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STUDY OF PERIPARTUM CARDIOMYOPATHY BY 2D ECHO IN 100 HIGH RISK PREGNANCIES

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ABSTRACT
Peripartum cardiomyopathy (PPCM) is an ominous life threatening disorder of unknown aetiology that occurs in the last month of pregnancy or in first few months postpartum with no identifiable cause for cardiac failure or heart disease. The diagnosis is often difficult, and needs high degree of clinical suspicion. Maternal mortality is as high as 50%. This study was a prospective observational study done at Government Maternity Hospital, Sultan bazaar, Hyderabad between June 2014 to May 2016 on 100 high risk and suspected cases of peripartum cardiomyopathy. After informed written consent, all the patients underwent 2D Echocardiography. Out of 100 suspected cases, 2D Echo diagnosed 18cases as Peripartum Cardiomyopathy, 8 cases as other heart diseases and 2D Echo was normal in 74 cases. EF was 35-45% in 39% of cases, 45-55% in 22% of cases, it was >55% in 39% of the 18 PPCM cases. Out of 18 cases of PPCM, 4 cases died. 75% of maternal mortality was seen in patients with EF<45% and 25% was seen in patients with EF>45%. So EF is important in prognosis. EF<45% is a bad prognostic indicator. 2D Echocardiography is used to diagnose and follow up peripartum cardiomyopathy. Early diagnosis of peripartum cardiomyopathy by 2D echo helps in better management and avoids maternal morbidity and mortality.

KEYWORDS: Peripartum Cardiomyopathy (PPCM), 2D Echocardiography (2DEcho), Cardiac failure, High risk Pregnancies, Ejection Fraction.

INTRODUCTION
Peripartum cardiomyopathy (PPCM) is a life threatening disorder of unknown aetiology that occurs in the last month of pregnancy or in first few months postpartum with no identifiable cause for cardiac failure or heart disease.[1] The incidence is about 1 in 1000-4000 deliveries.[2] The diagnosis is often difficult, as there are no definitive biochemical or imaging markers, and needs high degree of clinical suspicion. Diagnosis is by exclusion. Most cases occur in puerperium and often lead to maternal mortality.

Common risk factors for PPCM are advanced maternal age, multiparity, black race, low socioeconomic status, smoking, alcohol and cocaine abuse, multiple gestation, obesity, malnutrition, selenium deficiency, diabetes, preeclampsia, hypothyroidism, anaemia, HIV.[2] Myocarditis, viral infection, autoimmunity are now thought to be causative factors.[3,4,5] 2D Echo hasmade diagnosis easier, and more accurate to diagnose PPCM. Early diagnosis aids prompt treatment and decreases mortality and morbidity.

Symptoms of PPCM are dyspnoea, orthopnoea, Paroxysmal Nocturnal Dyspnoea, cough, chest pain, anorexia, fatigue, pedal edema. BP may be altered, gallop rhythms, engorged neck veins, lung crepitations, hepatomegaly, mitral or tricuspid regurgitation and features of thromboembolism.

Diagnostic criteria for PPCM[6]
1) Cardiac failure in last trimesterof pregnancy or within six months postpartum.
2) No other cause for heart failure.
3) No other heart disease
4) Demonstrable echocardiographic criteria of left ventricular dysfunction[7]
5) Left Ventricular Ejection fraction (LV EF) < 45%
Left ventricular fractional shortening < 30%
Left ventricular end-diastolic dimension (LVEDD) > 2.7 cm/m^2 body surface area.

All patients require ECG, chest X ray, Doppler echo for diagnosis. ECG may be normal or show atrial flutter /fibrillation and ventricular fibrillation, left axis

deviation, ST-T abnormalities, low voltage complexes, conduction abnormalities. X ray may show cardiomegaly, LVH, pleural effusion.[8] Echo also shows systolic wall thickening, dilatation of chambers, regurgitation, diffuse wall motion abnormality, pericardial effusion. 2D Echo gives poor images in obese, COPD. To diagnose thrombi, MRI is better.[9]

Complications of PPCM are thromboembolism, arrhythmias, organ failure, preterm delivery, IUGR, IUFD. PPCM treatment is multidisciplinary and in Intensive Care. Ventilatory support is often required. Maternal mortality is as high as 50%. Prognosis depends on reversal of ventricular dysfunction. LVEDD>5.6 cm and LVEF<45% at 2 months has poor prognosis.[10] One of the greatest concerns is the safety in future pregnancies. It is important to counsel about relapse and recurrence in future pregnancies (21-80%)[11] and contraception. Future pregnancies are avoided if cardiac function fails to return to normal.

MATERIALS AND METHODS

This study was a prospective observational study done at Government Maternity Hospital, Sultan bazaar, Hyderabad, after approval of institutional ethics committee, between June 2014 to May 2016 on 100 high risk and suspected cases of peripartum cardiomypathy.

Inclusion criteria: Preeclampsia, BMI>30, multiple gestation, multigravida, severe anaemia, smoking, >30 years, gestational diabetes, hypothyroidism, clinical symptoms and signs of PPCM.

Exclusion criteria: known heart disease, absence ofrisk factors.

After informed written consent, all the patients underwent M mode 2D Echocardiography. An echocardiogram (2D Echo) is a simple, non invasive, easily available test that uses ultrasound waves to diagnose a variety of heart problems.

RESULTS AND OBSERVATIONS

Table. 1: Number of cases.

Category	Number of cases	Percentage
Normal	74	74
PPCM cases	18	18
Other heart diseases	8	8
Total	100	100

Out of 100 suspected cases, 18 cases were found to be Peripartum Cardiomyopathy and other heart diseases were found in 8 cases. 2D Echo was normal in 74 cases.

Table. 2: Ejection fraction vs Maternal mortality.

LV EF%	PPCM cases	Percentage	Deaths
<35	0	0	0
35-45	7	39	3
45-55	4	22	1
>55	7	39	0
Total	18		4

In the 18 cases diagnosed as PPCM, EF was 35-45% in 39% of cases, 45-55% in 22% of cases, it was >55% in 39% of cases. Out of 18 cases of PPCM, 4 cases died. 75% of maternal mortality (3 deaths) was seen in patients with EF<45% and 25% (1 death) was seen in patients with EF>45%. Hence the importance of LV EF in prognosis.

Table. 3: Maternal complications vs mortality.

Complication	No. of PPCM cases	No. of deaths	Deaths Percentage
Thromboembolism	1	1	5.5
Arrhthmyias	3	0	0
CCF	7	2	11
LVF	1	1	5.5
Multi Organ Dysfunction Syndrome	0	0	0
No complications	6	0	0
Total	18	4	22

Case fatality rate was 22%. 5.5% of (1 death) maternal deaths was due to thromboembolism, 11% (2 deaths) were due to congestive heart failure and 5.5 % (1 death) was due to pulmonary edema.

Table. 4: Follow up.

Age(years)	Risk factor	LV EF	LV EF postpartum
26	Obesity	58	54
35	Advanced maternal age	45	67
16	Twin	43	45
36	Advanced maternal age	41	75
25	Diabetes	41	50
23	Diabetes	48	41
27	Preeclampsia	44	56
23	Obesity	53	73
33	Diabetes	44	44

In our study, out of the 18 cases of PPCM, there were 4 deaths, we could follow up 9 cases during postpartum period i.e. 6 weeks after delivery, and 5 cases were lost for follow up. Probably, the 5 cases recovered, hence did not come for follow up. Out of the 9 cases followed up, there was improvement of EF in 6 cases (66%).

DISCUSSION

In our study of 100 high risk cases, 18 cases were diagnosed as peripartum cadiomyopathy by 2D ECHO, 8 cases were of rheumatic heart disease and 74 cases did not show any Echocardiographic abnormality. Mielniczuk LM et al estimated the incidence of peripartum cardiomyopathy at 1 case/1,485 live births to 1 case/15,000 live births.[12]

25% of patients are in the age group of 40 and above. Increased maternal age is a risk factor in peripartum cardiomyopathy in a study by Whitehead et al.[13] In this study the risk factors noted were: 25% had multiple gestation, 23% advanced maternal age, 19% severe preeclampsia, 15% obesity and 14% gestational diabetes. This is in confirmity with the study of Elkayam U et al who postulated that increased maternal age, preeclampsia and multiple gestation are associated with increased incidence of peripartum cardiomyopathy.[14] This study also shows positive correlation between increasing parity and increased risk of peripartum cardiomyopathy as evidenced by 25% of peripartum cardiomyopathy being gravida 3 or above. Increased tobacco chewing (13%) and smoking (10%) are reported as risk factors. PPCM could be due to immunological cause, myocarditis secondary to viral, toxic or bacteriological cause, which could not be evaluated in this study.

PPCM occurs mostly postpartum, but in this study, only 22% of cases presented in postpartum period, while 78% of women diagnosed antenatally. As the cardiovascular changes in pregnancy take place between 28 to 36 weeks, the symptoms of peripartum cardiomyopathy manifest during this period. This study diagnosed most cases antenatally, as we screened all high risk, and diagnosed early. Therefore we have to screen the high risk by 2D-Echo from 28 weeks to upto 6 months postpartum period.

In this study we noted that 39% of women had EF between 35-40%, 22% had EF between 45-55% and 39% had >55%. Out of the 18 cases of PPCM, 4 died giving a case fatality rate of 22%. This is lower than most studies, as we have screened the high risk and diagnosed in early phase of the disease. In this study the maternal mortality in relation to EF was studied, and it was found that in 75% of deaths, EF was <40%, and in 25% of deaths it was between 45-55%. This is in conformity with studies by Brar et al.[15] This study proves the role of routine 2D-ECHO in early diagnosis of high risk cases of peripartum cardiomyopathy, taking LV EF as a vital parameter and these patients can be monitored in a high risk pregnancy unit by senior obstetrician /intensivist /cardiologist to decrease the maternal mortality rate. In our study, out of the 18 cases of PPCM, there were 4 deaths, we could follow up 9 cases during postpartum period i.e. 6 weeks after delivery, and 5 cases were lost for follow up. Probably, the 5 cases recovered, hence did not come for follow up. Out of the 9 cases followed up, there was improvement of EF in 6 cases (66%).

CONCLUSION

It is important to identify and screen all women who are at risk of developing peripartum cardiomyopathy. 2D Echocardiography is an extremely valuable tool to diagnose peripartum cardiomyopathy and also for follow up and prognosis. Increased maternal age, multiple gestation, increased parity and preeclampsia are significant risk factors. EF <45% is a bad prognostic indicator. Early diagnosis of peripartum cardiomyopathy by 2D Echo, helps in better management and avoids maternal morbidity and mortality.

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