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Original Research Article

Profile of gestational dyspnoea with focus on peripartum cardiomyopathy

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ABSTRACT

Background: Peripartum cardiomyopathy (PPCM) is even today an incompletely understood and rare disease affecting pregnant women. There have been few studies from south India, especially Kerala on PPCM.
Methods: Women who were referred from Department of Obstetrics and Gynecology from May 2010 to April 2016 for evaluation of dyspnoea during pregnancy or within 5 months of delivery were included in the study. They were screened and women with history suggestive of heart failure during peripartum period were evaluated in detail and followed up.
Results: 8760 pregnant and peripartum women presented with dyspnoea out of which 20 patients were diagnosed with PPCM. The incidence of PPCM was 1 per 2190 pregnancies. The mean left ventricular end-diastolic dimension was 58±9 mm, the mean end-systolic dimension 45±6 mm and mean left ventricular ejection fraction (LV EF) 31.45±3.73% at diagnosis. Major adverse events (MAE) occurred in 4 patients. Low baseline ejection fraction (LV EF < 30%) significantly correlated with greater incidence of adverse events.
Conclusions: The majority of pregnancy related dyspnoea is benign. Echocardiography can reliably diagnose potentially life threatening conditions and should be performed early. Echocardiography aids in both diagnosis and prognostication in PPCM. Low ejection fraction at baseline (LVEF < 30%) significantly correlates with greater incidence of major adverse events in patients with PPCM.

Keywords: LV ejection fraction, Peripartum cardiomyopathy, Pregnancy dyspnoea

INTRODUCTION

Causes of dyspnoea in pregnancy are many and range from benign to life threatening. Among these etiologies, peripartum cardiomyopathy (PPCM) is even today incompletely understood and still remains a diagnosis of exclusion to a certain extent.[1] There have been few studies from South India, especially Kerala on PPCM.

Peripartum cardiomyopathy presents with left ventricular systolic dysfunction in the last month of pregnancy or within 5 months of delivery.[2] It is rare and occurs at a frequency of about one in every 1000 - 4000 births.[3] The majority recover left ventricular function, usually between 3 and 6 months postpartum, though mortality rates are around 6-10%.[4] Normalization of ventricular function appears more likely if the ejection fraction is more than 30% at the time of diagnosis.[5] The aim was to study incidence and causes of pregnancy related dyspnoea in a tertiary care hospital in South India and to examine predictive factors for adverse outcome in patients found to have peripartum cardiomyopathy.

METHODS

Prospective observational analytical study was done from May 2010 to April 2016 at Department of General Medicine, Government TD Medical College Hospital, Vandanam, Alappuzha, Kerala, India. Women who were referred from Department of Obstetrics and Gynecology

for evaluation of dyspnoea during pregnancy or within 5 months of delivery were included in the study. The study was approved by the institutional research board and ethics committee and informed written consent was taken from the patients prior to the tests. Those women with history suggestive of heart failure during last month of pregnancy or ≤ 5 months postpartum were evaluated in detail with the following investigations.

History and physical examination

Electrocardiogram

Complete blood count, renal function tests, serum electrolytes, blood sugar

Thyroid function tests

Echocardiography: EF by Simpson's method

Those diagnosed to have peripartum cardiomyopathy were followed up. All patients were managed according to standard protocols.

The significance and predictive value of various parameters and their relationship to prognosis and recovery was assessed using paired two-tailed t-test and student's unpaired t-test.

RESULTS

8760 women in the pregnant and peripartum period presented with dyspnoea during the study period (Table 1). Upper and lower respiratory infections and anxiety together accounted for 60% of cases. Anemia caused dyspnea in 11.7% cases.

Rheumatic mitral stenosis was the cause of dyspnoea in 1.2 % of patients. These patients underwent balloon mitral valvotomy around 5 months of gestation, which lead to uneventful completion of the pregnancy.

The 6 patients (0.07%) who developed amniotic fluid embolism needed ventilation and inotropes for hypotension, but recovered after a mean period of 4.3 days. 20 patients were diagnosed to have peripartum cardiomyopathy (PPCM). The incidence of PPCM was 1 per 2190 pregnancies.

Mean age was 23.8±4.37 (Figure 1). The majority (85%) of patients were in NYHA Class III or IV at presentation (Table 2). 16 were primigravidas and the rest second gravida. 3 patients presented antepartum and the remaining 17 presented postpartum. 2 patients had history of peripartum cardiomyopathy in the previous pregnancy of which one had complete normalization of LV function and the other had persistent LV dysfunction. 1 patient had twins. Mode of delivery was cesarean section in 4 patients, which was performed for obstetrical reasons. Premature delivery occurred in 5. Fetal wastage occurred in 3 patients.

Table 1: Profile of gestational and peripartum dyspnoea - May 2010 to April 2016.

Etiology of dyspnoea	No of patients n = 8760	Percentage
URTI*	2482	28.3
LRTI**	1698	19.4
Anxiety	1086	12.4
Acute severe asthma	1038	11.8
Anemia	1027	11.7
H1N1	508	5.8
Leptospirosis	497	5.7
Rheumatic mitral stenosis	108	1.2
Tuberculosis	70	0.8
Pre eclampsia	64	0.7
Thyrotoxicosis	51	0.5
Myocarditis	34	0.4
Pulmonary embolism	28	0.3
Mitral valve prolapsed	22	0.25
Peripartum cardiomyopathy	20	0.23
Sepsis	9	0.1
Varicella pneumonia	8	0.09
Amniotic fluid embolism	6	0.07
Tetralogy of Fallot	3	0.03
Chronic myeloid leukemia	1	0.01

*Upper respiratory tract infection, **Lower respiratory tract infection

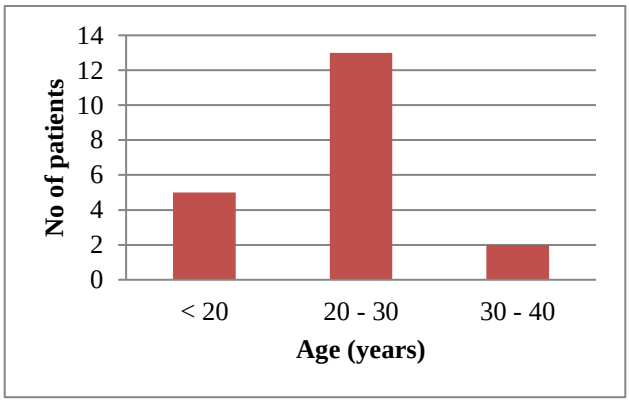

Figure 1. Ages of PPCM patients at presentation.

Table 2: NYHA Class at presentation.

NYHA Class	No of patients	Percentage
Class IV	4	20
Class III	13	65
Class II	3	15

The Hb levels, blood sugar, renal function tests and thyroid function tests were normal in all patients with PPCM. Electrocardiographic findings were sinus tachycardia, atrial fibrillation, nonspecific ST segment changes and conduction abnormalities (Table 3).

Table 3: Electrocardiographic changes in peripartum cardiomyopathy.

Electrocardiographic findings	Percentage
Normal	9
Sinus tachycardia	27
Atrial fibrillation	16
Nonspecific ST segment changes	38
Conduction abnormalities	10

The mean left ventricular end-diastolic dimension was 58±9 mm and the mean end-systolic dimension 45±6 mm at diagnosis. Mean left ventricular ejection fraction (LV EF) at diagnosis was 31.45±3.73%. 3 patients (25.3%) had severe mitral regurgitation. The pulmonary artery systolic pressure was more than 60 mmHg in 6 (25.3%) patients.

Table 4: Ejection fraction (EF) at baseline and follow up

	EF Initial	EF at 6 months
Mean	31.45	50.56
SD	3.73	6.95

Paired two-tailed t-test (p <0.0001) showing significant improvement in mean ejection fraction at follow up.

Table 5: Relationship of ejection fraction at baseline to major adverse events (MAE).

	MAE free	Patients with MAE
Mean	32.56	27.00
SD	3.27	1.41
SEM	0.82	0.71
N	16	4

EF at presentation significantly lower in patients who had MAE compared to those with event free survival. (Student's unpaired t-test; t = 3.2772; Degree of freedom = 18; p = 0.0042).

Table 6: Relationship of age at presentation to major adverse events (MAE).

	MAE free	Patients with MAE
Mean	23.19	26.25
SD	3.92	5.85
Variance	15.36	34.25
N	16	4

Age at presentation not statistically different in patients with MAE compared to those with event free survival. (Student's unpaired t-test; t = -1.273; Degree of freedom = 18; p value = 0.219).

There was a significant improvement in mean ejection fraction to 50.56±6.95% at 6 months which occurred in 16 patients (Table 4). Severe LV dysfunction and cardiac dilatation persisted in 4 patients even after 6 months of follow up. Major adverse events (MAE) occurred in 4 patients. All were in pulmonary edema, had severe LV dysfunction (LVEF< 30%) and PA systolic pressures > 60. The ejection fraction at presentation was significantly lower in patients who had MAE compared to those who had event free survival (Table 5).

Table 7: Relationship of gravidity to major adverse events (MAE).

	MAE free	Patients with MAE
Mean	1.13	1.50
SD	0.34	0.58
SEM	0.09	0.29
N	16	4

Gravidity not statistically different in patients with MAE compared to those with event free survival. (Student's unpaired t-test; t = 1.7162; Degree of freedom = 18; p = 0.1033).

The age at presentation (Table 6) or gravidity (Table 7) did not differ significantly in patients who developed MAE compared to those who had event free survival.

DISCUSSION

Causes of dyspnoea in pregnancy are many and varied. In this study, the majority of pregnancy related dyspnoea was found to be of benign etiology (60%). Anemia as a cause of dyspnea was only 11.7%, probably because of iron and folic acid supplementation in all pregnant women. Rheumatic heart disease as a causative factor of dyspnea in pregnancy was only 1.2 %.

The incidence and prevalence of traditional diseases like anemia and rheumatic heart disease as etiologies for dyspnoea in pregnant women in our societies are decreasing because of better standard of living, overall socioeconomic progress, improvements in nutrition, medical care and female literacy. In this context, other etiologies for dyspnoea begin to assume greater importance. Some of these diseases could carry life threatening prognoses.

Ours is an era of global travel and the shrinking world. Pandemics though originating elsewhere do not take long to make an appearance within our borders. In view of the recent H1N1 pandemic, all pregnant patients with sore throat and suggestive histories need to be evaluated with throat swabs and cultures which are cheap widely available investigations that can be done without fear of radiation. Also the rewards are greater, since these infections are potentially completely curable conditions, unlike other etiologies.

Echocardiography is an easily available, relatively cheap and safe screening tool that can reliably find evidence of potentially life threatening conditions diseases like pulmonary embolism and PPCM and should be

considered early in any pregnant woman presenting with dyspnea.

Echocardiography provides invaluable diagnostic and prognostic information in PPCM.

Elkayam et al conducted a large study of PPCM in 123 patients.[5] Their mean age was 31±6 years. LV ejection fraction at diagnosis was 29±11%, which significantly improved to 46±14% at follow-up. Normalization of LV ejection fraction was found in 54% and was more likely in patients with left ventricular ejection fraction > 30% at diagnosis. Maternal mortality was 9%. In a study from Manipal, India, incidence of PPCM was 1 per 1374 live births.[6] In a retrospective 6 year study of patients who had DCM with pregnancy conducted by Suri V et al from PGIMER, India, mean LVEF at diagnosis was 32.28 %.[7] Maternal mortality was 15.8 %. All deaths occurred in patients who presented in NYHA class IV and had global hypokinesia on echocardiography.

The large recent prospective multicentre IPAC study of 100 women with newly diagnosed PPCM was conducted by Mcnamara DM et al.[8] In this study mean patient age was 30±6 years, LVEF at study entry was 0.35±0.10 and 0.51±0.11 at 6 months. An initial LVEF <0.30 and LVEDD ≥6.0 cm were associated with a lower LVEF and less recovery.

In the present study, data from 20 women with LV dysfunction without a secondary cause who presented during peripartum from May 2010 to April 2016 was analyzed. In this 6 year study, incidence of PPCM was found to be 1 in 2190. LV ejection fraction at diagnosis was 31.45±3.73%, which improved to 50.56±6.95% at follow-up. 80 % of patients had significantly improved LVEF at 6 months. However 20% did not, and low ejection fraction <30% at baseline significantly correlated with poor recovery and greater incidence of major adverse events.

CONCLUSION

The majority of pregnancy related dyspnoea is benign. Echocardiography can reliably diagnose potentially life threatening conditions in pregnancy and should be performed early. Echocardiography aids in both diagnosis and prognostication in PPCM. Low ejection fraction at baseline (LVEF < 30%) significantly correlates with greater incidence of major adverse events in patients with PPCM.

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