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Peripartum Cardiomyopathy in Morocco: Clinical Profile, Predictors of LV Recovery, and Outcomes in 60 Patients

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AUTHORS AND AFFILIATION

Sara Aouame
Hopital militaire moulay ismail

ABSTRACT

Background: Peripartum cardiomyopathy (PPCM) is disproportionately prevalent in women of African descent. Data from Morocco and North Africa are absent, and predictors of left ventricular (LV) recovery in this population remain incompletely characterised.
Methods: Retrospective, observational, single-centre study (STROBE-compliant) of 60 consecutive PPCM patients (ESC 2019 Working Group criteria: LVEF <45%, onset last month of pregnancy or within 5 months postpartum, no prior identifiable cause), January 2018 – December 2023. Clinical, echocardiographic, and therapeutic data collected at baseline and 12 months. Multivariable logistic regression identified independent predictors of LV recovery (LVEF ≥50% at 12 months).
Results: Mean age was 28.6±6.4 years; 78% diagnosed postpartum. Risk factors: multiparity ≥3 (65%), anaemia (42%), hypertension (32%), pre-eclampsia (28%). Mean baseline LVEF was 27.4±8.2%. LV recovery at 12 months: 58% (n=35/60); mean LVEF improved from 27.4±8.2% to 46.8±11.4% (p<0.001). All-cause mortality: 10% (n=6). Independent predictors of LV recovery: baseline LVEF (OR 1.12/%; 95%CI 1.04–1.21; p=0.002), bromocriptine use (OR 3.4; 95%CI 1.3–8.9; p=0.013), pre-eclampsia (OR 0.32; 95%CI 0.12–0.88; p=0.027), and multiparity ≥3 (OR 0.38; 95%CI 0.15–0.96; p=0.041).
Conclusions: This first Moroccan PPCM series documents a severe profile with 10% mortality and 58% LV recovery. Bromocriptine is the strongest modifiable predictor of recovery. High-risk subgroups (pre-eclampsia, multiparity) require intensive management. A national MENA PPCM registry is urgently needed.

KEYWORDS :

Peripartum cardiomyopathy; Left ventricular recovery; Bromocriptine; Morocco; Echocardiography; Pre-eclampsia; Heart failure; Africa

MAIN ARTICLE

1. BACKGROUND

Peripartum cardiomyopathy (PPCM) is an idiopathic cardiomyopathy presenting with heart failure (HF) secondary to LV systolic dysfunction in the last month of pregnancy or within 5 months postpartum, without a pre-existing identifiable cause [1]. Although globally rare (approximately 1 per 1,000 live births in European cohorts), PPCM is disproportionately prevalent in women of African descent — affecting 1 per 100–300 live births in some sub-Saharan African series, with mortality rates of 10–30% [2].

The prolactin hypothesis is now the dominant mechanistic framework: cathepsin D-mediated cleavage of full-length prolactin generates a 16-kDa N-terminal fragment with potent anti-angiogenic, pro-apoptotic, and pro-inflammatory cardiomyocyte effects [3]. This underpinned the clinical development of bromocriptine — a dopamine D2 receptor agonist inhibiting pituitary prolactin secretion. A 2025 meta-analysis of 11 studies and 1,706 patients confirmed bromocriptine significantly improves LVEF vs standard therapy (mean difference +8.5%; 95%CI 3.4–13.6%; $p<0.01$), now incorporated into the 2023 ESC HF guidelines as a Class IIa recommendation [4,5]. Despite this evidence, PPCM remains underdiagnosed and undertreated in Morocco and North Africa, where no published series exists. This study aimed to describe the clinical, echocardiographic, and therapeutic profile of 60 consecutive PPCM patients and identify independent predictors of LV recovery at 12 months.

2. METHODS

2.1. Study design

Retrospective, observational, single-centre study (STROBE-compliant), January 2018 – December 2023, Cardiology Department, Moulay Ismail Military Hospital, Meknes, Morocco. IRB-approved (Ref: IRB-HMMIM-2023-009); consent waived (retrospective design). Included: all 60 consecutive patients meeting ESC 2019 Working Group PPCM criteria [1]. Exclusion: incomplete records or follow-up <6 months.

2.2. Data collection

Clinical data: age, parity, gestational age, obstetric data, cardiovascular risk factors, timing of diagnosis, NYHA class. Echocardiography within 72 hours of diagnosis, at 6 months, and at 12 months: LVEF (biplane Simpson), indexed LV volumes, LAVi, MR/TR severity

(ASE/EACVI 2017), estimated PASP, GLS where available. Bromocriptine: 2.5 mg/day ×4 weeks (uncomplicated); 2.5 mg twice daily ×2 weeks then once daily ×6 weeks (severe: LVEF <25% or cardiogenic shock), combined with systematic anticoagulation.

2.3. Statistical analysis

SPSS v25.0. Continuous: mean±SD; categorical: n (%). Pre/post LVEF: paired t-test. Multivariable logistic regression (forward stepwise, $p<0.10$ entry) for predictors of LV recovery. Significance: $p<0.05$.

3. RESULTS

3.1. Baseline characteristics

Baseline clinical and echocardiographic characteristics are presented in Table 1. Mean age was 28.6±6.4 years; median parity 3 (IQR 2–4). Diagnosis was antepartum in 22% and postpartum in 78%. Mean baseline LVEF was 27.4±8.2% with severely dilated LV (LVEDVi 224±48 mL/m²). Moderate/severe MR was present in 48% and pulmonary hypertension in 42%.

Table 1. Baseline clinical and echocardiographic characteristics (n=60)

Variable	Value — n (%) or mean±SD
Age (years)	28.6 ± 6.4 (range 18–44)
Parity (median)	3 (IQR 2–4)
Postpartum diagnosis	78% (n=47)
Multiparity ≥3	65% (n=39)
Anaemia (Hb <10 g/dL)	42% (n=25)
Hypertension	32% (n=19)
Pre-eclampsia	28% (n=17)
NYHA class III–IV	72% (n=43)
Baseline LVEF (%)	27.4 ± 8.2
Indexed LVEDV (mL/m²)	224 ± 48

Variable	Value — n (%) or mean±SD
Indexed LVESV (mL/m²)	168 ± 42
LAVi (mL/m²)	44.2 ± 12.4
Moderate/severe MR	48% (n=29)
Estimated PASP >35 mmHg	42% (n=25)

Hb: haemoglobin; IQR: interquartile range; LAVi: indexed left atrial volume; LVEDV: LV end-diastolic volume; LVESV: LV end-systolic volume; LVEF: left ventricular ejection fraction; MR: mitral regurgitation; NYHA: New York Heart Association; PASP: pulmonary artery systolic pressure.

3.2. Treatment

Treatment during index hospitalisation is summarised in Table 2. Bromocriptine was prescribed in 72% (n=43), systematically combined with anticoagulation.

Table 2. Pharmacological treatment during index hospitalisation (n=60)

Treatment	n (%)
Loop diuretic	57 (95%)
Beta-blocker (carvedilol or bisoprolol)	55 (92%)
ACEi / ARB / ARNI	53 (88%)
Mineralocorticoid receptor antagonist	41 (68%)
Anticoagulation (LMWH or VKA)	39 (65%)
Bromocriptine (2.5 mg/day × 4–8 weeks)	43 (72%)
Inotropic support (dobutamine)	11 (18%)
Mechanical circulatory support	2 (3%)
ICD implantation	3 (5%)

Treatment	n (%)
CRT	2 (3%)

ACEi: ACE inhibitor; ARB: angiotensin receptor blocker; ARNI: angiotensin receptor-neprilysin inhibitor; CRT: cardiac resynchronisation therapy; ICD: implantable cardioverter-defibrillator; LMWH: low molecular weight heparin; VKA: vitamin K antagonist.

3.3. Outcomes at 12 months

Twelve-month outcomes are presented in Table 3. LV recovery (LVEF ≥50%) was achieved in 58% (n=35). Mean LVEF improved significantly from 27.4±8.2% to 46.8±11.4% (+19.4±9.8%; p<0.001). All-cause mortality was 10% (n=6). Independent predictors of LV recovery on multivariable logistic regression: higher baseline LVEF (OR 1.12 per 1% increase; p=0.002), bromocriptine use (OR 3.4; p=0.013), pre-eclampsia (OR 0.32; p=0.027), and multiparity ≥3 (OR 0.38; p=0.041).

Table 3. Clinical outcomes at 12 months and multivariable predictors of LV recovery

Parameter	Value
LV recovery (LVEF ≥50%) at 12 months	58% (n=35/60)
Mean LVEF at 12 months (%)	46.8 ± 11.4
LVEF change (mean)	+19.4 ± 9.8% (p<0.001)
Persistent LVEF <35% at 12 months	18% (n=11)
All-cause mortality	10% (n=6)
HF rehospitalisation	28% (n=17)
Thromboembolic events	5% (n=3)
Composite poor outcome	22% (n=13)
Predictor: baseline LVEF (per 1%)	OR 1.12 (1.04–1.21); p=0.002
Predictor: bromocriptine use	OR 3.4 (1.3–8.9); p=0.013

Parameter	Value
Predictor: pre-eclampsia (negative)	OR 0.32 (0.12–0.88); p=0.027
Predictor: multiparity ≥3 (negative)	OR 0.38 (0.15–0.96); p=0.041

Composite poor outcome: death + LVEF <35% + NYHA class III–IV at 12 months. HF: heart failure; LVEF: left ventricular ejection fraction; NYHA: New York Heart Association; OR: odds ratio.

4. DISCUSSION

To our knowledge, this is the first published Moroccan and North African PPCM series with systematic 12-month echocardiographic follow-up. The clinical profile — young multiparous women (mean age 28.6 years), severe LV dysfunction (LVEF 27.4%), and 42% pulmonary hypertension — is consistent with West African cohort data, reflecting delayed diagnosis and limited prenatal cardiac screening [2,6]. The 58% LV recovery and 10% mortality are intermediate between European registry results (60–70% recovery, 2–4% mortality) and sub-Saharan African outcomes (40–50% recovery, 15–30% mortality) [6,7] — likely reflecting Morocco's intermediate healthcare access context.

The bromocriptine benefit (OR 3.4; p=0.013) aligns with the 2025 meta-analysis (n=1,706; +8.5% LVEF improvement; p<0.01) [4] and the established mechanism: the 16-kDa prolactin fragment induces cardiomyocyte apoptosis via microRNA-146a-mediated ERBB4/VEGF suppression; bromocriptine blocks upstream prolactin secretion, interrupting this cascade [3]. In North Africa, where breastfeeding has major nutritional implications, this benefit requires careful individual risk-benefit assessment with systematic anticoagulation for the associated thromboembolic risk.

Pre-eclampsia and multiparity as independent predictors of poor LV recovery are pathophysiologically plausible: pre-eclampsia shares anti-angiogenic signalling (sFlt-1) and complement activation with PPCM, creating additive cardiomyocyte injury [8]. Multiparity may reflect cumulative peripartum haemodynamic stress and anaemia burden [9]. These findings define a high-risk subgroup warranting intensive monitoring, early bromocriptine initiation, and multidisciplinary management. Limitations include retrospective single-centre design, n=60 limiting multivariate model power, and incomplete GLS data.

5. CONCLUSIONS

PPCM in Morocco presents with a severe echocardiographic and clinical profile, with 10% mortality and 58% LV recovery at 12 months. Bromocriptine is the strongest modifiable predictor of recovery; pre-eclampsia and multiparity predict poor outcome. Systematic early bromocriptine initiation with guideline-directed medical therapy and anticoagulation is recommended in all eligible patients. A national PPCM registry is urgently needed to characterise this disease in the MENA region.

LIST OF ABBREVIATIONS

Abbreviation	Definition
ACEi	Angiotensin-converting enzyme inhibitor
ARB	Angiotensin receptor blocker
ARNI	Angiotensin receptor-neprilysin inhibitor
CI	Confidence interval
CRT	Cardiac resynchronisation therapy
ESC	European Society of Cardiology
GLS	Global longitudinal strain
Hb	Haemoglobin
HF	Heart failure
ICD	Implantable cardioverter-defibrillator
IQR	Interquartile range
LAVi	Indexed left atrial volume
LMWH	Low molecular weight heparin
LV	Left ventricle
LVAD	Left ventricular assist device
LVEF	Left ventricular ejection fraction
MR	Mitral regurgitation
MRA	Mineralocorticoid receptor antagonist
MENA	Middle East and North Africa
NYHA	New York Heart Association
OR	Odds ratio
PASP	Pulmonary artery systolic pressure
PPCM	Peripartum cardiomyopathy
TR	Tricuspid regurgitation
VKA	Vitamin K antagonist

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Ethics approval and consent to participate
This study was conducted in accordance with the Declaration of Helsinki and reported following STROBE guidelines. Ethical approval was obtained from the IRB of Moulay Ismail Military Hospital, Meknes, Morocco (Ref: IRB-HMMIM-2023-009). Patient informed consent was waived due to the retrospective, non-interventional nature of the study.
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