Prognostic Factors at initial Presentation in Patients with Peripartum Cardiomyopathy

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Abstract

Objective: To describe the prognostic factors at initial presentation of patients with peripartum cardiomyopathy (PPCM).

Setting: Department of Adult Cardiology, National Institute of Cardio-vascular Diseases Karachi, Pakistan, from December 1999 to August 2001.

Methods: A total of 35 patients diagnosed to have peripartum cardiomyopathy (PPCM) were studied. A detail clinical history was taken in each case and two-dimensional Doppler echocardiogram was done at the time of diagnosis and later repeated at the end of six months to assess the recovery or progress of the disease.

Results: The mean age at the time of diagnosis was 30.8 ± 6.74 years; 77% were from lower socio-economic class with poor nutritional status; 77.14% Multiparous; 25.7% had recurrent PPCM and 71.4% presented during post-partum period. 71.4% had ejection fraction < 30% and 74% had >55 mm of left ventricular end-diastolic dimension. Patients who improved, as compared to those who deteriorated, were significantly younger (26.2 ± 5.8 v/s 33.3 ± 5.5 years, p-value <0.001), fair socio-economic class with better nutritional status (p-value <0.011), lower LVEDD (55.92 ± 5.2 v/s 60.96 ± 4.41 mm, p-value <0.005), and a better ejection fraction (30.1 ± 3.75 v/s 25.4 ± 5.6, p-value <0.006). Mortality at six months was 22.8%; 42.9% had persistent disease and only 34.3% recovered completely.

Conclusion: Advanced age (>30 years), lower socio-economic status with poor nutritional status, poor ejection fraction and increased left ventricular end-diastolic dimension were found as poor prognostic factors (JPMA 53:297;2003).

Introduction

Peripartum cardiomyopathy (PPCM) is a rare form of left ventricular failure that is poorly characterized and of unknown etiology. Ritchie and Virchow[1,2] first described an association between puerperium and cardiac failure in the middle and late 1800s. Later in 1971 Demarkis and associates[3] described it as the development of cardiac failure during the last month of pregnancy or 5 months after delivery in a patient with no demonstrable heart disease before the last month of pregnancy and no discernible etiology for heart failure. More recently, it has been suggested that impairment of left ventricular function and increased left ventricular end-diastolic dimension should be added as diagnostic criteria for PPCM.[4,5] Despite of current management, the mortality rate remains high between 25-50%[3,6] and nearly half of patients surviving the initial episode of cardiac failure continue to have persistent left ventricular dysfunction.[6] We attempted to identify the prognostic factors of peripartum cardiomyopathy (PP-CMP) in Pakistani patients.

Patients and Methods

From 1st December 1999 to 30th August 2001, 35 consecutive patients diagnosed to have peripartum cardiomyopathy (PP-CMP) at the National Institute of Cardiovascular Diseases (N.I.C.V.D.) Karachi, Pakistan, were enrolled. In each case the clinical history was verified and the two-dimensional Doppler echocardiogram was done at the time of diagnosis and later repeated at the end of six months of treatment to evaluate the left ventricular function so as to assess the recovery or progress of the disease.

Patiens with heart failure within the last month of pregnancy or 5 months postpartum, absence of pre-existing heart disease, no determinable etiology, and Echocardiographic evidence of left ventricular dysfunction[3,5] were included in this study.

Exclusion criteria were pre-existing heart disease e.g. congenital, valvular, or ischemic heart disease, heart failure secondary to anemia, infections, metabolic and toxic causes, presence of any other systemic illness before pregnancy e.g. autoimmune disease, and any complication arising during delivery e.g. puerperal infection, septicemia, ante-partum/post-partum hemorrhage, pulmonary embolism, amniotic fluid embolism, etc which may lead to heart failure.

Standard treatment for congestive cardiac failure including dispirin, angiotensin converting enzyme inhibitor (ACE-I), diuretics (Frusemide and aldactone) and digoxin, was given to the patients and their responses were analyzed.

The follow up visits were carried out for at least 6 months for every individual patients as nearly half of deaths usually occur during the first 3 months [3,7], while those who recover usually do so during first 6 months from the time of diagnosis[3] and those with persistent left ventricular dysfunction after 6 months usually have poor prognosis.[3,7]

Patients were divided into two groups depending upon their clinical status at follow-up. Group A consisted of patients who improved or recovered, and Group B consisted of patients who either died or deteriorated and remained in functional class 111 or 1V of NYHA.[8,9] Echocardiogram was repeated at the end of six months to evaluate the left ventricular function and to assess the recovery or progress of the disease.

Statistical analysis was done in SPSS system. Data was analyzed in two-tailed Chi-square test and two-tailed fisher exact test. Student t-test and Pearson's correlation coefficient were used for comparison and correlation. The data in the text are expressed as the mean±standard deviation. P-value less than 0.05 was considered significant.

Results

The mean age at the time of diagnosis was 30.8 ± 6.74 years (range 17 to 40 years), with 68.6% above 30 years. Majority of the patients were multiparous (77.14%) and presented during the postpartum period (71.4%). PPCM was more commonly found in patients belonging to lower socio-economic class with poor nutritional status (77%), 25.7% of patients had recurrent PPCM while 8.6% were diabetics, 71.43% had normal babies while 28.57 patients had either dead baby at delivery or their babies expired soon after delivery (Table 1).

Table 1. Salient features of PP-CMP.

Variables	No. of patients	Percentage
Mean Age (yrs.)	35	30.8±6.54 (range17-40)
Mean duration of symptoms (wks)	35	6±7.3 (range 1-36)
Recurrence of PP-CMP	9	25.7
Diabetes Mellitus	3	8.6
Complete Recovery	12	34.3
Persistent disease	15	42.9
Death	8	22.8
Babies expired	10	28.57
Fair socio-economic class	8	23.0
Lower class with poor nutritional status	27	77.0
Uniparous	8	22.86
Multiparous	27	77.14
Peri-partum	10	28.6
Post-partum	25	71.4
Ejection Fraction (%) in Echocardiography		
<20%	6	17.1
21-25%	11	31.4
26-30%	8	22.9
>31%	10	28.6

The mean duration of symptoms was 6 ± 7.3 (range 1-36) weeks at the time of diagnosis. Dyspnea was present in all patients followed by chest pain (45.71%), edema (37.14%) and paroxysmal nocturnal dyspnea (17.14%). The examination showed bilateral crepitations in the chest (88.7%), S3 gallop (65.71%), tachycardia (62.86%), edema (60%), hypotension (37.14%), raised JVP (28.57%) and anemia (2.86%). There was cardiomegaly on chest X-ray in 71.4%, while on ECGs 85.7% had poor 'R' wave progression in anterior chest leads and 5.7% had LBBB. Poor left ventricular function with ejection fraction <30% was found in 71.4% and 74% had dilated left ventricle with left ventricular end-diastolic dimension >55 mm; 34.3% of patients recovered completely while rest either had persistent and progressive disease (42.9%) or had expired (22.8%) (Figure).

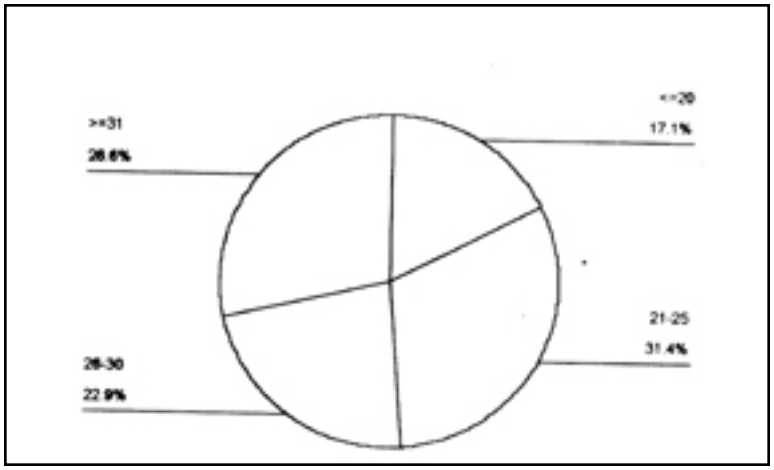

Figure showing ejection fraction at initial presentation.

Table 2 shows that there was no significant difference (p values = 0.097, 0.899 and 0.189 respectively) between patients who presented for the first time v/s patients with recurrent PPCMP in the mean age, ejection fraction (EF) and left ventricular end diastolic dimension (LVEDD). Similarly, parity, time of onset (peri-/post-partum period) and outcome between these two groups were also statistically insignificant.

To compare the various prognostic factors in PPCMP patients were divided in two groups depending upon their clinical status at the end of six months of follow-up. Group A consisted of 12 (34.3%) patients who improved and group B, 23 (65.7%) patients who deteriorated i.e., either expired or remained with persistent disease in functional class III or IV (Table 3). The patients who improved on therapy, as compared to those who deteriorated, were significantly younger (p-value <0.001), financially better off with better nutritional status (p value <0.011), had lower LVEDD (p value <0.005)and a better ejection fraction (p-value <0.006), while duration of symptoms, presentation period (first time or recurrent),

parity, time of onset (peri-/post-partum), mode of delivery (caesarian section or normal vaginal delivery), chest X-ray and ECG abnormalities did not show significant relationship with outcome.

Table 2. Comparison between patients presented first time v/s recurrent PP-CMP.

Features	Patients presented for first time (n = 26)	Patients with recurrent PP-CMP (n = 9)	p-value
Age (years)	29.9 ± 6.8	33.6 ± 4.9	0.097
Ejection Fraction (%)	26.9 ± 5.4	27.2 ± 6.4	0.899
LVEDD (mm)	58.5 ± 5.3	61.2 ± 4.9	0.189
Uniparous	8	0	0.081
Multiparous	18	9	
Peripartum	8	2	0.99
Postpartum	18	7	
Improved	10	2	0.450
Deteriorated	16	7	

LVEDD = Left ventricular end-diastolic dimension

Table 3. Prognostic factors in peripartum cardiomyopathy.

Variables	Improved (n=12)	Deteriorated (n=23)	P-value
Age	26.2±5.8	33.3±5.5	0.001
Duration of symptoms	6.2±5.3	5.9±8.3	0.911
Socio-economic status			
- Fair	6	2	0.011
- Poor	6	21	
Presentation			
- First time	10	16	0.450
- Recurrence	2	7	
Parity			
- Uniparous	4	4	0.402
- Multiparous	8	19	
Partum			
- Peripartum	5	5	0.258
- Postpartum	7	18	
Delivery			
- Normal vaginal	11	20	0.99
- Caesarian section	1	3	
Chest X-ray			
Normal	5	5	0.258
Abnormal	7	18	
Ejection Fraction (%)	30.1±3.73	25.4±5.6	0.006
LVEDD (mm)	55.92±5.2	60.96±4.41	0.005

- Deteriorated patients include both expired and those with persistent disease after six months of diagnoses and initiation of treatment.

LVEDD = Left ventricular end-diastolic dimension.

Discussion

Peripartum cardiomyopathy is a rare cause of heart failure with high morality.[3,6,7] The underlying cause remains undetermined, and diagnosis is essentially by exclusion; clinicians assuming that other problems such as volume overload, hypertension with systolic dysfunction, and sepsis, all of which occur at or after term, are absent. Evaluation by echocardiographic measurements of left ventricular chamber dimension and function at diagnosis and recovery; and by echocardiographic stress tests using pharmacologic stimulation with dobutamine to determine contractile reserve should be considered and recommended.[6]

The mean age in this study was 30.8 ± 6.54 years (range17-40) as most of our patients were >30 years of age (68.6%), emphasizing the fact that the disease has been found more commonly in women >30 years, although a wide range of ages have been reported.[3,10] Also majority of our patients were multiparous (77.14%) which is consistent with some[11] but different from other studies where they found the disease more commonly in younger age group with lower level of parity.[8,12] Majority of our patients were from lower socio-economic class with poor nutritional status (77%), which is also one of the recognized risk factor for PPCM.[11]

Thus, the study showed advanced age (>30 years), lower socio-economic class with poor nutritional status, multiparity, past history of PPCM as the risk factors for peripartum cardiomyopathy, which patients are more prone to develop during postpartum period; these findings are same as reported in earlier studies.[1, 3, 7,10,13,14] We also found that recurrent PPCM is more in advance age, as all of our 9 patients with recurrent PPCMP were above 30 years of age; among whom 2 (22.22%) recovered, 2 (22.22%) expired and 5 (55.56%) remained with persistent and progressive disease. Thus 77.78% of patients with recurrent PPCM either deteriorated or had expired by the end of six months of follow-up, showing that recurrent peripartum cardiomyopathy has much higher mortality and morbidity. Although there was no statistical significance between the mean age, ejection fraction (EF) and left ventricular end diastolic dimension (LVEDD), time of onset (peri-/post-partum), parity and outcome of patients with recurrent peripartum cardiomyopathy in our study as compared to those patients presenting for the first time with peripartum cardiomyopathy; however, these finding are consistent with the fact that patients, even after complete recovery from first episode of peripartum cardiomyopathy, may be at a higher risk for recurrence during subsequent pregnancies[3,10,14,15] and the reason of this recurrence is still unknown. This is in contrast to Sutton et al[16] that after resolution of left ventricular function the patients with PPCM are at no increased risk for cardiac problems on their subsequent pregnancies. Therefore, in our opinion the women with peripartum cardiomyopathy should be counseled for future pregnancies and be informed about the possibilities of recurrence of cardiomyopathy with subsequent pregnancies, which carries high mortality. However, if the pregnancy is still desired then patients should first undergo stress testing for example stress echocardiogram[6,17] to evaluate for contractile reserve under hemodynamic stressful conditions.

The study showed advance age (>30 years), low socio-economic status with poor nutrition, lower ejection fraction (EF) and increased left ventricular end-diastolic dimension (LVEDD) as poor prognostic factors. However, Ravikishore[8] did not find EF statistically significant in relation to prognosis, while Rosa et al[15] did showed prognostic value

in their study; however, they found parity, symptoms onset, cardio-thoracic ratio on chest X-ray (CXR) and hemodynamic data as significant markers of prognosis as opposed to our findings in which symptoms duration, presentation, parity, time of onset (peri/post-partum), mode of delivery and CXR were not statistically significant. Thus, in our study, those patients who did not improve on therapy were found to have higher left ventricular end-diastolic dimension with poor left ventricular ejection fraction on echocardiogram and advanced maternal age. It is also known that patients with persistent left ventricular dysfunction have an unacceptably high risk of cardiac complications and death during subsequent pregnancies and, therefore, should be counseled not to become pregnant again.[18]

In conclusion, we tried to describe the poor prognostic factors at initial presentation and to identify the high risk subjects and thus to provide effective treatment that will ensure a favorable return of normal left ventricular function.

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