Peripartum Cardiomyopathy: Management of 47 Black Women in a General Cardiology Department of Senegal

A Mbaye*, AA Ngaïde, Y Ndiaye, M Dioum, M Ndiaye, MM Kaï, I Kouame, ND Gaye, K Babaka, JS Mingou, F Aw, SA Sarr, M Bodian, MB Ndiaye, and A Kane

1Department of Cardiology Grand-Yoff General Hospital, Senegal
2Department of Cardiology, Aristide Le-Dantec Hospital, Senegal
3Department of Cardiology, Fann Hospital, Senegal

Abstract

Introduction: Peripartum cardiomyopathy is a heart failure which occurs between the eighth month of pregnancy and five months after delivery without any earlier symptoms of heart disorder. We aimed to evaluate management and prognostic factors at cardiology department in Senegal.

Methods: This is a cross-sectional descriptive study, conducted between January 2006 and June 2015 at the cardiology department of the Grand-Yoff general hospital. We have included women who were healthy before and who suffered from heart failure between the last month of pregnancy and 5 months after delivery. Diagnostic and therapeutic aspects have been studied and the prognostic factors evaluated at 6 months in those with no remission of symptoms. The data were analyzed using Excel software with a significance level set at p < 0.05.

Results: We identified 47 patients, i.e. a prevalence of 0.8% with an average age of 29.26 years. The disease occurred in postpartum period in 87.3% of cases, 29% in twin pregnancy, and 70.2% in multiparous. It often turned out to be congestive heart failure (78.7%). Echocardiography constantly showed hypokinetic cardiomyopathy with average left ventricular ejection fraction (LVEF) of 30.84%. At 6 months, clinical remission was observed in 27 patients (57.4%), complications in 7 (14.9%) and death in 4 (8.5%) of them. The factors of poor prognosis were LVEF < 27% (p = 0.024) and diastolic diameter of the left ventricle > 63 mm (p = 0.037).

Conclusion: In Senegal, peripartum cardiomyopathy appears similar to other reported studies and occurs more frequently in older, multiparous women. Prognosis is worse when the left ventricle function plummets the greatest with severely dilated ventricle.

INTRODUCTION

Peripartum cardiomyopathy (PPCM) is a heart disease of unclear etiology that associated with pregnancy [1,2]. PPCM is a major cause of heart failure (HF) and cardiovascular mortality among women of child-bearing age [1,3]. Its initial definition was based on the combination of the four following criteria: (1) heart failure (HF) occurring in the last month of pregnancy or within 5 months of delivery; (2) absence of an identifiable cause of cardiac failure other than pregnancy, (3) absence of recognizable heart disease before the last month of pregnancy and (4) left ventricular systolic dysfunction (LVSD) with left ventricular ejection fraction (LVEF) < 45% by echocardiography, fractional shortening < 30% or both [2,4-6]. The Heart Failure Association of the European Society of Cardiology Working Group on PPCM has defined it as an idiopathic cardiomyopathy presenting with HF secondary to LVSD towards the end of pregnancy or in the months following delivery, when no other cause of HF is found [4,5,7]. PPCM remains a diagnostic of exclusion. It was classified as dilated non-family and non-genetic, pregnancy-related cardiomyopathy [4]. Etiology is complex and evolution remains unpredictable with a high risk of recurrence in subsequent pregnancies. This condition
is variously reported in Africa [8-10]. Our aim was to assess the prevalence of PPCM, to study its management and its prognostic factors at cardiology department in Senegal.

MATERIALS AND METHODS

Type, framework and period of study

This is a transversal and descriptive study conducted at the cardiology department of Grand-Yoff general hospital in Dakar, Senegal, between 1 January 2006 and 30 June 2015. This is a national reference centre in terms of heart disease and is located in the Senegalese capital suburb. It provides care, research and training for doctoral students and physicians in specialization.

Inclusion criteria

We included women with the following criteria:

- Heart failure occurring between the last month of pregnancy and 5 months after childbirth, in women who were previously healthy;
- LVEF ≤ 45% and/or fractional shortening ≤ 30% by echocardiography;
- Unknown previous heart disease;
- Admittance to the cardiology department of Grand-Yoff General Hospital in the study period.

Exclusion and non-inclusion criteria

Presence of a pre-existing heart failure which could evidence the disease; Observable severe anemia with hemoglobin level ≤ 7 g/dl; Lost or unusable patients records.

Course of the survey and parameters studied

We have identified the patients’ records that met the inclusion criteria described above. Data were collected from the register of hospitalization and outpatient visits, through a form designed for this purpose. The parameters studied were the following: socio-demographic, medical and obstetric history (number of pregnancies, twinning), the time to onset of symptoms compared to the end of pregnancy and childbirth, symptoms, physical signs, paraclinical signs, and therapeutic and evolutionary aspects. The data of evolution were analyzed under hospitalization and at 6-months follow-up to investigate remission or not of clinical signs, advent or not of complications or death. Thus, the patients were divided into 2 groups at the 6-month follow up: Group 1 (patients in clinical remission) and Group 2 (symptomatic patients). No patients received coronary angiography.

Data processing

Data were analyzed using the Epi Info software. The characteristics of patients were expressed as of the mean ± standard deviation. Parametric tests of Student and Chi2 were used to compare the two groups from the epidemiological, clinical and echocardiographic aspects to analyze the prognostic factors. The significance threshold was chosen for a p-value < 0.05.

RESULTS

During our study period, 5621 patients were admitted in the care unit, of which 47 patients for PPCM. Prevalence of PPCM was 0.8% with an annual incidence of 4.95. The average age of patients was 29.26 ± 8.26 years and 55.3% of them were aged under 30 years. A low socio-economic level was noted in 70% of cases. 29% of pregnancies turned out to be twins. Multiparity was noted in 70.2% of women and 26% had more than 4 pregnancies (Figure 1). The disease occurred in postpartum period in 87.3% of cases, specifically in the first months in 61.7%. In 37 cases (78.7%) patients had congestive heart failure and in 10 cases (21.3%), they suffered from isolated left ventricular failure. Functional signs were dominated by dyspnea (100%), cough (68.1%), chest pain (27.7%), hemoptysis (14.9%) and palpitations (10.6%). Physical signs are summarized on the Table 1. The average systolic blood pressure was 119 ± 34 mmHg (60-140 mmHg). The average diastolic blood pressure was 84.4 mmHg (60-130 mmHg). Blood pressure was normal in 44 cases and 3 patients had hypertension. Frontal chest x-ray showed in all cases global cardiomegaly and signs of venous hypertension. All patients had a sinus rhythm on the electrocardiogram with the presence of isolated extrasystole in 2 patients. Left atrial enlargement was found in 85.1% of cases and left ventricular in 61.7%. Secondary repolarization disorders were recorded on 24 graphs (51%). Echocardiography showed in all patients a hypokinetic cardiomyopathy associated with reduced systolic function parameters of left ventricular (LV). The mean LVEF was 30.84%. LV dilation was observed in 36 cases (76.6%) and mean diastolic LV diameter was 60.66 ± 6.59 mm with a range of 50 mm and 79 mm. The average systolic LV diameter was 51.60 ± 6.59 mm with a range of 31.7 mm and 68 mm. The average diastolic diameter of the right ventricle was 29.34 ± 6.92 mm with a range of 11 mm and 41 mm. Dilatation of the left atrium was observed in 21 patients with a mean anteroposterior diameter of 41.70 ± 7.37 mm. Furthermore, there was a minimal pericardial effusion of low to average abundance in 18 cases (38.3%), intraluminal thrombus in 5 cases Figure (2) and spontaneous contrast in 4 cases. Most

---

Table 1: Physical signs (n = 47).

<table>
<thead>
<tr>
<th>Signs</th>
<th>Effectifs</th>
<th>Fréquences (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachycardia</td>
<td>39</td>
<td>83</td>
</tr>
<tr>
<td>Arrhythmia</td>
<td>2</td>
<td>4.25</td>
</tr>
<tr>
<td>Gallop rythm</td>
<td>40</td>
<td>85.1</td>
</tr>
<tr>
<td>Mitral systolic murmur</td>
<td>20</td>
<td>42.6</td>
</tr>
<tr>
<td>Crackles</td>
<td>30</td>
<td>63.8</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>34</td>
<td>72.3</td>
</tr>
<tr>
<td>Ascite</td>
<td>15</td>
<td>31.9</td>
</tr>
</tbody>
</table>

Figure 1 Distribution of patients according to the parity (n = 47).
frequent laboratory abnormalities were CRP elevation in 25 cases (53.2%). The mean CRP level was 48 mg/L with a range of 6 and 192 mg/L. Hyperleucytosis was noted in 14 patients (31.8%). Mean WBC count of 8,971 per mm$^3$ with a range of 3,500 and 21,700 WGC per mm$^3$. Moderate anemia was found in 34 patients with an average hemoglobin level of 10.9 g/dl. The red blood cells distribution width was not available in our laboratory. As for treatment, strict rest and salt restriction were observed in all patients. In the acute phase, loop diuretics (Furosemide) and Spirinolactone were prescribed in such cases, nitrates in 66%, angiotensin-converting enzyme in 95.7%. On leaving the hospital, 49% of patients had a beta-blocker and 81% oral anticoagulant with vitamin K antagonist (VKA). Similarly, contraception has been prescribed in 22 cases. No patient received treatment with immunosuppressive or Bromocriptine. The hospital evolution was favorable in 38 patients (81%). Complications were noted in 7 patients with, pulmonary embolism (2 cases), deep veinous thrombosis of the lower limb (1 case), ischemic stroke (3 cases) and atrial tachycardia (1 case). Two patients died of cardiogenic shock and pulmonary embolism during hospitalization. In 6th month follow-up, 27 patients (57.4%) were in clinical remission while 5 (10.6%) remained symptomatic and 2 died. At 3 years, 2 patients relapsed during another pregnancy. The factors of poor prognosis associated with absence of clinical remission were LVEF <27% (p = 0.024) and LV diastolic diameter dilatation > 63 mm (p = 0.037). Patients with isolated left ventricular failure (p = 0.04), were more likely to have clinical remission (Table 2).

**DISCUSSION**

Certainly, this study has limitations related to its retrospective nature. However, in the absence of multi-center study, we will still compare our results with those reported in a similar context. The epidemiological profile of the CMPP is largely unknown and the incidence of the disease varies according to geographical regions, ethnic group, socio-economic factors and the criteria for inclusion in studies [1]. The data usually come from Africa, Haiti and the United States of America (USA). A US study reported an incidence of 0.18 per 1000 deliveries [1,11]. The incidence is higher in Haiti and Africa than in the USA [1]. Genetic factors are discussed with the disparities between geographical areas and the greater frequency of PPCM appears in the black women, especially in the USA, among African American [1,11]. The pathogenesis of PPCM is complex. It involves factors such as low levels of selenium, viral infections, cytokines, inflammation, autoimmune reactions, pathologic response to hemodynamic stress and unbalanced oxidative stress [1,7]. Several factors are associated with PPCM as older maternal age, multiparity, multi-fetal pregnancy (twins), prior toxin exposure (cocaine), use of certain medications to preventing premature labor, African descent and high blood pressure [2]. Bello et al., reported a prevalence of pre-eclampsia, hypertensive disorders and multiple gestations in women with PPCM higher than that the general population [12]. Multiparity has been reported, as noted in our patients in several studies [1,10]. Similarly, twinning risk factor found by other authors [10]. In a study conducted in the USA, increase in the incidence of PPCM in 1990-1993 to 2000-2002 was noted and attributable to a rise in maternal age and increase in multifetal pregnancies owing to access to reproductive techniques, or possibly improved recognition and diagnosis of the disease [1,7]. A low socioeconomic level was found in studies in Africa [10]. More recent experimental studies suggest a critical role of deregulation of angiogenesis after pregnancy with increased oxidative stress causing increased degradation of the prolactin, as part of the development of PPCM. Other studies show the increase of anti-angiogenic factors in late pregnancy probably constituting a substrate on which any infectious or inflammatory impairment or abnormality could trigger latent left ventricular dysfunction [5,7,13]. Hilfiker-Kleiner et al., showed that female mice with a cardiomyocyte specific deletion of STAT3 protein develop PPCM.
Peripartum cardiomyopathy is a serious heart condition that affects the young woman of child-birth previously healthy. In Senegal, it appears similar to other reported studies and occurs more frequently in older, multiparous women, usually in the first month after delivery. Prognosis is worse when the left ventricle function plummets the greatest with severely dilated ventricle and compromises the recovery.

REFERENCES

Mbaye et al. (2016)

Email: ambayel@hotmail.com


20. McMurray JJV, Adamopoulos S. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012. The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J. 2012; 33: 1787-847.