ORIGINAL ARTICLE

Peripartum Cardiomyopathy in a Pakistani Cohort

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ABSTRACT

Objective: To describe the demographics, risk factors, and clinical presentation in Pakistani patients with peripartum cardiomyopathy.

Study Design: A descriptive observational study.

Place and Duration of Study: Rawalpindi Institute of Cardiology, Rawalpindi, from June 2014 to June 2015.

Methodology: Seventy patients meeting criteria of peripartum cardiomyopathy were included in the study. A detailed history, physical examination and investigations were done. Epidemiologic data, risk factors, New York Heart Association (NYHA) class and echocardiographic findings were recorded. Statistical analyses were done using SPSS version 19.

Results: The mean age was 28.66 ±4.57 years. Mean parity and weight was 3.04 ±1.7 and 60.97 ±12.40 Kg, respectively. Fifty-five (78.6%) cases were diagnosed in the postpartum period. Thirty-three (50.8%) and 31 patients (44.7%) presented in NYHA - III and IV classes, respectively. Pregnancy-induced hypertension was seen in 16 (22.9%) cases, diabetes in 6 (8.6%), and twin pregnancy in 2 (2.9%) cases. The mean hemoglobin and brain natriuretic peptide (BNP) was 11.26 ±1.61 gm/dl and 1583.70 ±1237.65 pg/ml, respectively. Echocardiography showed mean ejection fraction of 21.74 ±7.45%. Left ventricle systolic and diastolic diameters were 53.71 ±9.74 mm and 63.37 ±8.48 mm, respectively.

Conclusion: Peripartum cardiomyopathy was seen in younger women with higher parity and pregnancy induced hypertension, often manifesting in the postpartum period with NHYA class III and IV status.

Key Words: *Peripartum cardiomyopathy. Ventricular ejection fraction. Parity. Pregnancy induced hypertension.*

INTRODUCTION

Peripartum cardiomyopathy (PPCMP) is a pregnancy-associated myocardial disease characterized by the development of heart failure due to marked left ventricular systolic dysfunction. It is associated with significant morbidity and mortality.[1] Its incidence varies globally where it is as uncommon as 1 per 2500 to 4000 live births in United States, Canada, Europe; and as common as 1 in 1000 live births in South Africa and up to 1 in 300 live births in Haiti.[2-4] Risk factors associated with PPCMP include maternal age of 25 years or older, African race, parity of 4 or greater, multiple gestation, severe anemia, pre-existing and pregnancy-related hypertensive disorders, and hemolysis-elevated liver enzymes-low platelets syndrome (HELLP).[4,5] The underlying cause of PPCMP has not been clearly defined. This may be attributable to a prior viral illness or abnormal immune response, although there is no evidence that antiviral or immunosuppressant medications improve outcomes.[3] Many other studies have shown genetic mutations as leading to the disease.[6] Some studies focus on the hormonal cause, especially the raised prolactin levels in peripartum and immediate postpartum period leading to the abnormal immune response and disease.[7]

Because there is a significant overlap between symptoms related to pregnancy, especially toward the end of the third trimester or after delivery, and heart failure, the diagnosis may be delayed.[2] Apart from detailed history and complete examination, electro-cardiography, magnetic resonance imaging (MRI), endomyocardial biopsy; and in selected cases, cardiac catheterization aid in the diagnosis and management of PPCMP. Diagnostic echocardiographic criteria include left ventricular (LV) ejection fraction < 0.45 or M-mode fractional shortening < 30% (or both) and end-diastolic dimension > 2.7 cm/m^2.[8]

Standard heart failure management strategies are used to treat these patients. Studies have shown promising results with bromocriptine; whereas, experimental strategies such as intravenous immunoglobulin await further clinical validation.[9] Maternal mortality is up to 11%; about 42% of the women with PPCMP had improvement in their LV function, with delayed recovery (> 6 months) noted in the majority.[10] A few have persistently reduced systolic function and may progress to severe heart failure. About 5% of these women will have heart transplantation with a 2-year survival rate of 82.7%.[11,12]

Data in Pakistan is scarce regarding this disease. There have only three studies quoting a small number of patients.[13-15] This study was carried out to describe the demographics, risk factors and clinical presentation in PPCMP, presenting at a single public sector tertiary care center of heart diseases in Northern Pakistan.

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METHODOLOGY

The study was carried out at the Rawalpindi Institute of Cardiology (RIC), Rawalpindi, from June 2014 to June 2015 after approval from the Ethical Review Board of RIC, Rawalpindi. All patients admitted in or referred to the institute with PPCMP were included in the study after formal informed consent. Only the patients who refused to be part of study were excluded. The patients were evaluated by a joint team of a cardiologist and a gynecologist. A detailed history and physical examination were done. Patients' previous records were checked for any known cardiac disease and associated conditions. Patients' height and weight, blood pressure and pulse were recorded and electrocardiography done. Baseline investigations including blood complete picture, renal function tests, liver function tests, serum electrolytes, blood sugar levels, and serum BNP levels were performed. A detailed 2-D echocardiography was done to evaluate the LV systolic function and to rule out any other cardiac pathology leading to heart failure.

Data was entered in SPSS version 19 and analyzed. Descriptive analysis with mean ± standard deviation (SD) was calculated for numerical variables (age, parity, weight, hemoglobin, uric acid, BNP, ejection fraction, left ventricle systolic and diastolic diameters). Frequencies with percentages were given for categorical variables including NYHA class, peripartum and postpartum period of presentation, associated medical conditions, and mode of delivery.

RESULTS

The mean age of patients was 28.66 ±4.57 years, ranging from 18 - 38 years. Mean parity and weight was 3.04 ±1.76 and 60.97 ±12.4 Kg, respectively (Table I). Fifty-five patients (78.6%) presented in postpartum period; whereas, 15 patients (22.4%) were diagnosed as PPCMP during pregnancy. Most of patients presented in NYHA classes III (n=3534, 51.4%) and IV (n=34, 48.5%) with only a single (1.4%) patient in class II, respectively. Thirty-eight patients (54.3%) had no associated co-morbid condition; whereas, pregnancy induced hypertension, diabetes mellitus and twin pregnancy were most common comorbids identified as shown in Table II. The mean hemoglobin was 11.26 ±1.61 g/dl, ranging from 8.5 - 15.9 g/dl. The mean BNP was 1583.70 ±1234.76 pg/mL, rest of biochemistry is shown in Table I. Echocardiography revealed a mean ejection fraction of 21.74 ±7.45%. LV systolic and diastolic diameters were 53.17 ±SD 9.7mm and 63.3 ±8.4 mm, respectively (Table I).

The pregnancy outcomes in 15 patients, who were diagnosed with PPCMP during pregnancy, were assisted term vaginal deliveries in five (33.3%), caesarian section in four (26.6%), and therapeutic termination and preterm deliveries in three (20%) patient each.

Table I: Demographics, biochemistry, and echocardiography findings.

	Mean n=70	Std. Deviation
Age in years	28.66	4.571
Parity	3.04	1.740
Weight (kg)	60.9714	12.40497
Hb (g/dl)	11.2629	1.61857
BNP(pg/mL)	1583.70	1237.65133
Uric Acid (mg/dl)	8.2100	2.58990
Creatinine (mg/dl)	1.1531	.66039
Urea (mg/dl)	48.3143	31.18135
Na (mg/dl)	135.229	2.9936
K (mmol/ml)	4.2021	.51361
Cholesterol (mg/dl)	148.087	31.26592
Ejection fraction (%)	21.74	7.455
LVIDDD (mm)	63.37	8.499
LVIDS (mm)	53.71	9.748

Table II: Associated conditions in patients with peripartum cardiomyopatty.

	Frequency n= 70	Percentage %
Pregnancy induced hypertension	16	22.9
Diabetes	6	8.6
Twin pregnancy	2	2.9
Deep vein thrombosis	3	4.3
Tuberculosis	1	1.4
Acute pneumonia	1	1.4
Hypertension	1	1.4
Acute renal failure	1	1.4
No associated condition	38	54.3

DISCUSSION

PPCMP is a rare serious condition of childbearing women, which occurs as a rapid and unexpected onset of heart failure in a previously healthy woman. Although the disease has been reported in women between the ages of 16 and 44 years, the mean age of women with PPCM in the United States has ranged from 27 to 33 years.[1,12] In this study, the mean age was found to be 28.662 ±4.71 years. Whereas, studies carried out in Karachi and Peshawar, Pakistan, slightly higher the mean ages of 30.93 ±6.63 years and 32 ±3 years, respectively.[13,14] Multiparty has also been described as one of the predisposing factors and this study showed mean parity of 3.04 ±1.76, which is similar to the other two studies from Pakistan. (3.66 ±1.5 and 3.66 ±1.41, respectively).[13,14]

The disease can present in third trimester as well as in postpartum period; but studies show that majority of patients are diagnosed after delivery. This is reported as up to 71% according to a study done in USA, and 68.8% in a study done in Pakistan.[10,15] Patients present with signs and symptoms of heart failure in NYHA class III or IV as seen in this study.[14]

The prevalence of pre-eclampsia (PE) and hypertensive disorders in women with PPCMP is markedly higher than that in the general population. The present study

found 22.9% of PPCMP with pregnancy induced hypertensive disorders, which is similar to many other studies.[4,5,16] These findings have led to the concept of a shared pathogenesis between PE and PPCMP and highlight the need for awareness of the overlap between these two diseases.[17] PE can also present with signs and symptoms of heart failure (HF), but systolic function is usually preserved or even improved.[18] Studies also relate twin pregnancy with increased risk of PPCMP. These results also showed 2.9% cases of PPCMP being associated with twin pregnancy.[19]

PPCMP rarely presents with thromboembolic complications. The true incidence of thromboembolism in PPCMP is unknown. A few case reports and studies show thromboembolism with PPCMP.[20] This study found 4.3% PPCMP patients having thromboembolism.

A major challenge is to distinguish the peripartum discomforts in healthy women (fatigue, shortness of breath, and edema) from the pathological symptoms of PPCMP. Difficulties in diagnosis and the discrimination from other pathological conditions in pregnancy may explain why PPCMP is still underestimated.[21] In addition, most PPCMP patients are initially not seen by cardiologists. Biomarkers could help in early identification of PPCMP patients, so that they may be evaluated and managed by a mutli-disciplinary team with cardiologists and gynecologists/obstetricians. So far, NT-proBNP, (an unspecific marker for pregnancy complications such as PE as well as for HF and other diseases) has been found to be markedly elevated in most PPCMP patients with a little overlap in healthy peripartum women. Failure to normalize a biomarker profile including NT-proBNP, is associated with adverse outcome in PPCMP patients.[9] This study showed a mean B-type natriuretic peptide (BNP) levels of 1583.70 ± 1234.76 pg/ml.

PPCMP resembles a dilated cardiomyopathy (DCM) but the LV may not always be dilated. The ejection fraction is nearly always reduced below 45%.[2] This study found a mean ejection fraction of 21.74 ±7.45%; whereas, other studies have shown it be around 28 ±9.9% in USA and 29.8 ±8.5% in Singapore.[10,22] Early recovery in patients with PPCMP is significantly related to the degree of myocardial insult at the time of diagnosis. Recovery of LV function was 6.4-fold higher in women with baseline LV ejection fraction ≥ 30% (group III) and 3.9-fold higher in women with LV ejection fraction between 20% - 29% (group II), compared to those with LV ejection fraction between 10% - 19% (group I). Failure to achieve full recovery was seen in 63% of group I patients, 32% of group II (p=0.03), and 21% of group III (p=0.02) vs. group I. Failure to achieve LV ejection fraction ≥ 30% was seen in 30% of group I patients, and 13% of group II (p = 0.09).[23]

CONCLUSION

In a Pakistani cohort, age more than 25 yrs, multiparty and hypertensive disorders of pregnancy were common in PPCMP; whereas, most patients presented in NYHA class III or IV in the postpartum period.

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