International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2019; 3(2): 206-209
Received: 04-01-2019
Accepted: 11-02-2019

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Peripartum cardiomyopathy: A 5-year retrospective study in a tertiary care center, India

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DOI: https://doi.org/10.33545/gynae.2019.v3.i2d.35

Abstract
Objectives: To study the clinical presentation, course and maternal outcome in pregnancy in Peripartum Cardiomyopathy.
Methods: A retrospective study was conducted over a period of 5 years and a total of 21 number of peripartum cardiomyopathy cases were collected, in ESIC medical college, Bangalore. Data collected included the age of the patient, past obstetric history, gestational age, clinical symptoms, risk factors, diagnosis, medical management and maternal outcome and were analyzed in SPSS 10 software.
Results: In the study we found that the prevalence of peripartum cardiomyopathy was 0.07% (21/16,866). The maximum age group fell between 20 to 30 years 16(76.1%), 11(52.3%) were primigravidae, 5(23.8%) had pre-eclampsia and none of the patients had gestational diabetes. The echocardiography parameters were studied, diagnosis made and management planned accordingly.
Conclusion: PPCM is diagnosed by excluding the other conditions. Predominantly young women are affected. The associated risk factors are pre eclampsia and hypertension. Complications like cardiac arrhythmias, thromboembolism and refractory heart failure are very common and future pregnancies should be avoided.

Keywords: Peripartum cardiomyopathy, ejection fraction, left ventricular systolic dysfunction, maternal mortality

Introduction
Peripartum cardiomyopathy is a very rare, critical condition of the heart seen in women in later pregnancy or puerperium, which leads to heart failure. The modified definition to diagnose PPCM includes 3 clinical and 1 echocardiographic finding–

1. Development of heart failure during last trimester of pregnancy or first six months' postpartum.
2. Absence of any identifiable cause for cardiac failure.
3. Absence of any recognizable heart disease prior to last trimester of pregnancy.
4. Echocardiographic criteria- Ejection fraction less than 45%, left ventricular fractional shortening less than 30% or left ventricular end-diastolic dimension>2.7cm/m square of body surface area [1]

The exact incidence in India is not known but 1/1374 live births has been reported by a study by pandit in south India [2]. The incidence is found to be greater in multiparous, elderly women, with preeclampsia, gestation hypertension and twin gestation [3, 4]
When a woman develops a sudden onset of cough, orthopnea, paroxysmal nocturnal dyspnea, fatigue, palpitations, hemoptysis, chest pain, and unexplained abdominal pain, a suspicion of PPCM arises. On examination women are found to have following saturation, tachycardia, enlarged heart, normal blood pressure, elevated JVP and pulmonary rales. Progressive increase in the Peripheral edema, ascites and hepatomegaly. The complication includes arrhythmias, which may lead to peripheral or pulmonary embolism. The changes are difficult to be differentiated from that associated with dilated cardiomyopathy [5].
Diagnosis is made by ECHO changes which depicts decrease in myocardial systolic function, decrease in left ventricular ejection fraction or fractional shortening. ECG may be normal or show sinus tachycardia, atrial fibrillation, nonspecific ST segment changes, conduction abnormalities and arrhythmias [6].

Management during pregnancy requires a prompt and early diagnosis; the fetal outcome should be given special interest in theses cases. Most of the women will need intensive unit care for prompt monitoring of blood pressure, central venous pressure or rarely pulmonary artery catheter. A combined effort from the cardiologist, obstetrician and intensivists is needed for a fruitful outcome. Angiotensin converting enzymes inhibitors are contraindicated in pregnancy due to the birth defects they are knowing to cause [7]. Drugs like digoxin with its inotropic and rate reduction effect, loop diuretics with its preload reduction, sodium restriction and drugs that reduce afterload such as hydralazine and nitrates are proven to be safe and used in pregnancy. The only concern when treating a woman with the above drugs will be fluid management as a reduction can lead to fetal distress [8] In recent studies amlodipine has been found to improve the survival in non-ischemic patients [10]. In the postnatal period where in the fear of the fetus is no longer present management can be initiated without any inhibition.

ACE inhibitors are used; the dose is one half the maximum antihypertensive doses. Diuretics are used to release the uncomfortable symptoms. Women with class New York Heart Association class III or IV symptoms are treated with spironolactone or digoxin. Beta-blockers are given as they improve symptoms, ejection fraction, and survival. Other management requirements include anticoagulants, anti arrhythmics and newer drugs like Pentoxifylline, Bromocriptine and Cabergoline and Immune Modulating Therapy.

Materials and Methods

Type of study: Retrospective study conducted Period of sample collected: over 5 years from January 2013 to December 2017

Place of study: ESIC medical college, Bangalore

Inclusion criteria: all diagnosed cases of per partum cardiomyopathy by ECHO

Exclusion criteria: women with a preexisting cardiac disease

Statistical analysis: Data analyses were performed with SPSS software (version 18)

The study was conducted by reviewing the patients' medical files to study the age of the patient, obstetric index, number of fetuses, presenting features, clinical course and cardiac complications. ECG and ECHO parameters were studied. The maternal outcome in the form of ICU stay, its duration, management option and response to the drugs were studied.

Results

21 women were diagnosed with PPCM, of the 16,866 women who delivered with us over 5 years. Table 1: shows the maternal characteristics, commonly women between the age 20 to 30 were affected, constituting to 76.1% .11(52.3%) women were primigravida, of the 10 women who were multigravida 4 of them had a previous history of PPCM. All the 21 women developed symptoms and were diagnosed in the postpartum period. 5(23.8%) of the women had antenatal preeclampsia, 2(9.52%) had eclampsia in our study.

Table 1: Maternal characteristics

Details	Number (n= 21)	Percentages (%)
AGE		
<20 years	1	4.7
21-25	8	38.09
26-30	7	33.3
31-35	3	14.2
>35 years	2	9.5
Parity		
Primigravida	11	52.3
Multigravida	10	47.7
Past history of cardiomyopathy		
Yes	4	19.04
No	17	80.96
Associated conditions:		
Preeclampsia	5	23.8
Twin geatstaion	1	4.7
Eclampsia	2	9.5
GDM	0	-
Presentation period		
During pregnancy Post pregnancy	0 21	 100

In the Table 2 the presenting complains of the patients where studied and tabulated. all the women presented with symptoms of heart failure , 12 (57.1%) had breathlessness, 6(28.5%) had cough, 4(19.04%) had persistent cough followed by breathlessness and 6 (28.5%) were complicated with ventricular tachycardia.

Table 2: Clinical Presentation

	Number (n =21)	Percentage (%)
Breathlessness	12	57.1
Cough	4	19.04
Chest pain	6	28.5
Tachycardia	6	28.5
Palpitation	2	9.5
Reduced urine output	3	14.2

Predominantly women had left ventricular systolic dysfunction, with a significant lowering of the ejection fraction. 16(76.1%) of the women had a ejection fraction less than 30%, with features of global hyperkinesia. 17(80.9%) of the women had mitral regurgitation of whom 8(38.09%) had severe regurgitation. Right ventricular dysfunction was seen in 6(28.5%) and only 1(4.7%) of the women had LV clot and none of the women had thromboembolic stroke.

Table 3: ECHO changes

ECHO changes	Number of patients (n = 21)	Percentage (%)
Ejection fraction		
<30%	16	76.1
30-45%	5	23.9
Mitral regurgitation		
Severe	8	38.09
Moderate	3	14.2
Mild	6	28.5
RV dysfuction	6	28.5
LV clot	1	4.76
Thromboembolic stroke	0	-

Table 4 depicts the complications in women with cardiomyopathy, all the 4 women were treated with a standard management protocol in the medical intensive care unit. 2(9.5%) of the women progressed to congestive cardiac failure with pulmonary oedema and 3 (14.2%) women had arrhythmias and 2 (9.5%) mortality was reported and the cause for both was cardiac failure.

Table 4: Complications

Complication	Number (n = 21)	Percentage (%)
Congestive heart failure with pulmonary edema	2	9.5
Arrhymias	3	14.2
LC clot	0	-
Stroke	0	-
Maternal mortality	2	9.5

Discussion

The incidence of PPCM varies very widely across the world, ranging from 1: 15,000 to as common as 1:100, [8]. Minimal studies have been conducted mainly in developing and underdeveloped countries, due to the low prevalance. A study conducted in south India by vinay *et al.* stated an incidence of 1 in 1374 live births, in comparison to your study the incidence was 1.2 in 1000 live births [11]. The cause for PPCMP even today is unknown, but attributed to be multipal factorsl, and various studies have found a significant association with family and genetics [12]. Murali *et al.* found a strong association of the acute elevation of blood pressure in pregnancy to be one of the cause for women to develop cardiac failure [13] our study 23.8% of the women with preeclampsia progressively developed peripartum cardiomyopathy, all of them had developed hypertension in the third trimester.

Multiple factors have been attributed to the cause of PPCM, like very young and elderly age groups, African descendant, sever anemia, gestational hypertension, drug addiction, long term use of tocolytic drugs i.e terbutaline for more than 4 weeks. and multiple gestation [13]. In our study 5(23.8%) of the women had preeclampsia, 2(9.5%) of the women had postpartum eclampsia and 1(4.7%) of the patient was carrying a monochorionic monoamniotic gestation. Of the 10 multigravida in our studies 4(19.04%) of the women had previously developed PPCM in the first pregnancy.

In our hospital the commonest symptoms of cardiac failure with which the patient presented was breathlessness (57.1%), chest pain and tachycardia 6 (28.5%) post natally, in concurrence to the result obtained by bonow *et al.* [14].

In our study 2D ECHO finding revealed a ejection fraction of <30% in 16(76.1%) of the women, with global hypokinesia, as the same noted by Lampert *et al.* [15]. Mitral regurgitation was noted in 17(80.79%) of the women, among whom women with severe MR was 8(38.09%). Right ventricular dysfunction was noted in 6(28.5%) of the women and no thromboembolic strokes was reported.

Atrial fibrillation was the commonest complication noted in our study in 3(14.2%) of the women, which was the similar results obtained in multiple other studies [16, 17]. In our study 80.79% of the women recovered left ventricular ejection fraction and also did the mitral regurgitation improve. 2(9.5%) of the women progressed to cardiac failure and mortality was reported in them.

Conclusion

PPCM remains a very rare but deadly condition with a very high mortality and morbidity. The study was designed as very minimal literature is available about PPCM in our country. The diagnosis by exclusion and high index of suspension is the key to identify this rapidly progressing condition. Early diagnosis and close monitoring of the patients in the risk range would improved the patient outcome. A standard protocol in high risk patients and frank medical management can reduce both the mortality and morbidity. Considering it's high rate of recurrence the further pregnancy is to be avoided.

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