

Peripartum Cardiomyopathy Care at Lomé University Hospital of Campus

Tcherou T^{1*}, Yayehd K², Atta Db¹, Gafa A², Kpelafia M², Togbossi Ek², Pessinaba S², Bakai Am¹, Pio M¹, Baragou S² and Damorou F²

¹Department of Cardiology, University of Kara, Togo.

²Department of Cardiology, University of Lomé, Togo.

*Correspondence:

Tchaa TCHEROU Cardiology Department, University of Kara, Togo, Tel: +228 93 23 84 93.

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ABSTRACT

Objective: To describe the epidemiological, clinical, therapeutic data and access outcomes of peripartum cardiomyopathy (PPCM) at Lomé University Hospital Centre (CHU), campus de Lomé.

Materials and Methods: This was a cross-sectional study, carried out from January 2012 to December 2021 in the department of cardiology at the Campus University Hospital of Lomé. The study included patients of African origin diagnosed with PPCM on the basis of clinical and echocardiographic evidence.

Results: PPCM accounted for 3.3% of all heart failure patients, 6.7% of heart failure in women and 1.3% of all hospitalisations in the cardiology department. The mean age was 31.3 ± 6.1 years, with 67.6% aged over 30, and 70% of patients had a low socioeconomic status. Multiparous women were the most common (35.3%). Symptoms appeared in the postpartum period in 93.8% of cases. Functional signs were dominated by dyspnoea at NYHA stage IV (100%) and oedema of the lower limbs (78%). On electrocardiogram, left ventricular hypertrophy was found in 58.5% of cases. All patients had left ventricular dilatation and the mean left ventricular ejection fraction was $29.5 \pm 7.8\%$. Treatment was for systolic heart failure in all cases and 12.3% had received bromocriptine. The main complication was pulmonary embolism (24.6%). The rate of intra-hospital death was 3.1%.

Conclusion: PPCM was relatively common; the patient profile was multiparous, in her thirties, with a low socioeconomic level. Thromboembolic complications were frequent, with a significant rate of death.

Keywords

Peripartum cardiomyopathy, Epidemiology, Diagnosis, Treatment, Togo.

Introduction

The Peripartum Cardiomyopathy (PPCM) Task Force of the Heart Failure Association (HFA) and the European Society of Cardiology (ESC) has defined PPCM as idiopathic cardiomyopathy occurring late in pregnancy or within months after delivery, abortion or miscarriage, with no other causes of heart failure, and with a left ventricular ejection fraction (LVEF) $< 45\%$. It is a potentially fatal cardiomyopathy characterised by acute or slowly progressive left

ventricular (LV) dysfunction in late pregnancy, during delivery or in the first few months postpartum in women with no previous known heart disease [1,2]. Its overall incidence is estimated at 1/3000 to 1/4000 births, with considerable geographical variation [3].

In the United States of America, its incidence is estimated at one in 2000 [4]. It appears to be particularly more common in tropical regions, with a predilection for black women [5,6].

African and African-American women are at higher risk of developing PPCM, with an estimated incidence of 1/100 pregnancies in Nigeria and 1/299 in Haiti [7,8].

Ten years ago, a study conducted in a hospital in Lomé reported that PPCM accounted for 12.65% of heart failure cases over a two-year period [9]. The increasing frequency observed in our facility motivated the present study, which aimed to describe the epidemiological, diagnostic and therapeutic aspects of PPCM at the Lomé University Hospital Center (CHU Campus).

Materials and Methods

Type, period and setting of the study

This was a descriptive cross-sectional study with retrospective data collection, which was led from January 2012 to December 2021 in the cardiology department of the Campus University Hospital in Lomé.

Study population

This was an exhaustive sample of the records of patients hospitalised in the cardiology department during the study period.

Inclusion criteria

The files of patients meeting the following criteria were included: heart failure syndrome developing in the last month of pregnancy until the fifth month after delivery, no obvious aetiology or history of heart disease and LVEF < 45% or shortening fraction < 30% associated with the left ventricular end-diastolic diameter (LVEDD) > 27 mm/m² on transthoracic Doppler echocardiography.

Exclusion criteria

Incomplete or poorly completed forms were excluded from this study.

Data collection

Data were collected on a survey form used to gather: sociodemographic parameters (age, occupation and socioeconomic status); gynaecological and obstetric data (parity, gestation, abortion, twins, caesarean section, gestational hypertension and pre-eclampsia); clinical parameters (functional signs, and physical signs); paraclinical parameters (chest X-ray, electrocardiogram [ECG] and cardiac Doppler ultrasound); therapeutic data and in-hospital outcome (length of hospitalisation, complications, hospital mortality).

Operational definitions

- Socioeconomic status was arbitrarily estimated based on three parameters such as diet, physical labour during pregnancy and level of education, and was classified according to the following scale: high socioeconomic status if the patient had regular access to a rich and varied diet, was exempt from intense physical labour during pregnancy and had a secondary or higher level of education; medium socioeconomic status if the patient regularly had sufficient food, was not exempt from intense physical labour during pregnancy, and had a primary school education or no schooling; and low socioeconomic status if the patient did not regularly have sufficient food, was subject to intense physical labour during pregnancy, and had no schooling.
- Postpartum: defined as the period from delivery to the return of

menstruation, lasting 6 to 8 weeks in the absence of hormonal contraception.

- Gestational hypertension: is an increase in blood pressure that appears after the 20th week of pregnancy and often disappears 6 weeks after delivery.
- Pre-eclampsia is gestational hypertension with significant proteinuria (> 0.3 g/24h).

Data analysis

Categorical variables are expressed as numbers and percentages, and continuous variables as means and deviations. Data were analysed using EPI INFO software version 7.2.1.0.

Results

Sociodemographic characteristics

1,994 patients hospitalised for heart failure, 974 were women. Among them, 68 were suspected of having PPCM, of whom 65 were confirmed and included in this study (Figure 1). Thus, PPCM accounted for 3.3% (65/1,994) of heart failure cases, 6.7% (65/974) of heart failure cases in women, and 1.3% (65/5,118) of all hospitalisations in the cardiology department.

Mean age was 31.3 ± 6.1 years and the modal age group was 30 to 35 years, accounting for 38.5% of cases. A total of 67.6% of patients were over 30 years of age. Shopkeepers and retailers accounted for 29.2% of cases, followed by housewives in 16.9% of cases. Most of patients had a low socioeconomic status (70.8%) (Table 1).

Gynaecological and obstetric characteristics

Gestational hypertension was present in 33.8% of cases and pre-eclampsia in 21.5% of cases. Multiparous women (≥ 4 deliveries) accounted for 35.4% of cases and 21.5% of patients gave birth by caesarean section (Table 2).

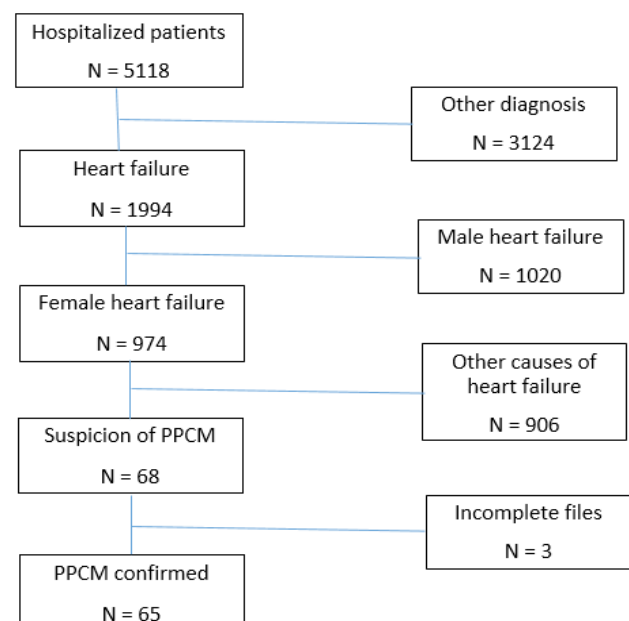


Figure 1: Patient inclusion diagram

Clinical characteristics

Symptoms appeared in the post-partum period in 93.8% of cases (61 patients) and in the last month of pregnancy in 6.2% of cases (4 patients).

Table 3 shows the distribution of clinical signs: NYHA stage IV dyspnoea (100%), bilateral lower limb oedema (78%) and cough (57%) were the main functional signs. Arterial hypertension was present on physical examination in 49.2% of cases.

Physical signs were dominated by signs of right heart failure with hepatomegaly in 72.3% of cases, spontaneous turgidity of the jugular veins in 64.6% of cases and hepatojugular reflux in 49.2% of cases. In the majority of cases, global cardiac insufficiency was found in 60 patients (92.3%) and isolated left heart failure in 5 (7.7%).

Table 1: Sociodemographic characteristics of the study population.

	Number	Percentage
– Age groups (years)		
[15 – 19]	2	3.1
[20 – 24]	7	10.8
[25 – 29]	12	18.4
[30 – 34]	25	38.5
[35 – 39]	13	20
[40 – 45]	6	9.2
– Occupation		
Shopkeepers and retailers	19	29.2
Liberal professions	13	20
Housewives	11	16.9
Civil servants	5	7.7
Manual workers	2	3.1
No information provided	15	23.1
– Socioeconomic status		
Low	46	70.8
Medium	19	29.2

Table 2: Distribution of patients according to gynaecological and obstetric history.

Personal history	Number	Percentage
– Gestation		
1	18	27.7
2 to 3	27	41.5
4 to 7	20	30.8
– Parity		
1	20	30.8
2 to 3	22	33.8
4 to 7	23	35.4
– History of miscarriage		
0	56	86.2
1	7	10.8
2	2	3
– Twins		
10	15.4	
– Gestational hypertension		
22	33.8	
– Pre-eclampsia		
14	21.5	
– Current caesarean section		
14	21.5	

Paraclinical signs

→ Radiographic abnormalities

All patients had cardiomegaly (100%), with stage 2 cardiac lung in 19 (29.2%) and stage 3 cardiac lung in 2 patients (3.1%).

→ Electrocardiographic abnormalities

Left ventricular hypertrophy was found in 38 patients (58.5%) and

29 patients (44.6%) had left atrial hypertrophy (Table 4).

Table 3: Distribution of patients according to clinical signs.

	Number	Percentage
– Functional signs		
Dyspnea NYHA stage	65	100
Lower limb oedema	51	78.5
Cough	37	57
Abdominal distension	28	43.1
Palpitations	24	36.9
Chest pain	9	13.8
Haemoptysis	4	6.2
– Blood pressure		
Normal	27	41.5
High	32	49.2
Low	6	9.3
– Physical signs		
Tachycardia	59	90.8
Hepatomegaly	47	72.3
Peripheral oedema	44	67.7
Spontaneous turgidity of jugular veins	42	64.6
Crepitating rales	41	63.1
Hepatojugular reflux	32	49.2
Mitral insufficiency murmur	30	46.2
Gallop noise	23	35.4
Ascites	20	30.8
Tricuspid insufficiency murmur	17	26.2
Pleural effusion	4	6.2
Harzer's sign	1	1.5
Facial paralysis	1	1.5

Table 4: Distribution of electrocardiographic abnormalities.

	Number	Percentage
Sinus tachycardia	48	73.8
Left ventricular hypertrophy	38	58.5
Left atrial hypertrophy	29	44.6
Subepicardial ischemia	24	36.9
Left anterior hemiblock	4	6.2
Ventricular extrasystole	3	4.6
Left axial deviation	3	4.6
Right atrial hypertrophy	2	3.1
Right ventricular hypertrophy	2	3.1
Right axial deviation	2	3.1
Atrial fibrillation	1	1.5
Right bundle branch block	1	1.5
Left bundle branch block	1	1.5
S1Q3T3 aspect	1	1.5

→ Echocardiographic abnormalities

The mean indexed left ventricular end-diastolic diameter (LVEDD) was 34.5 ± 2.5 mm with a mean LVEF of $29.5 \pm 7.8\%$. All patients had left ventricular dilatation and 35.4% had right ventricular dilatation. Intracavitary thrombus was noted in 11 patients (16.9%). Table 5 shows the distribution of echocardiographic abnormalities.

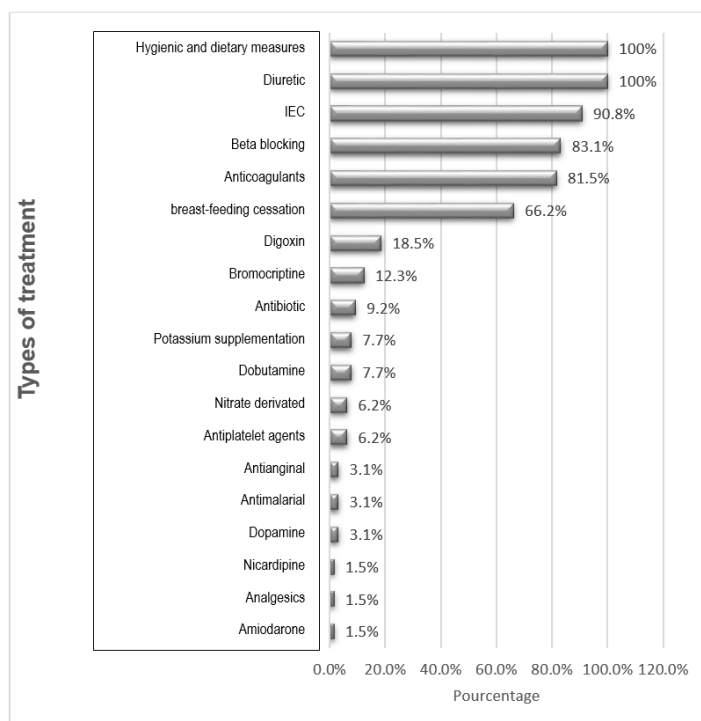
Table 5: Echocardiographic signs distribution.

	n (%) or m ± ET
Mean LV end-diastolic diameter (mm)	62.3 ± 5.6
Mean indexed LV end-diastolic diameter (mm/m ²)	34.5 ± 2.5
Left ventricular dilatation	65 (100)
Mean left ventricular ejection fraction (%)	29.5 ± 7.8
Mean indexed left atrial volume	34.1 ± 10.1
Left atrial dilatation	41 (63.1)
Mean right ventricular diameter (basal)	34.1 ± 14.6
Right ventricular dilatation	23 (35.4)
Dilatation of the right heart chambers	17 (26.2)
Dilatation of the 4 heart chambers	14 (21.5)
Functional mitral insufficiency	32 (49.2)
Mean SPAP (mm Hg)	57 ± 14
Pulmonary arterial hypertension	22 (33.8)
E/A > 2	28 (43.1)
E/Ea mean > 13	18 (27.7)
Intracavitary thrombus	11 (16.9)
Low cardiac output	5 (7.7)
Pericardial effusion	4 (6.2)
Spontaneous contrast	3 (4.6)

LV = left ventricle, LVEF = left ventricular ejection fraction; SPAP = systolic pulmonary artery pressure.

Therapeutic data

Management involved a combination of hygienic and dietary measures: a low-salt diet was observed in all patients, breast-feeding was stopped in 66.2% of patients and heart failure drugs were used; bromocriptine was prescribed in 12.3% of patients (Figure 2).

**Figure 2:** Distribution of patients according to therapeutic management.

In-hospital outcome

92.3% of cases had stabilised heart failure with clinical improvement with regression of symptoms. Pulmonary embolism was the most common complication (24.6%). Two deaths were recorded (Table 6).

Table 6: In-hospital outcome.

Complications	Number	Percentage
Pulmonary embolism	16	24.6
Cardiogenic shock	1	1.5
Bleeding complications	1	1.5
Ischaemic stroke	1	1.5
Death	2	3.1
Persistence of signs of HF at discharge	3	4.6
Favourable outcome	60	92.3

HF= Heart Failure.

Discussion

PPCM accounted for 3.3% of heart failure patients, and 6.7% of heart failure in women and 1.3% of all patients hospitalized in the cardiology department. These results are similar to those of Dembélé in Mali, who found that PPCM accounted for 3.36% of heart failure patients [10]. Higher frequencies were reported by Pio, et al. (12.65% of heart failures, 22.65% of heart failures in women) [9], Adjagba, et al. (2.2% of hospitalisations and 12.8% of heart failures in women) [11] and Coulibaly, et al. (6.11% of hospitalisations and 18.37% of heart failures) [12]. The different proportions found are related to differences between the study populations due to the disparity in affluence at the various hospitals influencing hospitalisations. Women who have a good socio-economic status and are well-educated tend to seek medical attention as soon as possible if they develop symptoms, and they visit public hospitals more rarely in our regions. Many of them consult private clinics.

Mean age in this study was 31.2 ± 6.1 years and the modal age group was 30-35 years, accounting for 38.5% of cases. Our results are similar to those of the EORP (EUR Observational Research Programme multicentre) study, which reported a mean age of 30.7 years [13]. The mean age varies from 28 to 31 in African studies [11,12,14].

A proportion of 67.6% of our patients were over 30 years of age, and this rate was 50% in Benin [11]. PPCM can occur at any age in women of childbearing age, as shown by the data available in the literature, but with an increased frequency after the age of 30. Maternal age over 30 is considered a frequent risk factor.

In this study, 70.8% of patients had low socio-economic status. This figure was 65% according to Dembélé in Mali [10]. Low socio-economic status is a constantly described risk factor, but the explanations remain patchy [15,16]. In fact, women in black Africa are subject to a hot, humid climate and malnutrition (vitamin and micronutrient deficiencies), which could constitute favourable conditions for the onset of CMPP.

Multiparous women accounted for 69.2% of cases. Pio, et al. and Adjagba, et al. also reported a predominance of multiparous women, with respectively 82.9% and 55.3% [9, 11]. There was a lower proportion of twin pregnancies (15.4%) in our sample. Adjagba, et al. reported a proportion of twin pregnancies of 23.1% [11].

Pregnancy-induced hypertension was present in 33.8% of patients in our study. This proportion was 21.1% in the series by Codjo et al. in Parakou [15] and 13.5% in the study by Sliwa, et al. [17].

In our study, 21.5% of patients presented with pre-eclampsia during pregnancy. A recent meta-analysis covering 979 cases of CMPP showed an overall prevalence of preeclampsia of 22% [17]. The EORP study reported preeclampsia in 25% of cases [18]. No clear geographical or racial differences were detected.

In general, the factors frequently described in the literature as predisposing to CMPP are multiparity and multiple pregnancies, family history of dilated cardiomyopathy with identification of certain genes, ethnic origin, smoking, diabetes, hypertension, pre-eclampsia, malnutrition, maternal age (older mothers being at greater risk) and prolonged use of beta-tocolytic agonists [2].

Symptoms appeared in the postpartum period in 93.8% of cases, which is comparable to data from other African studies, which vary between 87% and 91% [9-11,19]. Similarly, the EORP study found that symptoms appeared in the postpartum period in 67% of patients [18].

The mode of decompensation is often that of global heart failure, which was found in 92.3% of cases in our study. Several African studies reported a high frequency of global heart failure, with rates varying between 72% and 85% [10,15].

Functional signs were dominated by dyspnoea at NYHA stage IV (100%), which is comparable to the results of some studies [12,20]. The high frequency of patients admitted with rest dyspnoea could be explained by the rapid onset of symptoms in the PPCM, partly associated with a delay in consultation related to difficulties in accessing care and the low socioeconomic level.

Electrical signs were dominated by sinus tachycardia in 73.8% of cases and left ventricular hypertrophy (LVH) in 58.5%. LVH was reported in 52.5% of cases by Dembélé [10] and in 67.1% of cases by Coulibaly, et al. [12]. However, Mongo Ngamami, et al. found LVH in only 14.3% of cases [19]. In the case of a recent delivery complaining of dyspnoea, the discovery of cardiomegaly associated with sinus tachycardia and LVH should raise the suspicion of CMPP and lead to the performance of a cardiac doppler ultrasounds.

All our patients had left ventricular dilatation with a mean LV end-diastolic diameter (LVEDD) of 62.3 ± 5.6 mm and a mean indexed LVEDD of 34.5 ± 2.5 mm/m². In the series by Adjagba

et al., the mean indexed LVEDD was 35.2 ± 3.5 mm/m² with 75% of patients presenting with left ventricular dilatation. In the series by Yaméogo et al., the mean LVEDD was 59.72 ± 6.98 mm [21].

The mean LVEF was $29.5 \pm 7.8\%$ in our study. In the literature, the mean LVEF is constantly impaired with values of $25.7 \pm 8.4\%$ in the series by Adjagba et al. in Benin, $36.44 \pm 7.96\%$ in a South African study [22], and $32.43 \pm 8.53\%$ according to a study in the United States of America [23].

Intracavitary thrombus was found in 11 patients (16.9%) with 4.6% of patients presenting spontaneous contrast. Adjagba et al. found intracavitary thrombus in 26.3% of cases [11] and Yameogo et al. found intracavitary thrombus in 7.40% of cases and spontaneous contrast in 13.88% of cases [21].

The treatment of CMPP is that of a classic systolic heart failure, with special features such as the need for systematic curative anticoagulation in view of the risk of thromboembolism and the administration of bromocriptine. A total of 81.5% of patients received low molecular weight heparin followed by a VKA, and bromocriptine was used in 12.3% of cases; 90.8% of patients were placed on an ACE inhibitor. This result is comparable to that of Yaméogo et al. in Burkina Faso, who reported that 100% of patients were put on an ACE inhibitor [21]. Digoxin was used in 18.5% of our cases. In the series by Yaméogo et al., it was used in 6.69% of cases [21].

The use of bromocriptine is rarely reported in African studies because it is an experimental molecule whose use has recently been formally recommended by learned societies.

In our study, hospital outcomes were favourable, with improvement and regression of symptoms in 92.3% of cases. Pulmonary embolism was the most common complication in 24.6% of cases, and 1.5% of patients had an ischaemic stroke.

Hospital outcome was favourable in 78.04% of cases according to Pio et al. and in 95.71% of cases according to Dembélé [10]. In the series by Coulibaly et al, the outcome was favourable in 95.71% of cases, with complications marked by ischaemic stroke (1.43%), pulmonary embolism (1.43%) and a rhythm disorder (1.43%) [13]. Mongo Ngamami et al. reported more thromboembolic complications, with 11.9% pulmonary embolism and 2.4% ischaemic stroke [19].

In the present study, 3.1% of deaths were recorded in patients with heart failure refractory to medical treatment. The death rate varies between 4.88% and 7.5% in African studies [9,10,13]. CMPP is a fatal condition whose prognosis depends on LVEF and the speed and quality of management. Late diagnosis has been shown to have an impact on morbidity and mortality [24-26]. CMPP is a form of heart failure with the potential for complete restoration of LVEF. For example, the IPAC (Investigations of Pregnancy Associated Cardiomyopathy) study showed that the probability of

having a final LVEF greater than 50% was 91% if the initial LVEF was greater than 30% and DTDVG < 60 mm; this probability fell to 62% if one of the two criteria was missing and the probability returned to 0% if both criteria were absent [27]. Our patients were initially in a severe condition, which could reduce the possibility of complete remission with full restoration of LVEF. A prospective study of the outcome of these patients after discharge from hospital is required at a later date.

Limitation

As the PPCM is a diagnosis of elimination, it remains difficult to confirm a positive diagnosis given the limited technical resources and the lack of financial means available to patients, which is an obstacle to the performance of all useful tests. For example, cardiac MRI and coronary angiography are not routinely performed to formally rule out myocarditis or ischaemic heart disease. Routine viral serology tests are not available in our hospitals, and are not routinely performed on all patients admitted to hospital with suspected CMPP. Certain tests required for the aetiological diagnosis of CMPP, such as plasma selenium measurement and in vitro measurement of sFlt-1 and VEGF, are not available in our region.

Conclusion

The incidence of CMPP in our department was relatively high. The patient profile was that of a multiparous woman of low socioeconomic status, with an average age of 31, admitted in the postpartum period with global heart failure, a dilated left ventricle and a collapsed LVEF. The technical facilities need to be improved, and certain etiological tests need to be made available so that differential diagnoses such as myocarditis and ischaemic heart disease can be formally ruled out in certain situations, using cardiac MRI and coronary angiography. In the near future, studies could be carried out on the long-term evolution of patients with CMPP undergoing treatment, by reassessing their clinical condition and LVEF.

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