Case Report

Peripartum cardiomyopathy – case series

Gowri Sayi Prasad a,*, Ashok Bhupalib, Sayi Prasad c, Ajit N. Patild, Yashodhan Dekae

a Associate Professor, Dept. of OBGyn, Dr. D.Y. Patil Hospital, Kolhapur, Maharashtra 416006, India
b Chief Cardiologist, Dept. of Cardiology, Apple Saraswati Multispeciality Hospital, Kolhapur, India
c Chief Intensivist, Dept. of Intensive Care, Apple Saraswati Multispeciality Hospital, Kolhapur, India
d Head of Department, Dept. of OB Gyn, Dr. D.Y. Patil Hospital, Kolhapur, India
e Post-Graduate Student, Dept. of OBGyn, Dr. D.Y. Patil Hospital, Kolhapur, India

ARTICLE INFO

Article history:
Received 3 July 2013
Accepted 5 February 2014
Available online 28 February 2014

Keywords:
Peripartum
Cardiomyopathy
2D ECHO
Pregnancy
Heart failure

ABSTRACT

Objectives: To study the pattern of presentation, course of disease and outcome of pregnancy in Peripartum Cardiomyopathy.

Methods: A prospective study of sixteen cases of PPCM was conducted at Apple Saraswati Multispeciality Hospital and Dr. D.Y. Patil Medical College and Hospital, Kolhapur, Maharashtra, India from January 2006 to December 2012. Data included age distribution, parity, gestational age, symptoms and risk factors. Medical management and pregnancy outcome were documented. Serial echocardiography data was compiled for a period of one year.

Results: In our study 9/16 (56%) were primigravidae, 4/16 (25%) had pre-eclampsia and 6/16 (35%) had co-existing hypertension. The difference in Echocardiography parameters observed between recovered and non-recovered patients was significant: Left Ventricular End diastolic dimension (5.6 cm vs 6.06 cm), Left Ventricular Ejection Fraction (28.7% vs 22.4%) and Left Ventricular fractional shortening (17.5% vs 13.4%). Thirteen out of sixteen patients were followed up for a period of one year out of which 61% (8/13) patients recovered completely. There was one mortality.

Conclusion: PPCM is a diagnosis of exclusion. Majority were young primigravidae presenting postnatally. Pre-eclampsia and hypertension were risk factors. ECHO parameters were reliable predictors of recovery. Future pregnancies are better avoided.

Copyright © 2014, Cardiological Society of India. All rights reserved.

1. Introduction

Peripartum cardiomyopathy (PPCM) is a dilated cardiomyopathy defined as systolic cardiac failure in the last month of pregnancy up to within five months of delivery. It was first described in the 1800s, yet its aetiology is still unclear. Early signs and symptoms of heart failure can be obscured by pregnancy because often the patient considers them to be a normal part of pregnancy.

The incidence has been reported to vary by geographical location with rates ranging from 1:15,000 pregnancies in...
United States, to as frequent as 1:299 in a well-studied population in Haiti and 1:100 in a small region in Sub-Saharan Africa. Incidence in India has not been reported.

2. Patients and methods

A prospective study of PPCM was conducted at Apple Saraswati Multispeciality Hospital and Dr. D.Y. Patil Medical College and Hospital, Kolhapur, Maharashtra, India between January 2006 and December 2012. A total of sixteen patients were identified during the study period who fulfilled the inclusion criteria.

PPCM definition criteria included:

Classic:

i) Heart failure in the last month of pregnancy and up to five months postpartum.

ii) Absence of identifiable causes of heart failure.

iii) Absence of recognizable heart failure before the last month of pregnancy.

Additional:

iv) Left ventricular systolic dysfunction demonstrated by classic echocardiographic criteria such as depressed shortening fraction (less than 30%), ejection fraction (less than 45%) and a left ventricular end diastolic dimension of more than 2.7 cm/m² of body surface area.

Clinical data, including age distribution, gestational age at presentation, parity, presenting symptoms and identifiable risk factors was collected. Other causes of heart failure were ruled out by detailed clinical examination, ECG and Cardiac enzymes for ischaemic events, thyroid profile and ANA were also done. ECHO equipment used was Acuson Cypress System (2D, M-mode and Doppler) and data was analysed by Medialogic software. ECHO parameters measured were LV end diastolic dimension, LV fractional shortening and LV ejection fraction.

Echocardiography was repeated at six months and one year by the same cardiologist. A multidisciplinary team of intensivists, obstetricians and cardiologists were involved in the management. Management goals included preload optimization, afterload reduction and increasing the cardiac contractility. All patients received diuretics, digoxin, vasodilators and β-blockers. Selectively, ACE inhibitors in postpartum patients, inotropes and anti-coagulants were also used. Additionally fluid and salt restriction was instituted for an optimisation of blood pressure. Mode of delivery was individualised as per obstetric requirement and pregnancy outcomes were systematically documented. Complications encountered such as pulmonary oedema, acute kidney injury, MODS (multiple organ dysfunction syndrome), pleural effusion etc were appropriately managed by the attending intensivist. Recovery was defined as LV ejection fraction of 50%, LV fractional shortening of 30% or higher and NYHA functional class I with or without continuation of medication related to heart failure. Mean serial echocardiography findings comparing recovered and non-recovered patients were tabulated.

This study was conducted in conformity with the ethical guidelines and approval of Hospital Ethics Committee with respect to clinical care, informed consent of all patients, laboratory investigations, study protocol and even submission of manuscripts for publication.

3. Results

Our study revealed that a majority were young primigravidae and were at a higher risk for developing PPCM, mean age being 25.25 yrs.

The initial occurrence of symptoms of heart failure were predominantly during the postpartum period 11/16 (77%). Cases presenting antenatally were at about 36–37 weeks gestation and postpartum patients were between first day postnatal upto four weeks gestation and postpartum patients were between first day postnatal upto four months after delivery. All of them had dyspnoea (100%) at presentation, followed by cough (50%), shock (37%), chest pain (25%) and haemoptysis (12%). According to NYHA (New York Heart association) 5/16 (31%) were in Class II, 2/16 (12%) were in Class III and 9/16 (56%) were in Class IV. Thirteen cases were available for further follow up, all of whom underwent serial 2D ECHO at six months and one year interval. One patient expired and two were lost to follow up. Mean LV End diastolic dimension (cm), Mean LV Ejection fraction (%) and Mean LV fractional Shortening (%) at diagnosis, six months and one year were tabulated (Tables 1 and 2).

PPCM mortality rates: Low mortality in our study is probably related to availability of advanced cardiac and critical care unit.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Clinical data of 16 study patients.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs)</td>
<td>25.25</td>
</tr>
<tr>
<td>Mean parity</td>
<td>1.5</td>
</tr>
<tr>
<td>Mean time of presentation (days postpartum)</td>
<td>19.8</td>
</tr>
<tr>
<td>Mean gestation (weeks)</td>
<td>37.4</td>
</tr>
<tr>
<td>Primigravida</td>
<td>9</td>
</tr>
<tr>
<td>Co-existing pre-eclampsia</td>
<td>4</td>
</tr>
<tr>
<td>Co-existing hypertension at diagnosis</td>
<td>6</td>
</tr>
<tr>
<td>NYHA II</td>
<td>5</td>
</tr>
<tr>
<td>III</td>
<td>2</td>
</tr>
<tr>
<td>IV</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Serial echocardiography records of study patients (13 patients).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean LV End diastolic dimension (cm)</td>
<td>5.8</td>
</tr>
<tr>
<td>Mean LV fractional shortening (%)</td>
<td>15.9</td>
</tr>
<tr>
<td>Mean LV Ejection fraction (%)</td>
<td>26.3</td>
</tr>
</tbody>
</table>

Echocardiography values of recovered and non-recovered patients were compared (Table 3) using Unpaired-t test with Welch correction.
Comparision of serial echocardiography data for recovered and non-recovered study patients.

<table>
<thead>
<tr>
<th></th>
<th>Recovered (8 patients)</th>
<th>Non-recovered (5 patients)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean LV End diastolic dimension (cm)</td>
<td>5.6 ± 0.24 (5.3–5.9)</td>
<td>6.06 ± 0.13 (5.9–6.2)</td>
<td>0.0008</td>
</tr>
<tr>
<td>Mean LV Ejection fraction (%)</td>
<td>28.7 ± 1.90 (26–32)</td>
<td>22.4 ± 1.51 (22–24)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Mean LV fractional shortening (%)</td>
<td>17.5 ± 1.58 (14–19)</td>
<td>13.4 ± 1.30 (12–15)</td>
<td>&lt;0.0007</td>
</tr>
</tbody>
</table>

**Prognosis based on 2D ECHO at diagnosis:** Echocardiography parameters in our study like LV size, ejection fraction and fractional shortening at diagnosis differed significantly between those who recovered and those who did not. Although differences were statistically significant, there was no standard reference value to accurately predict outcome with certainty, in an individual patient, as the values varied widely. Hence the inability to fix a point value for each parameter.

**4. Discussion**

PPCM is a form of idiopathic primary myocardial disease associated with the pregnant state. Multiple mechanisms have been postulated but PPCM remains a diagnosis of exclusion. In contrary to published literature where increasing age and multiparity were considered as high risk factors for development of PPCM, our study revealed that a majority of patients were young primigravidae. Although we failed to establish the reason for high prevalence in primigravidae, the Haiti study which was conducted over a period of 5 years hints that multiparity and increasing age are not as important risk factors as seen in western population. PPCM in South Asian population may have preponderance towards a younger age group due to earlier age of marriage. Pre-eclampsia was seen in 25% of patients and co-existing hypertension was diagnosed at presentation in 37% patients.

PPCM being a diagnosis of exclusion, a high index of suspicion is essential in detecting early signs of heart failure, thus aiding early recognition and intervention. Diagnosis of PPCM as previously mentioned, rests on the echocardiographic identification of new left ventricular systolic dysfunction, depressed fractional shortening and ejection fraction during a limited period surrounding parturition.

In our study, 2D ECHO findings of recovered and non-recovered patients varied significantly at diagnosis (LVED: 5.6 cm vs 6.06 cm, LVFS: 17.5% vs 13.4%, LVEF: 28.7% vs 22.4%) and were statistically significant (p value <0.01). The above ECHO parameters at six months and one year were also statistically significant. ECHO remains the single best tool in prognosis, however prediction of recovery eludes ECHO.

PPCM is known to have high mortality, ranging from 15 to 50% but in our study we had only one (6%) mortality. Timely critical care instituted under supervision of a Cardiologist can favourably change outcome. Medical therapy used was similar as in other forms of heart failure. Diuretics, vasodilators, digital, ACE inhibitors, inotropes formed the mainstay of treatment. Subsequently, after initial stabilisation, β-blockers were added. All our patients required supplemental oxygen. Five patients required non-invasive ventilation while three patients were intubated and ventilated. Two patients required Amiodarone, indication being atrial fibrillation with fast ventricular rate. LMWH (low molecular weight heparin) was routinely used for DVT prophylaxis. One patient expired of refractory cardiogenic shock in spite of use of temporary pacemaker and intra-aortic balloon counterpulsation. Patients who did not recover or even those with mild LV dysfunction were continued with long-term medical management including ACE inhibitors and diuretics. Three patients presented intra-natally and six patients were postnatal at the time of initial presentation. We can summarise that the stress of delivery may play a significant role in unmasking probable underlying LV dysfunction. Eight patients had a vaginal delivery and Caesarean section was done for obstetric indication only. Presence of PPCM or its severity has minimal effect on foetal outcome if timely obstetric care is in tandem with aggressive medical management. Prognosis for women with peripartum cardiomyopathy depends on normalisation of LV size and function within six months of delivery. Even with full recovery subsequent pregnancies carry a 30% risk of relapse. Hence we strongly counselled our patients to avoid future pregnancies.

**5. Conclusion**

PPCM is a diagnosis of exclusion. Majority were young primiparae presenting postnatally. Pre-eclampsia and co-existing hypertension appears to be strong associations. ECHO parameters were sensitive predictors of recovery. Aggressive medical and obstetric management is crucial for a good outcome. Future pregnancies are better avoided.

**6. Study limitations**

Exact incidence of PPCM could not be determined in view of both centres being high-risk referral care centres, and the relatively small number of cases studied.
Conflicts of interest

All authors have none to declare.

REFERENCES


