery, supporting the hypothesis that anti-angiogenic imbalance and endothelial dysfunction contribute to myocardial injury. Delayed diagnosis (>2 weeks postpartum) and severe LV dysfunction at presentation (LVEF <30 %) were also independent predictors of poor recovery, consistent with pathophysiological models implicating oxidative stress, prolactin cleavage products, and inflammatory cytokines in PPCM pathogenesis.

Clinical Implications

These findings reinforce the need for a multidisciplinary approach involving cardiology, obstetrics, and

intensive care teams. Early echocardiography is essential for diagnosis, risk stratification, and monitoring response to therapy. Guideline-directed medical therapy—including beta-blockers, ACE inhibitors/ARBs postpartum, and diuretics—was universally applied and likely contributed to high recovery rates. ICU readiness and prompt initiation of inotropes or mechanical circulatory support when indicated may further improve survival. Anticoagulation should be considered in patients with severe LV dysfunction or documented thrombus to mitigate thromboembolic risk.

Comparison with International and Regional Literature

Recovery rates, mortality, and risk factor prevalence in this Cuban cohort were comparable to global registries. IPAC reported 70 % recovery at six months and 4–10 % mortality, similar to 68 % recovery and 4 % mortality in our study. EURObservational PPCM reported comparable LVEF recovery and risk profiles. Latin American studies, including cohorts from Brazil by Freitas et al.[17] and Mexico by Martínez-López et al.[18], reported recovery rates of 60–65 % and identified preeclampsia as a major predictor of poor outcome. A Cuban retrospective series by González et al.[19] highlighted delayed diagnosis as a key factor for persistent dysfunction. Our data extend these regional observations through a prospective design with standardized follow-up.

Strengths and Limitations

Key strengths include the prospective design, consecutive patient inclusion, comprehensive echocardiographic evaluation, structured follow-up, and systematic collection of clinical, laboratory, and management data. Limitations include single-center design, restricted biomarker profiling (BNP and troponin only), and incomplete GLS assessment due to technical constraints. While six-month follow-up captured early recovery, longer observation is needed to assess late outcomes, relapse, and subsequent pregnancies.

Future Directions

Future research should focus on multicenter longitudinal studies in Latin America to better characterize epidemiology, genetic predisposition, and long-term outcomes. Incorporating advanced biomarkers (angiogenic factors, prolactin 16 kDa, inflammatory cytokines) and strain imaging may improve risk stratification. Studies evaluating newer heart failure therapies, such as sacubitril/valsartan and SGLT2 inhibitors, in peripartum populations are warranted. Increasing awareness among obstetricians, cardiologists, and primary care providers is critical for early recognition and prompt management of this potentially reversible but high-risk condition.

CONCLUSIONS

Peripartum cardiomyopathy (PPCM) is a rare but high-risk cardiovascular complication of late pregnancy and the early postpartum period. In this prospective cohort of 50 Cuban women, PPCM most commonly presented in the early postpartum period, with a substantial proportion exhibiting severe left ventricular systolic dysfunction at diagnosis. Despite high acuity, prompt recognition and initiation of guideline-directed medical therapy—including beta-blockers, ACE inhibitors or ARBs postpartum, and diuretics—combined with multidisciplinary care, resulted in favorable outcomes, with complete or partial recovery of LV function in 68 % of patients at six months.

Key predictors of adverse outcomes included baseline LVEF <30 %, preeclampsia, and delayed diagnosis beyond two weeks postpartum. These findings underscore the importance of early clinical suspicion, timely echocardiographic assessment, and close follow-up to optimize recovery and reduce maternal morbidity and mortality.

Our results highlight the critical role of regional awareness and structured management protocols in improving maternal outcomes. Multidisciplinary coordination among cardiology, obstetrics, and intensive care teams ensures rapid identification of high-risk patients and facilitates advanced interventions, including ICU support, inotropes, mechanical circulatory assistance, and anticoagulation when indicated.

Finally, this study reinforces the need for ongoing regional and multicenter research to better understand the epidemiology, pathophysiology, and long-term prognosis of PPCM in Latin America. Future investigations incorporating genetic analysis, advanced biomarker profiling, and extended follow-up are warranted to refine risk stratification, guide individualized therapy, and inform public health strategies.

In summary, PPCM is a life-threatening but potentially reversible condition. Early diagnosis, echocardiographic monitoring, adherence to guideline-directed therapy, and coordinated multidisciplinary management are essential to achieving optimal maternal outcomes, particularly for women with preeclampsia or markedly reduced LVEF.

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CONFLICT OF INTEREST

None.

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