Original Article

The Rising Trend in the Incidence of Peri-partum Cardiomyopathy; Characteristics and Outcome

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Abstract

Objective: The aim of this study was to identify clinical features, prognostic factors and the rising trend associated with peripartum cardiomyopathy(PPCM) in our setup.

Study Design: Descriptive Case series study

Place and Duration of Study: This study was conducted from May, 2012 to November 2016 in departments of Obstetrics & Gynecology and Radiology of Aziz Fatimah hospital Faisalabad.

Methodology: All the women fulfilling inclusion criteria for PPCM were selected in the study sample. On the basis of clinical evaluation and echocardiograpy, PPCM was diagnosed. A detail history along with examination was taken for clinical evaluation. Left ventricular ejection fraction LVEF was evaluated through echocardiograpy by using standard transthoracic Doppler 2D M mode. The recovery status of the patients was assessed after three and six months with the help of Echocardiography.

Result: The mean age of patients was 30.42±6.05 years. There were 21(38.89%) primi-gravida, 13(24.07%) gravida 2 and 20(37.04%) multi-gravida women in the study. In our sample 32 (59.26%) cases presented with severe hypertension, 15 (27.78%) with mild and Four (7.41%) cases with pre-eclampsia. Only 20 (37.0%) presented during pregnancy and 34 (63.0%) presented after delivery. It was observed that 33(61%) cases recovered completely. The echo parameters improved significantly in recovered patients after 3 and 6 months. There was highly significant differences (P-value < 0.001) in LVIDd, LVISd, EF and FS between patients who recovered and who did not at 3 and 6 months.

Conclusion: Hypertension and preeclampsia are the major contributing factors for PPCM and main bulk of the patients in our study presented after delivery with PPCM. The echocardiographic parameters were found significant predictors for good prognosis.

Key Words: Peripartum Cardiomyopathy, hypertension, echocardiography, Ejection fraction

Cite this article as:.Zaman Z, Imran F, Alia N. The Rising Trend in the Incidence of Peri-partum Cardiomyopathy; Characteristics and Outcome. J. Soc. Obstet. Gynaecol. Pak. 2017; Vol 7(1):4-8.

Introduction

Peripartum cardiomyopathy (PPCM) is one of the idiopathic disorders of cardiac muscle that arises in the last month of pregnancy or within 5 months during postpartum period and causes heart failure. This is the second main cause for heart failure after left ventricular systolic dysfunction which is the leading cause of heart failure during pregnancy or in the postpartum period. PPCM has great variation in its prognosis the patients with PPCM have chances of complete recovery or this disease can be fatal for them. In some cases, PPCM can be improved by heart transplantation in about 10% cases. [1]

Authorship Contribution: [1]Concept and idea, Randomization of study and writing the article, [2]Data Analysis, [3]Reviewed the study.

Funding Source: none **Received:** Feb 7, 2017 **Accepted:** Mar 25,2017

Conflict of Interest: none

The etiology of PPCM is not very clear but there are some factors which are considered to cause the development of PPCM. These factors include older age of mother, hypertensive disorders, preeclampsia, multiple gestations, and prolonged use of tocolytics. Further credentials of risk factors are required to develop a comprehensive protocol for identification of women at highest risk to get PPCM.[2]

The prevalence of heart diseases during pregnancy has greater variation with respect to geographical and industrialized countries. In western countries, the incidence of cardiovascular diseases is 4% and is increasing with passage of time. The heart diseases might be caused by pregnancy complications like hypertensive disorders in the absence of pre-existing cardiovascular disease. The hypertensive complications can be gestational hypertension, preeclampsia, HELLP syndrome and PPCM, and can cause heart diseases. [3,4]

Peripartum cardiomyopathy has a very low incidence but morbidity and mortality associated with it is quite high having a range of 5% to 32%. This rare disease is difficult to diagnose because it has symptoms like other pregnancy associated pathologies as myocarditis, gestational hypertension or pre-eclampsia, or underlying genetic disease. Pre-eclampsia is a complication of hypertension indicating multisystemic disorders. In many cases, patients with preeclampsia also present with edema. Similarly, all these symptoms hypertension, edema and proteinurea are present in PPCM patients. [5]

In patients of Peripartum cardiomyopathy the heart failure is initiated from striking left ventricular systolic dysfunction. Although this disease is not so common but its incidence is increasing, and is associated with severe morbidity and mortality. There is also a great variation in clinical presentation of PPCM in different parts of the world. [6]

The main contributing factors of PPCM are not very clear. Heart inflammation has been noted in biopsies performed in 10% to 75% cases among the women presenting with PPCM. This indicates any previous viral illness or abnormal immune response in the patient but there is no evidence of improvement in outcome with the use of antiviral or immunosuppressive medication. Nutritional deficiency, genetic disorders and defective antioxidant defenses can be other potential risk factors for PPCM. There is huge variation in incidence of PPCM from 1:15000 to 1:100 across different geographic regions. [7, 8]

The prognosis of PPMC attributes to a good outcome in first 6 months if the ejection fraction improves early. Some women have slow response to the medication and they get improvement in EF in years. The normalization of EF is considered after EF>50% achieved and qualifies as full recovery of heart function. At this point after getting full recovery of heart function the decision to stop medication is debatable. Majority of the physicians have a view that angiotensin converting enzyme (ACE) inhibitors and beta blockers should be continued at least one year after normalization of EF. After diagnosis of PPCM, the subsequent risk for pregnancy depends upon the recovery of heart function and the women persistently having reduced EF have increased risk of recurrent heart failure or even mortality. [9, 10]

PPCM is a major risk factor of morbidity and mortality of mothers, so it will be very helpful to identify the cases having high risk of sudden cardiac death by classifying predictors and indicators of clinical outcome and major contributing factors of PPCM. This present study was planned to identify major contributor for PPCM and their impact on recovery status of the patients of PPCM in our setup.

Methodology

This descriptive case series study was conducted in departments of Radiology and Obstetrics & Gynaecology, Aziz Fatimah hospital Faisalabad, from May, 2012 to November 2016 over a period of four and half years. All the patients were followed for six months. The approval of the study was taken from hospital ethical committee before start of the study. All the women fulfilling inclusion criteria for PPCM were selected in the study sample. The diagnostic criterial for PPCM was based on (i) indications of heart failure during last month of pregnancy or within 5 months' postpartum period. (ii) without having any other identifiable reason of heart failure (iii) and having a less than 45% ejection fraction value.

The patients of any heart disease like valvular or ischaemic heart disease or patients presenting with heart failure after anaemia were excluded from the study. A detail history was taken and examination

was done for clinical evaluation. Left ventricular ejection fraction (LVEF) was evaluated through echocardiography by using standard transthoracic Doppler 2D M mode.

Guidelines of American society of Echocardiography were followed to measure the advanced remodeling parameters of Doppler Echo. The recovery status of the patients was assessed after three and six month with the help of Echocardiography.

All the patients in the study were treated by standard treatment of PPCM comprising of angiotensin converting enzyme inhibitor along with ARBs and beta blockers as well as loop diuretics. The recovery status was measured in terms of resolution of heart failure signs and symptoms, the normalisation of LVSF i.e. EF of more than 50% along with persistent left ventricular dysfunction (EF<50%) after six months post-delivery. The outcome of recovery in terms of LVEF, RV function and mitral regurgitation were noted to see the improvement in systolic function, after 3 and 6 months. All the information was recorded on a predesigned performa.

The collected data was entered and analysed by using SPSS v. 21. Mean and standard deviation was calculated for quantitative variables and frequency along with percentages were presented for qualitative variables. Independent sample t-test was applied to compare the quantitative data between recovered and non-recovered patients. P-value < 0.05 was considered significant.

Results

In this case series study a total of 59 cases of peri-partum cardiomyopathy were included during the study period. Out of which 3 expired during first month of postpartum period and 2 were lost to follow up on first visit after 3 months and our study sample consisted of 54 cases of PPCM. The age of the patients ranged from 22 to 38 years with a mean of 30.42±6.05 years. There were 21(38.89%) primi-gravida, 13(24.07%) gravida 2 and 20(37.04%) multi-gravida women in the study sample of patients. In majority of the cases the commonest comorbid condition found was hypertension and 32 (59.26%) cases presented with severe hypertension followed by 15 (27.78%) cases who presented with mild hypertension. Four (7.41%) cases were complicated with pre-eclampsia and 3 (5.56%) patients were complicated with Jaundice at the time of presentation. In our study sample 20 (37.0%) presented with PPCM during pregnancy and 34 (63.0%) presented after delivery. All the cases were followed up for 6 months and it was observed that 33(61%) cases recovered completely. (Table I)

Table I: Distribution of demographics and associated comorbidities

Characteristics	Frequency	Percentage
Age of Patient		
Mean ± SD	30.42 ± 6.05	
Parity		
Primi-gravida	21	38.89%
Gravida 2	13	24.07%
Multigravida	20	37.04%
Associated morbidities		
Severe hypertension	32	59.26%
Mild hypertension	15	27.78%
Pre-eclampsia	4	7.41%
Jaundice	3	5.56%
Presentation Time		
Presented during pregnancy	20	37.0%
Presented after delivery	34	63.0%
Recovery status after 6 months		
Recovered	33	61%
Not-recovered	21	39%

At baseline, all the parameters including LVIDd, EF and FS except LVISd were significantly different between the cases who recovered and those who did not recover. The results of analysis showed that all the echo parameters were improved in recovered patient in contrast to those who did not recover at the time of follow up after 3 and 6 months. There was highly significant difference (P-value < 0.001) in LVIDd, LVISd, EF and FS between patients who recovered and who did not. Similarly, highly significant difference (P-value < 0.001) was observed between both type of patients who recovered and who did not recover with respect to

LVIDd, LVISd, EF and FS respectively as described in table II.

Table II : Comparaison of Echocardiographic parameters at Baseline, 3rd and 6th month between recovered and not recovered cases

Characteristics	Recovered (n= 33)	Not-recovered (n= 21)	P-Value
At baseline			
LVIDd	57.385 ± 4.823	60.045 ± 3.093	0.017
LVISd	39.713 ± 4.935	38.573 ± 6.945	0.516
EF	42.925 ± 3.083	31.437 ± 7.869	0.000
FS	25.033 ± 3.864	19.732 ± 2.933	0.000
After 3 months			
LVIDd	42.782 ± 4.956	54.321 ± 4.937	0.000
LVISd	28.143 ± 4.373	34.731 ± 3.271	0.000
EF	54.192 ± 3.793	45.291 ± 2.732	0.000
FS	24.286 ± 1.948	18.451 ± 1.821	0.000
After 6 months			
LVIDd	40.917 ± 4.934	52.961± 4.934	0.000
LVISd	26.319±4.693	32.835 ± 2.699	0.000
EF	59.074 ± 3.917	46.378 ± 1.008	0.000
FS	25.213 ± 1.393	19.069 ± 2.343	0.000

LVIDd: Left ventricular internal dimension at diastole
LVISd: Left ventricular internal dimension at systole
EF: Ejection fraction
FS: Fractional shortening

Discussion

Peripartum cardiomyopathy is an uncommon disease in our population but causes serious kind of heart failure in last month of pregnancy or early months of puerperium. It has been considered as contributor of severe morbidity and mortality. [11]

PPCM is a myocardial disease reported to occur in every region of the world with variable incidence. This disease is heterogeneous having diversity in phenotype in different geographical regions. Therefore, it is very difficult to make uniform recommendations for different regions of the world. Another reason which halts uniform guidelines for PPMC is quality of care given to the patients in different parts of the world. [12]

Several risk factors are known to predispose a woman for developing peripartum cardiomyopathy. These include advancing maternal age, multiparity, multiple pregnancy, obesity, pregnancies complicated by chronic hypertension, pre-eclampsia, gestational hypertension and black-race. [13]

PPCM has been reported mostly in women older than 30 years. [14] In our study also the mean age noted was 31.81 ± 3.7 years despite the trend of young age marriages in our society. Most of the patients in our study were multiparous which indicates multiparity as a major risk factor.

Pregnancy is a stage of a women's life when her cardiovascular system faces many challenges. In pregnancy, the blood plasma level increases by 50%, which has additional load on heart and increases cardiac output by 30%-50% by enhancing the work load of heart. In this situation women with any underlying heart disease may be at risk for baseline cardiac dysfunction and their cardiac function may not tolerate the additional strain caused by pregnancy. [15]

Previous case series studies done on women having peripartum cardiomyopathy have found that most common factors found were advanced maternal age, multiple gestation, hypertension or preeclampsia and long use of tocolytic agents etc. [16, 17] The results of the present study also support these findings, in our study 37.04% women were multigravida and 24.07% were gradvida two.

In this present study, it was observed that majority of the cases of PPCM presented with disorder of hypertension and 59.26% cases had severe hypertension followed by 27.78% cases who presented with mild hypertension. Four 7.41% cases were complicated with pre-eclampsia and 5.56% patients were complicated with Jaundice at the time of presentation. Many other studies showed similar results with findings that hypertension, and preeclampsia/eclampsia were significantly associated with PPCM as in our analysis as well.[18, 19]

Hypertension is a very common presenting comorbidity among the patients of PPCM, as described in our study in which severe and mild hypertension was noted in (87.04%) patients. Any hypertensive disorder either chronic, pregnancy induced, or preeclampsia has been described in 15% to 68% of patients having PPCM with a similar

incidence reported in women diagnosed antepartum and postpartum. [20, 21]

The patients diagnosed with PPCM need additional care during the pregnancy and if the patient remains unstable then early delivery is recommended instead of being on medical treatment. For induction of labor medicines like prostaglandins and oxytocin is should be used because these are considered to have comparatively less risks. Epidural analgesia is recommended because it reduces the load on heart by stimulating a sympathetic response. Fluid overload should be controlled by restricting the fluid intake. For delivery, cesarean section should be avoided and vaginal delivery is preferred to avoid the surgical risks associated with cesarean section, but if there is any obstetric indication then caesarian section should be performed for delivery. [22]

All the women having major contributing factors for development of PPCM should be evaluated by echocardiography and other modern techniques in order to diagnose the PPCM. These cases should be managed by standard criteria with multidisciplinary approach to avoid cardiac failure. The patients should be carefully followed and monitored for recovery but if the symptoms of ventricular dysfunction persist then these patients should be advised to avoid pregnancy by using any suitable contraceptive method.

Conclusion

It can be concluded from all this discussion that PPCM is a rare disease but has serious outcome including complete failure of heart due to unknown cause at the end of the pregnancy or in early postpartum period. Hypertension and preeclampsia are the major contributing factors for PPCM and main bulk of the patients in our study presented after delivery with PPCM. The echocardiographic parameters were important predictors for good prognosis and patients having comparatively better echo had good and early recovery. EF, FS, LVIDd and LVISd showed strong relation with recovery status of the patients.

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