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Complications of Peripartum Cardiomyopathy at the Departmental University Hospital Teaching of Borgou (Benin) in 2022: About 3 Cases

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Abstract

Introduction: Peripartum cardiomyopathy (PPCM) is a dilated cardiomyopathy occurring in the last month of pregnancy or the first five months postpartum without pre-existing cardiovascular pathology. It is a major cause of pregnancy-related heart failure with high morbidity and mortality. In severe forms (10% to 15% of cases), thrombo-embolic complications are the main cause. The initial hemodynamic evolution is totally unpredictable and sometimes extremely brutal and fatal. The objective of this work was to show the often pejorative evolution of PPCM in our country. **Methods:** We report in this work three serious clinical cases revealing the complications of this PPCM among patients admitted to the cardiology department of the CHUD-B/A in 2022 for heart failure. The data were collected according to the Declaration of Helsinki. **Patients and Observations:** The first case was a PPCM with severe left ventricular (LV) systolic dysfunction complicated by spontaneous left intraventricular contrast and right superficial sylvian ischemic stroke. The

second case reports a global cardiac decompensation of a PPCM with severe LV systolic dysfunction complicated by an apical thrombus. The third case is that of a state of cardiogenic shock complicating a PPCM with severe LV systolic dysfunction. Among our 03 patients presenting these severe forms of PPCM, the evolution, in spite of the symptomatic and prognostic treatments of the heart failure, and even of the complications, was unfavourable with death in two of them. **Conclusion**: Complications of PPCM are frequent and fatal in Benin.

Keywords

Cardiomyopathy, Peripartum, Complications, Parakou, Benin

1. Introduction

Peripartum cardiomyopathy (PPCM) is defined as dilated cardiomyopathy occurring in the last month of pregnancy or in the first five months postpartum [1] [2]. It is recognized as a major cause of pregnancy-related heart failure with high morbidity and mortality [3]. Indeed, it represents 2.04% of cardiology admissions in Parakou in 2019 [4]. In Cotonou, this frequency was 2.40% in 2016 [5]. These high frequencies of PPCM in Benin are close to that reported by Ngamami in Brazzaville in 2014 (2.7%) [6] and confirm that the risk of PPCM is higher in women of African origin [7]. PPCM is a serious condition with high mortality. In Parakou in 2019, the case fatality at 6 months was 9.5% [4] compared to 11.5% in Zimbabwe in 2017 [8]. In 2014, in a series by Pio *et al.*, mortality was 8.3% [9]. These deaths were most often related to sudden death or the occurrence of complications. These were most often arrhythmias, thromboembolic complications and new decompensations responsible for numerous rehospitalizations. In severe forms (10% - 15% of cases), these complications are revealing of the disease [4] [5]. We report in this article three (03) clinical cases which show the severity of complications of PPCM in our setting.

2. Methods

These were patients hospitalized for heart failure in a peripartum setting in the cardiology department at the Departmental University Hospital teaching of Borgou (Benin) in the months of May and June 2022. The presentation of these cases was made in accordance with the principles set out in the Helsinki Declaration of 1975 [10]. Thus, the dignity of the patients, the anonymity and the confidentiality of the data were respected. The authorization of the head of the cardiology department and of the hospital management was obtained for the publication of these three clinical cases.

Patients and observations

Clinical case N˚ 1 (Figures 1-3):

This was a 26 year old female patient, gender 2, parity 2 (G2P2) and 5 months old infant, with no known cardiovascular history, referred from the neurology

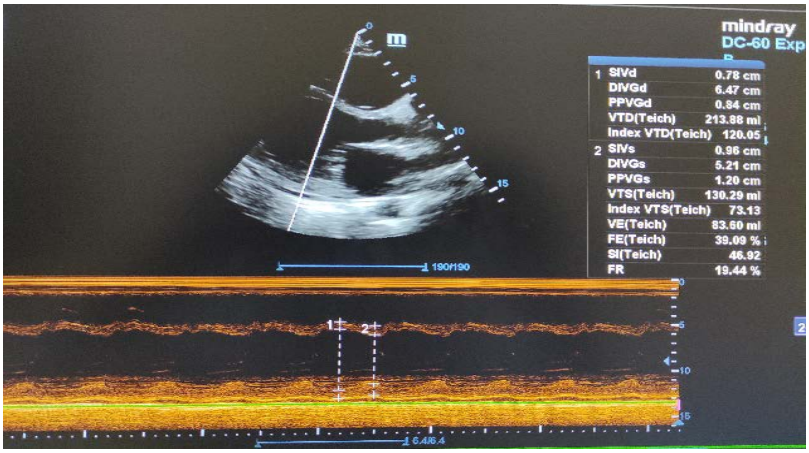

Figure 1. Transthoracic echocardiography in the parasternal long axis window using the TM mode showing dilatation and global hypokinesia of the left ventricle in a patient with peripartum cardiomyopathy in Parakou in 2022.

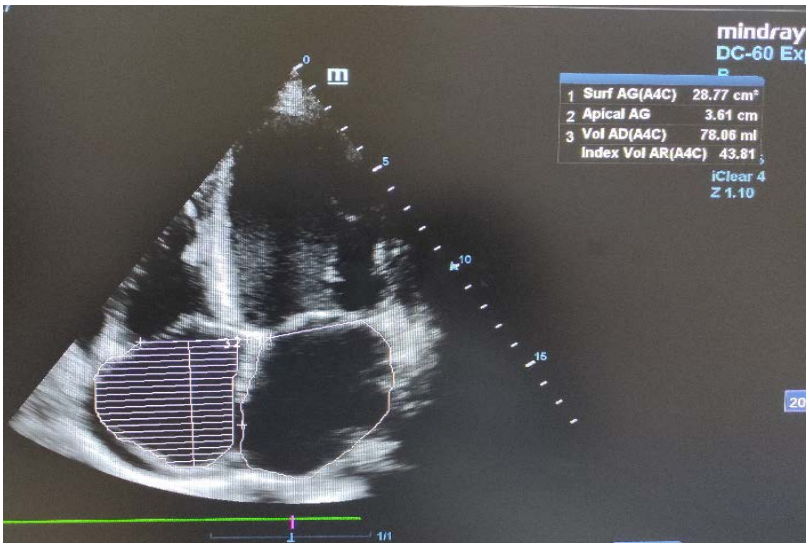

Figure 2. Transthoracic echocardiography in apical 4-cavity window showing bi-atrial dilatation in a patient with peripartum cardiomyopathy in Parakou in 2022.

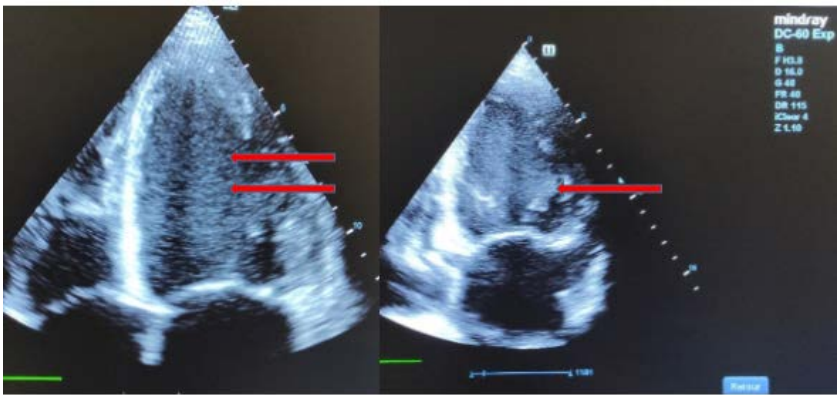

Figure 3. Transthoracic echocardiography in apical 4-cavity and 2-cavity window showing spontaneous intraventricular contrast (red arrows) in a patient with peripartum cardiomyopathy in Parakou in 2022.

department on May 24, 2022 for a stroke assessment. The history revealed a four-week-old onset of exertional dyspnea episodes, stage 3 according to the New York Heart Association (NYHA) classification. One week later, a neurological deficit of sudden onset with right hemiparesis, without loss of consciousness, was associated. The brain scan performed three weeks later concluded to a left superficial sylvian stroke. She was therefore referred to a cardiology consultation for an etiological assessment of the stroke.

The physical examination revealed a stable hemodynamic state with blood pressure (BP) = 109/74mmHg in the right arm and 109/73mmHg in the left arm, heart rate = 110 bpm; saturation 96% in room air, temperature 36˚C, a left heart failure syndrome (dyspnea at the slightest effort, crackles at the base of both lung fields), a right heart failure syndrome (discrete edema of the pelvic limbs, hepatica with hepato-jugular reflux) and a mitral insufficiency murmur of intensity 2/6. The neurological examination noted a proportional right hemiparesis with a segmental muscle strength of 4/5, hypoesthesia of the right hemisphere.

The electrocardiogram showed a regular sinus tachycardia at 110 bpm, a delay in septal activation, asymmetric negative T-wave repolarization abnormalities in the apical-lateral region.

Cardiac echocardiography showed a dilated left ventricle (DTDVG = 64 mm), hypokinetic with severe systolic dysfunction of the left ventricle (LVEF 23% on Simpson biplane). There was spontaneous left ventricular contrast; high left ventricular filling pressures (E/Ea = 15.76; dilated left atrial area = 28 cm^2), moderate mitral insufficiency due to annular dilatation. The right ventricle is normal. No significant valvular anomaly. The inferior vena cava was dilated to 22 mm uncomplicated. The pericardium was free and the leaflets were normal.

The results of the biology are noted in Table 1 below.

Given the absence of heart disease before pregnancy and the occurrence of symptoms after delivery, the diagnosis of moderate global cardiac decompensation of peripartum cardiomyopathy with severe LV dysfunction complicated by spontaneous left intraventricular contrast and left superficial sylvian ischemic stroke was made. She was put on diuretic treatment (Furosemide injection 40 mg every 6 hours then relay by lasilix tablets 40 mg), bromocriptine 2.5 mg (1/2 tablet D1; 1 tablet D2 then 1 cp x^2/day from D3); angiotensin-converting enzyme inhibitor (ramipril tablet 5 mg/day); anticoagulation (enoxaparin injection in curative dose); antiplatelet agent (aspirin 75 mg/day), statin (atorvastatin 40 mg/day) and physical therapy. The combination of anticoagulation and antiplatelet agent was introduced after the neurological consultation. This patient

Table 1. Results of the biological examinations of clinical case N˚1.

Bio Chemistry	Blood count
uremia = 0.31 g/L	Hemoglobin = 14 g/dl
Creatinine = 7.14 mg/L	White blood cell count = 8 G/L
Natremia = 135 meq/L; Kalemia = 4.45 meq/L Chloremia = 102.4 meq/L	Platelet count = 279 G/L

was seen in consultation after her exeat and the examination noted a regression of the signs of cardiac failure with a weight loss of five kg and an improvement of the motor deficit; the muscular force having passed from 4/5 to 5/5.

Clinical case N° 2 (Figures 4-6):

Aged 26 years, primigravida and without known cardiovascular history, this patient consulted on June 02, 2022 for a dyspnea stage 4 according to the NYHA classification associated with a cough with mucous sputum and a bilateral edema of the lower limbs. This dyspnea had been evolving for one (01) month following a caesarean section for severe pre-eclampsia. The patient consulted a center for care without any real improvement of symptoms and was then referred to cardiology for better management.

The physical examination at admission revealed blood pressure (BP) = 122/78 mmHg in the right arm and 118/71 mmHg in the left arm, heart rate = 91 bpm;

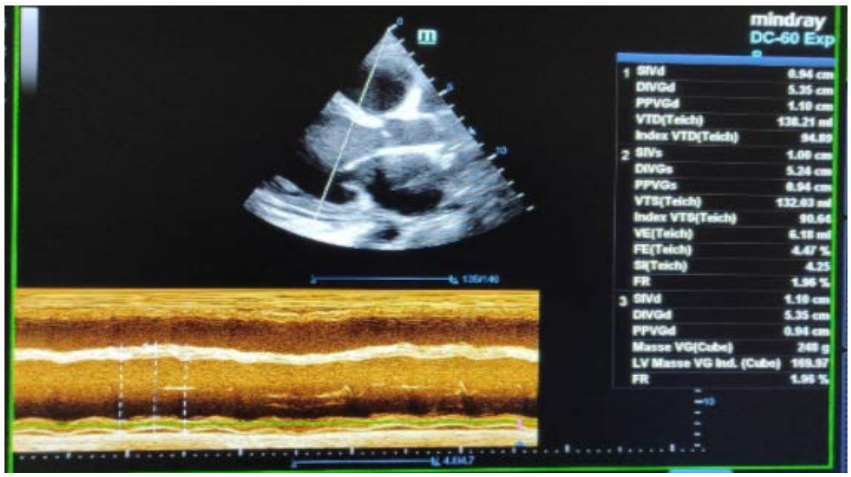

Figure 4. Transthoracic echocardiography in the parasternal long axis window using the TM mode showing dilatation and global hypokinesia of the left ventricle in a patient with peripartumcardiomyopathy in Parakou in 2022.

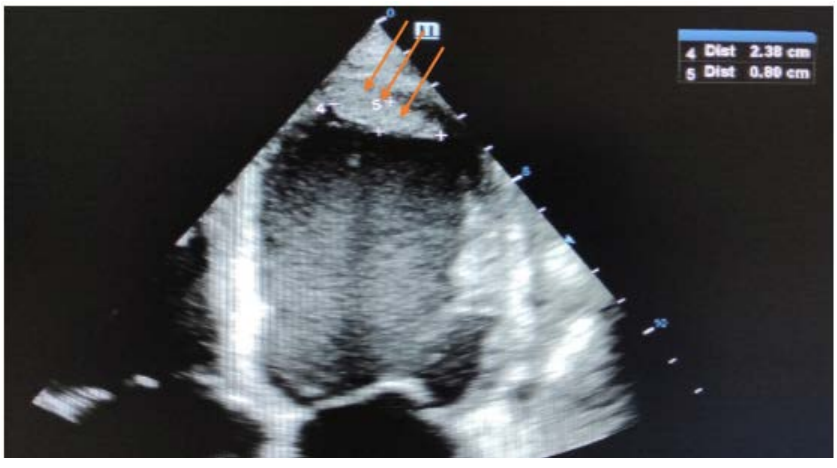

Figure 5. Transthoracic echocardiography in apical window 4 cavities showing an apical intraventricular left thrombus (red arrows) of 23.8mm X 8mm in a patient with peripartum cardiomyopathy in Parakou in 2022.

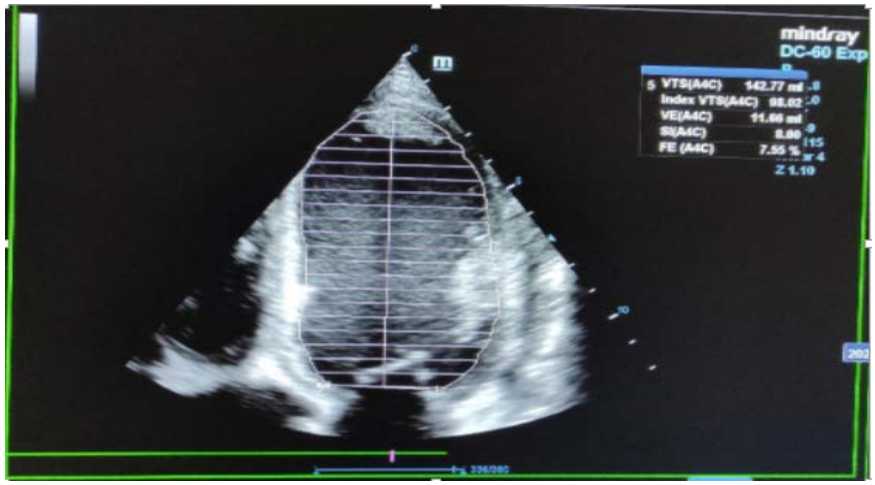

Figure 6. Transthoracic echocardiography in apical 4-cavity window showing LVEF assessment in a patient with peripartum cardiomyopathy in Parakou in 2022.

Table 2. Results of the biological examinations of clinical case N˚2.

Bio Chemistry	Blood count
uremia = 1.32 g/L	Hemoglobin = 10.8 g/dl
creatinine = 16.76 mg/L	White blood cell count = 10.9 G/L,
Natremia = 127 meq/L, Kalemia = 3.63 meq/L, Chloremia = 94.5 meq/L	Platelet count = 182 G/L

saturation 99% on room air, temperature 36.7˚C, right heart failure syndrome (pelvic limb edema, hepatorrhea with hepato-jugular reflux) and left heart failure syndrome (resting dyspnea, crackles at the base of both lung fields). The rest of the physical examination was normal.

The electrocardiogram recorded a regular sinus tachycardia at 110 bpm, anteroseptal R-wave planing and asymmetric negative T-waves in the low inferolateral. A chest X-ray could not be performed due to lack of funds.

Table 2 summarizes the biological results of the patient with moderate anemia, functional renal failure and hyperleukocytosis.

Cardiac echocardiography revealed hypokinetic dilated heart disease with severe bi-ventricular systolic dysfunction (LVEF = 10%, subaortic LTI = 6.4 cm with cardiac output lowered to 1.8 L/min, TAPSE = 6.6 mm, S't = 6.7 cm/s). Presence of an apical thrombus of 23.8 mm × 8 mm. Left ventricular filling pressures were high (E/Ea = 15.51; dilated left atrial area = 24 cm^2). There was moderate central mitral insufficiency and no aortic valve disease. PAPS was estimated at 30 mmHg on moderate IT flow, Vmax IT = 2.4 m/s. The inferior vena cava was 20 mm uncomplicated. There was a systolic pericardial detachment over both ventricles.

Given the absence of heart disease before pregnancy and the occurrence of symptoms after delivery, a PPCM was diagnosed. It was a global cardiac decompensation of a PPCM with severe bi-ventricular systolic dysfunction complicated by low cardiac output and an apical thrombus. She benefited from hydrosodic depletion

with injectable furosemide 40 mg/hour, injectable dopamine 3 microgram/kg/min, curative anticoagulation with enoxaparin and potassium supplementation (Diffu K one capsule x^3/day). The initial evolution was marked by a poor diuretic response with persistent congestive signs in a context of hyponatremia at 121 meq/l which required correction. In a second time, the patient presented an alteration of consciousness and then a cardio-respiratory arrest which was not recovered.

Clinical case N° 3 (Figures 7-9):

This was a 32 year old female patient, G3P3, with no known cardiovascular history admitted for dyspnea. The onset of symptoms was three (03) months after a vaginal delivery, with NYHA stage 2 exertional dyspnea associated with bilateral edema of the lower limbs and pain in the right hypochondrium. This symptomatology persisted in spite of various treatments received in different health structures. Due to the worsening of the dyspnea and the onset of an anasarca state, she was hospitalized in our department.

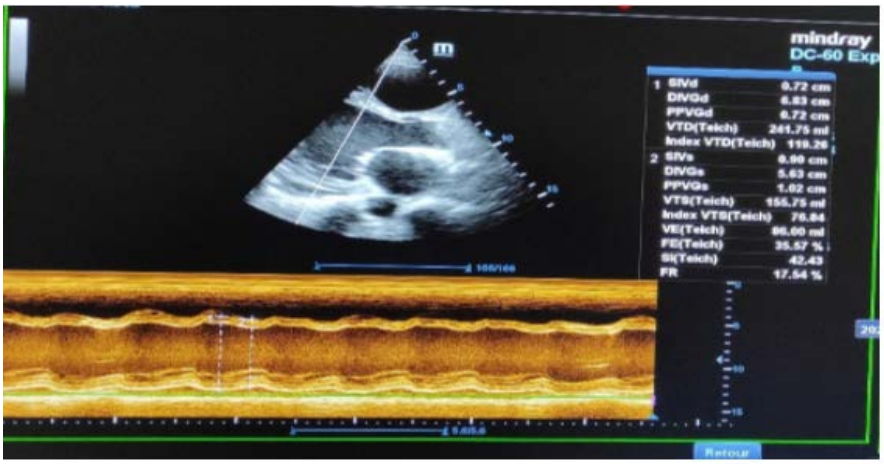

Figure 7. Transthoracic echocardiography in the parasternal long axis window using the TM mode showing dilatation and global hypokinesia of the left ventricle in a patient with peripartum cardiomyopathy in Parakou in 2022.

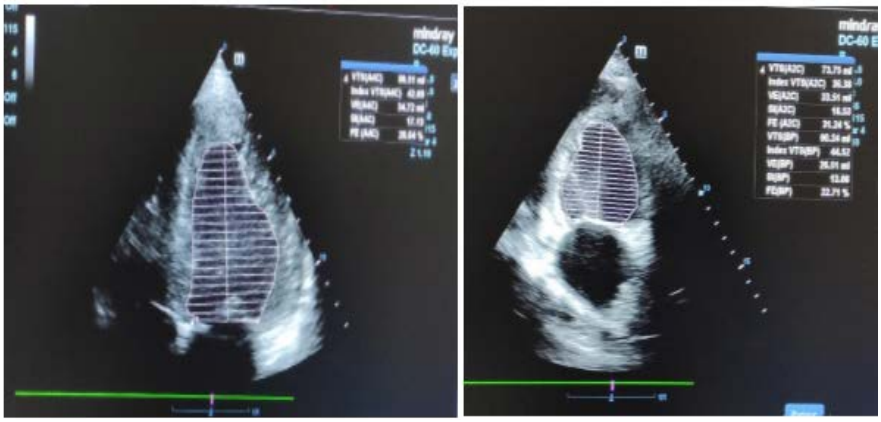

Figure 8. Transthoracic echocardiography in apical 4-cavity and 2-cavity window showing LVEF evaluation in a patient with peripartum cardiomyopathy in Parakou in 2022.

The physical examination revealed on admission: a poor general condition, palpebral mucous membranes with little color, arterial hypotension (BP = 84/56mmHg in the right arm and 90/60mmHg in the left arm), tachycardia at 125 bpm; a saturation of 88% in room air, temperature of 36˚C, polypnea at 38 cycles/min, a right heart failure syndrome (anasarca state, hepatorrhea with hepato-jugular reflux) and a left heart failure syndrome (dyspnea at rest, crepitating rales in half of the two pulmonary fields), signs of peripheral hypoperfusion (cold extremities, oliguria)

The electrocardiogram showed a sinus tachycardia made irregular by isolated ventricular extrasystoles with a mean heart rate of 125 bpm, a diffuse microvoltage and diffuse disorders of repolarization.

Anemia at 9 g/L and renal failure were noted in the biology results recorded in Table 3 below.

Cardiac echocardiography showed dilated, hypokinetic heart disease with severe left ventricular systolic dysfunction, LVEF 22% in simpson biplane, cardiac output 4 L/min under dobutamine infusion. Left ventricular filling pressures were high (restrictive mitral profile E/A = 2.66, left atrium dilated to 26 cm^2). There was moderate mitral insufficiency due to ring dilatation. The right ventricle was normal. The inferior vena cava was dilated to 24 mm with little complication. In addition, there was a small to moderate pericardial effusion in the right cavities (16 mm in the right atrium and 8 mm in the right ventricle), without

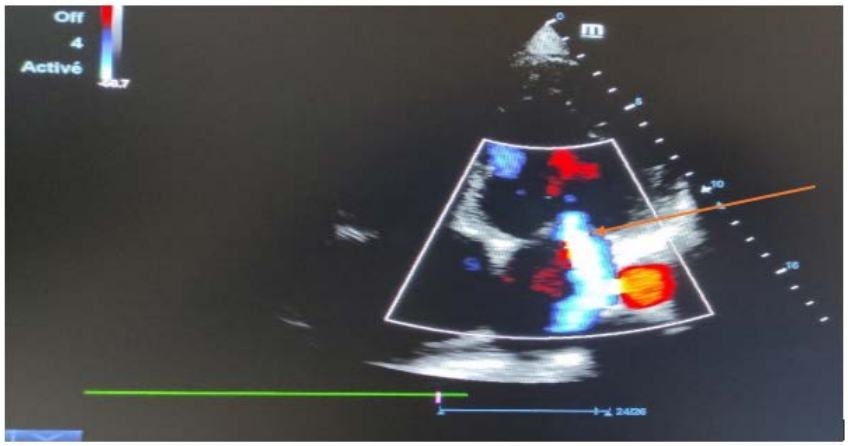

Figure 9. Echocardiographie transthoracique en fenêtre apicale 4 cavités montrant un flux d'insuffisance mitrale au doppler couleur chez une patiente porteuse de cardiomyopathie du péripartum à Parakou en 2022.

Table 3. Results of biological examinations of clinical case N˚3.

Bio Chemistry	Blood count
uremia = 0.57 g/L	Hemoglobin = Hb = 9 g/dl
creatininemia = 17.49 mg/L,	White blood cell count = 8.23 G/L,
Natremia = 140 meq/L, Kalemia = 4.44 meq/L, Chloremia = 0.8 meq/L,	Platelet count = 80 G/L

hemodynamic consequences.

The diagnosis of cardiogenic shock complicating a peripartum dilated cardiomyopathy with severe left ventricular dysfunction was made. She was put on dobutamine 5 gamma/kilogram/min; furosemide 250 mg/24h then increased to 500 mg/24h at PES in front of the bad diuretic response, hydrochlorothyazide, preventive anticoagulation, potassium supplementation, blood transfusion.

The initial evolution was marked by a normalization of the blood pressure under amines, a regression of the signs of peripheral hypoperfusion, and an unsatisfactory diuretic response. In the aftermath, the patient presented an unrecovered cardiorespiratory arrest.

3. Discussion

The prognosis of PPCM is essentially related to three factors: the severity of the initial hemodynamic failure and its response to therapeutic measures, thromboembolic complications, and recovery of LVEF away from the acute episode [11].

The mortality rate in the acute phase due to refractory shock, embolic complications, or complications related to resuscitation measures is not well known, but the figure of 10% to 15% is generally accepted [12]. However, this figure is based on relatively old publications, and it is likely that the use of modern therapies for heart failure and the possibility of transient circulatory assistance in the most severe forms have contributed in Western countries to improve the prognosis of the acute phase.

Thrombo-embolic complications:

Embolic complications are known to be frequent and remain the most feared, due to their particularly dramatic consequences in case of neurological accident in these young patients [13]. They are related to the hypercoagulable state of pregnancy, cardiac dilatation, alteration of the LVEF, bed rest and sometimes caesarean section. These include stroke, coronary embolism, renal or mesenteric infarction [12] [13].

In the first clinical case of this work, PPCM was complicated by spontaneous left intraventricular contrast and right superficial sylvian ischemic stroke.

The second patient presented with global cardiac decompensation of a PPCM with severe LV systolic dysfunction complicated by an apical thrombus. The US registry of patients hospitalized for PPCM found that thromboembolic events were the most common serious complication at 6.6% [14]. Numerous cases of intraventricular thrombus have been reported [14] [15] [16]. In Cotonou, Adjabga *et al.* in 2016 found 3 cases (7.9%) of thrombo-embolic complications (01 pulmonary embolism) and 2 cases of ischemic stroke on left intraventricular thrombus) [5].

In Mali in 2021, Touré *et al.* published a clinical case reporting an association of PPCM, acute coronary syndrome and stroke [17]. A study conducted in Senegal in 2010 found the presence of left intraventricular thrombus in 30% of pa-

tients [18]. This rate is much higher than that found in another study carried out in Mali in 2021 where the proportion of left intraventricular thrombus was 8.54% in patients hospitalized for heart failure [19]. Naibe *et al.* found three cases of ischemic stroke and two cases of pulmonary embolism in a series of 2214 patients in Chad in 2018 [20]. Ramorasata *et al.* in Madagascar described in their series a case of intracardiac thrombus with acute ischemia and thrombophlebitis of the lower limbs whose evolution resulted in the death of the patient in a picture of acute respiratory distress, evocative of pulmonary embolism [21]. In Congo in 2014, Mongo-ngamami *et al.* noted the occurrence of a pulmonary embolism in 5 cases (11.9%) and an ischemic stroke in 1 case [6]. Kane *et al.* [22] and Ford *et al.* [23] reported 12% and 10% of stroke cases respectively.

It should be remembered that in this work, the patients consulted late after the onset of symptoms with an unfavorable evolution. Hence the need for an early consultation for an early diagnosis leading to an adapted treatment. The management of thrombo-embolic complications requires the initiation of curative anticoagulant treatment, which was effective in our patients.

Hemodynamic complications:

Regarding hemodynamic complications, the evolution of the disease is totally unpredictable, it can be in 24 - 48 h towards a state of refractory cardiogenic shock requiring extracorporeal circulatory assistance while waiting for functional recovery or heart transplantation [24] [25]. The long-term evolution of PPCM is unpredictable: a restitution ad integrum of the cardiac function is observed in half of the cases, in a third of the cases we note a stabilization of the lesions, only a small number will progressively evolve towards refractory cardiac failure indicating a cardiac transplantation. According to Codjo *et al.* [4], the evolution during hospitalization was favorable in 86.48% of cases. In post-hospitalization, 78.26% of patients had regression of congestive signs. This rate is significantly higher than the proportion found by Adjagba *et al.* in 2017 [5]. This difference was explained by the absence of ultrasound confirmation of recovery during follow-up, as a patient may show no congestive signs despite impaired systolic function. Failure to recover full cardiac function within 6 months postpartum is indicative of progression to chronic cardiomyopathy [1] [26]. The risk of recurrence in a subsequent pregnancy is variable according to the studies and can vary from 25% to 100%.

The third clinical case reported cardiogenic shock occurring on a PPCM. Jihad *et al.* in 2018 reported a case of acute pulmonary oedema (APO) on PPCM [27]. In their study the evolution was favorable after non-invasive ventilation(NIV) and loop diuretic therapy. Adjabga *et al.* found four (4) cases (10.5%) of cardiogenic shock [5].

Acute pulmonary oedema (APO) and cardiogenic shock were cited as haemodynamic complications in 5.7% and 3.4% respectively in the study by Bamba-kamagaté *et al.* in Abidjan [28]. Pio M *et al.* in Lomé reported four deaths in a study conducted on 48 patients with PPCM. In fact, these authors noted three

cases of sudden death at home and one case of refractory heart failure during hospitalization [9]. Naibe *et al.* recorded four (20) deaths by cardiogenic shock in a series of 2214 patients [8]. In 2019, Codjo *et al.* reported five deaths out of 74 patients at 6 months of follow-up for PPCM; an overall mortality of 6.76% [4]. The NIV used in the study by Jihad *et al.* is not available in the majority of the Departmental Hospitals in Benin, in particular in the CHUD Borgou. Also, the delay in consultation and diagnosis found in all our patients constitutes an element of poor prognosis in the sense that it favors the evolution towards severe forms with a poor prognosis.

Rhythmic complications:

The rhythmic complications of PPCM are identical to those found in other dilated heart diseases. These include supraventricular and ventricular rhythm disorders. Naibe *et al.* reported a case of death due to ventricular tachycardia in Chad [20]. Bamba-kamagaté *et al.* found in Abidjan 6.8% of rhythm disorders in 88 patients during a follow-up of 8 years [28]. In the present work, we did not find this type of complication in our patients.

We conclude from this work that the delay in diagnosis and adequate management, the severity of the clinical pictures at the time of diagnosis, and the inadequacy of the therapeutic platform in our context could explain these often pejorative evolutions. Hence, there is the need to sufficiently equip our hospitals and to educate the population to consult early in order to avoid the evolution towards complications.

4. Conclusion

PPCM remains an intriguing pathological entity often posing a significant challenge to the clinician. Complicated forms such as arterial thromboembolic accident and cardiogenic shock as was the case in our observations are grafted with a gloomy prognosis imposing on the carer an early and adapted therapeutic attitude.

Additional Explanation

This article has no conflict of interest in its writing. All data were collected from our own funds. We did not receive any grants or funding for this study.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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