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RETROSPECTIVE STUDY ON PERIPARTUM CARDIOMYOPATHY AT TERTIARY CARE HOSPITAL IN KARNATAKA INSTITUTE OF MEDICAL SCIENCES, HUBLI

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ABSTRACT

Background: Peripartum cardiomyopathy is a rare disease which is idiopathic and reversible form of dilated cardiomyopathy seen in women of reproductive age group. The aim of the study was to analyse the clinical profile, risk factors and maternal outcome in patients with peripartum cardiomyopathy. **Methods:** It is a retrospective Observational Study conducted at Karnataka institute of medical sciences Hubli hospital, with total of 40 peripartum cardiomyopathy cases diagnosed between January 2014 to January 2018. **Results:** Our study revealed that most of the affected patients were young with the mean age at presentation being 24.25 years. Most of the patients were diagnosed in the postpartum period (87.5%). Common risk factors were pre-eclampsia (25%) and multiparity(25%) followed by anaemia (22.5%). The mean Ejection fraction at the time of presentation was 30.4%. There were 8 maternal deaths (20%). **Conclusions:** PPCM is associated with high maternal morbidity and mortality, hence there is a need for more multi-centric studies to understand the exact pathogenesis and to determine the possible early treatment to achieve a better outcome.

KEYWORDS: Peripartum Cardiomyopathy (PPCM), Ejection fraction (EF), Left ventricular function, Echocardiography, Maternal outcome.

INTRODUCTION

Peripartum cardiomyopathy is a rare but potentially life threatening cardiac failure of unknown aetiology, presents with left ventricular systolic dysfunction in the last month of pregnancy or within 5 months of delivery. It is rare and occurs at a frequency of about one in every 1000 - 4000 births.[1] It is very similar to other nonischemic dilated cardiomyopathy except for its unique relationship with pregnancy.[2] Currently it is a diagnosis of exclusion following a concurrent evaluation of peripartum heart failure. PPCM was 1st described in the 18th century but in 1930 it was recognized as a separate clinical entity. Demakis et al in 1971 described 27 patients who presented with cardiomegaly, abnormal electrocardiographic findings, and congestive heart failure during the puerperium and named the syndrome "The peripartum cardiomyopathy".[3]

DIAGNOSTIC CRITERIA

The definition of PPCM was modified which now includes following four criteria, three clinical and one echocardiography –

1. Development of heart failure during last trimester of pregnancy or first six months post partum.
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- Demostrable echocardiographic proof of left ventricular systolic dysfunction. 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.[4]

Multiple risk factors associated with PPCM include age greater than 30 years, history of preeclampsia, postpartum hypertension, multiparty, African descent, pregnancy with multiple foetuses, maternal cocaine abuse, long-term(>4 weeks) tocolytic therapy with beta adrenergic agonists. Management of PPCM is similar to that employed for other types of heart failure with left ventricular systolic dysfunction, but it should be given carefully to ensure the safety of the mother and the unborn foetus or breastfed baby.[5] Diuretics, vasodilators, digoxin, beta blockers and anticoagulant use is well established in medical management. ACE inhibitors and ARB blockers are usually avoided during pregnancy but should be started in post partum period. Pentoxifylline, immunoglobulin and immunosuppressive drugs may be used in resistant cases. Bromocriptine and cabergoline are newer drugs in research. Cardiac transplantation is the last resort of treatment for patients in whom conventional therapy is not successful.

There are limited number of studies in Karnataka hence this study was conducted to assess the clinical profile, prognostic factors and the management along with maternal outcome in women with peripartum cardiomyopathy.

METHODS

It is a retrospective Observational Study conducted at Karnataka institute of medical sciences Hubli hospital, with a total of 40 peripartum cardiomyopathy cases diagnosed between January 2014 to January 2018. All Antenatal women in reproductive age group of 20 years to 40 years attending the labour ward of a tertiary care centre who presented with heart failure in last month of pregnancy till 5 months postpartum, without previously having a heart lesion and then having ECG changes, ECHO findings suggestive of cardiomegaly, LVEDV (left ventricular end diastolic volume) more than 2.7cm/m2 and EF (ejection fraction) less than 45, were included in the study. Detailed history regarding demographic, obstetric, past and family histories taken, general physical examination, cardiovascular and respiratory system examination was carried out in detail. Routine investigations, ECG, ECHO were carried out and were monitored in intensive care unit. Standard heart failure therapy protocol was used. ACE inhibitors were avoided in pregnancy. Statistical analysis of data was done using SPSS software.

RESULTS

Table 1: Showing age wise distribution of peripartum cardiomyopathy cases.

Age groups in years	No of patients	Percent (%)
20-24	21	52.5
25-29	13	32.5
30-35	6	15

Most of patients were in the age group of 20-24 years that is 52.5% with mean age of 24.25years.

Table 2: Antenatal cases of peripartum cardiomyopathy.

Gravida	No of patients	Mean gestational age in weeks
Gravida 1	3	37
Gravida 2	1	38
Gravida 3	0	-
Gravida 4 and above	1	36

5 cases were diagnosed in the late 3rd trimester, 3 patients were primigravida and mean gestational age of presentation was 37 weeks.

Table 3: Postnatal cases of peripartum cardiomyopathy.

PARITY	No of patients
Para 1	13
Para 2	12
Para 3	7
Para 4 and above	3
Total	35

Out of 40 patients 35 patients presented in the postnatal period that is 87.5% of total.

Table 4: Showing average time of diagnosis of peripartum cardiomyopathy.

Average time of diagnosis	No of patients	Percent (%)
ANC (around 37weeks)	5	12.5
<1 Week	11	27.5
1 Week -1 Month	9	22.5
2nd month	5	12.5
3rd month	7	17.5
>4th month	3	7.5

Most cases presented in postpartum period, 11 patients (27.5 %) were presented within one week of delivery, 9 cases presented between 1 week -1 month, 5 cases in 2nd month, 7 cases in 3rd month and 3 cases presented 4 month after delivery.

Table 5: Showing risk factors for peripartum cardiomyopathy.

Risk factor	No of patients	Percent (%)
Pre-eclampsia	10	25
Twins	2	5
Anaemia	9	22.5
Peripartum cardiomyopathy in previous pregnancy	2	5
Multipara	10	25
None	7	

In our study the most common risk factors were Pre-eclampsia (25%) and multipara(25%) followed by anaemia(22.5%) and 2 cases were of twin pregnancies (5%), 2 patients had a prior history of peripartum cardiomyopathy in the previous pregnancy (5%).

Table 6: Showing Ejection fraction at the time of diagnosis and discharge.

Ejection fraction (%)	Diagnosis	Discharge
<25	2	-
26-30	10	-
31-35	11	1
36-40	10	3
41- 45	7	12

In this study 11 patients had Ejection fraction in the range of 31-35% and the lowest ejection faction at the time of diagnosis was 24% and only 15 patients had 2D echo at the time of discharge.

Table 7: Showing the maternal outcome of peripartum cardiomyopathy cases.

Outcome	No of patients	Percent (%)
Recovered clinically	15	37.5
LV function recovered (EF>45%)	7	17.5
Death	8	20

15 patients (37.5%) recovered clinically by showing improvement in dyspnea, chestpain, hemoptysis and 7 patients had recovery of ejection fraction by showing improvements in left ventricular function. There was mortality in 8 patients (20%).

In a study conducted by Elkayam et al[6] the mean age of presentation were 31±6 years. Our study revealed that most of the affected patients were young with the mean age at presentation being 24.25 years, most of the patients were diagnosed in the postpartum period (87.5%) and there were 2 patients who had a prior history of peripartum cardiomyopathy in the previous pregnancy. In the study conducted by Elkayam et al the common antenatal risk factors were gestational hypertension (43%), tocolytic therapy (19%), and twin pregnancy (13%). In our study, the most common risk factor was pre-eclampsia (25%), multiparty (25%) followed by anaemia (22.5%) and mean Ejection fraction at the time of presentation was 30.4%.

At the end of 6 weeks 7 patients (17.5%) showed an improved ejection fraction of >45,15 patients(37.5%) recovered clinically at the time of discharge by showing improvement in dyspnea, chestpain,hemoptysis. 8 patients (20%) died. Rest of them did not have an improvement of Ejection fraction; however none of them deteriorated either. Similarly, in a study conducted at D. Y. Patil Hospital at Kolhapur by Prasad et al (7), 61% (8/13) patients recovered completely and there was mortality of one case.

Limitation of this study was patients were not followed up as it was retrospective study hence morbidity and mortality after discharge was not studied.

DISCUSSION

Clinical course of peripartum cardiomyopathy is variable with diagnosis of exclusion. Multiparty, advanced maternal age. Obesity, history of cardiac disorders like myocarditis, smoking, alcohol, use of certain drugs, preeclampsia are risk factors. A strong association with hypertension was observed in study conducted in the United States hence there is dispute that the cause of heart failure seen in patients with peripartum cardiomyopathy is may be increased blood pressure. However additional studies in women with preeclampsia have revealed no change in systolic left ventricular function.[6] The etiology is multifactorial, it includes, abnormal inflammatory changes, immunological, myocarditis, genetic predisposition and cytokine production. One recent study suggests role of prolactin sub-fragments which causes unbalanced oxidative stress in etiology.[8] Now particular importance is given to production of proapoptotic, proinflammatory and angiostatic mediators causing oxidative stress. CRP, IL-6, TNF-α are plasma markers of inflammation and are significantly increased and correlated with LV dimensions changes and low EF at the time of presentation.[9]

The clinical features are similar to dilated cardiomyopathy of any other form, symptoms includes dyspnea, cough, palpitations, chest pain, fatigue and signs are tachycardia, peripheral oedema, decreased saturation, ascites and hepatomegaly. Embolic episodes are commonly caused by arrhythmias.

Management requires multidisciplinary team. Optimum pregnancy outcome is achieved by early diagnosis and prompt treatment.

The continuous hemodynamic monitoring and prevention of fluid overload are principles of management. The afterload reducing agents are mainstay of medical therapy including Hydralazine and Nitroglycerine or Amlodipine and are preferred in the pregnancy as these are non-teratogenic. For reducing pre-load and pulmonary congestion diuretics are used. Digoxin is inotropic agent used in low output failures. As Beta blockers improve symptoms, ejection fraction and survival, these are recommended drugs in treatment.

When ejection fraction of <35%, atrial fibrillation, bedridden or obese require anti-coagulation therapy. Advanced therapies like mechanical support and heart transplantation should be considered in patients with persistent severe left ventricular (LV) dysfunction.

Pentoxifylline (inhibits tumor necrosis factor), cabergoline and bromocriptine (antagonist of prolactin) are upcoming modalities. Plasmapheresis, ventricular assist devices, immunoadsorption, and heart transplantation are newer interventions which hold a promising future.[10] The optimum time and mode of delivery is still controversial. In stable patients vaginal delivery and for obstetrical indications Caesarean delivery is reserved. Preferred delivery mode is planned caesarean section in critically ill and in unstable patients who are on inotropic therapy and on mechanical support.[11]

Prognosis is based on the degree of cardiomegaly, EF and LV dilatation at diagnosis and in the following 6 months. Long-term follow up of these patients is essential. Over a period of 6-12 months the treatment is usually tapered.

Patients with persistent ventricular dysfunction are advised to avoid subsequent pregnancies and counselled regarding possible recurrence in future pregnancy. Early booking of antenatal cases will help us to diagnose before acute clinical deterioration occurs in these patients.[8]

CONCLUSION

Our study showed that elderly women with multiparty, preeclampsia and anaemia are important risk factors for peripartum cardiomyopathy. Early diagnosis and prompt management plays vital role in determining the outcome of these patients. When there is delay in diagnosis it is associated with high maternal morbidity and mortality hence there is a need for more multi-centric studies to understand the exact pathogenesis and to determine the possible early treatment to achieve better outcome.

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