Original Article

RISK FACTORS ASSOCIATED WITH PERIPARTUM CARDIOMYOPATHY

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ABSTRACT

OBJECTIVE: To determine risk factors associated with peripartum cardiomyopathy in our set up.

SETTING: Coronary care unit, cardiology department Liaquat University Hospital, Hyderabad—Sindh from February to April 2005.

METHODS: Thirty patients with signs and symptoms of heart failure including chest x-ray showing cardiomegally were included in the study. Detailed clinical review of the patients was undertaken. Diagnosis of cardiomyopathy was confirmed on M-Mode / 2D / Colour Doppler Echocardiography.

RESULTS: All (30) patients belonged to poor socioeconomic class. Mean age was 29.1 years (range 21-42 years). Mean parity was 4 (range 1-8) and included primipara 1(3%), multipara 25 (83.3%) and grand multipara were 4(13.3%) patients. Five (16%) patients had gestational hypertension. Twenty-five(83.3%) patients presented with shortness of breath and orthopnea (NYHA Class-IV), 5(16%) with shifted apex beat and 3rd heart sound. All (100%) patients had sinus tachycardia, raised JVP and oedema feet. All patients also showed cardiomegally on x-ray chest. Echocardiograpically, 21 (70%) were having dilated left ventricle (LVIDD>57mm) ranging from 55-75 and reduced ejection fraction i.e, (<40%) ranging from 18-40%. Nine (30%) cases had normal size left ventricle and generalized left ventricular hypokinesia with reduced EF (<40%). Eighteen (60%) patients were having moderate MR on Colour Doppler Echocardiography.

CONCLUSION: This preliminary study shows that peripartum cardiomyopathy is associated with multiple risk factors in our set up. The most common risk factor is poor socioeconomic status followed by pregnancy with increasing age (>29 years) and multiparity (para >4).

KEY WORDS: Cardiomyopathy. Risk factor. Parity. Socioeconomic Status.

INTRODUCTION

Heart failure in the puerperium has been recognized since the 18th century, but cardiomyopathy was not identified as its cause until 1937.[1] Peripartum cardiomyopathy (PPCMP) is uncommon form of congestive heart failure with high mortality that develops either in late pregnancy or in the first five months after delivery.[2] In 1997, the participants in national heart lung and blood institute workshop agreed on a standardized definition.[3,4] Hence, PPCMP was defined clinically as onset of cardiac failure with no identifiable cause in the last month of pregnancy or within five months after delivery. A finding of left ventricular systolic dysfunction by echocardiography is an important criterion for making the diagnosis. Stricter echocardiography criteria have been recommended as; a) EF <45% b) FS <30% c) LVEDD >2.7 cm/square meter of body surface area.[5] The importance of adhering to the interval from one month before delivery to 5 months postpartum was emphasized to exclude pre existing causes of cardiomyopathy.[4] The incidence of PPCMP is not known because population based estimates are not available and incidence rates reported in individual studies are based on the experience at a particular institution. Although, the reported incidence rates range from 1 per 1485 to 1 per 15,000[6,7], the currently accepted estimate of incidence is 1:3000 to 1:4000.[8] Most cases have been women of African decent in United States, mainly black southern women. Peripartum cardiomyopathy has also been reported in Whites, Chinese, Japanese and Korean women. The exact data about incidence and prevalence in Pakistan is not available but disease is not uncommon. The patients with PPCMP usually present with symptoms of dysponea, cough, orthopnea, palpitation, haemoptysis, chest pain and abdominal pain. Other signs of PPCMP are sinus tachycardia,

oedema (swelling of feet and legs), raised JVP and cardiomagally on chest x ray. The exact aetiology is not known, however, a number of possible causes have been proposed for PPCMP including myocarditis[9-11], abnormal immune response to pregnancy, maladaptive response to the haemodynamic stresses of pregnancy, stress activated cytokines and prolonged tocolysis. In addition, there have been a few reports of familial disease.[12-14] Risk factors for this disease classically identified in the literature include multiparity[3], advance maternal age, multi foetal pregnancy, pre-eclampsia, gestational hypertension and African American race.[15] Some other rare risk factors are maternal cocaine abuse, entero virus infection, selenium deficiency, use of drugs like terbutaline for more than 4 weeks, smoking, chemotherapy and Guillian-barre neuropathy.[10] Since the disease is relatively uncommon, but can be devastating with reported mortality rates between 18% and 56%[3,16], survivors may not recover completely and may require heart transplantation. Therefore, it is important to see what risk factors play a role in this significant problem, so that an appropriate strategy can be planned. Hence, this study was designed to identify risk factors in hospitalized patients of peripartum cardiomyopathy in our set up.

PATIENTS AND METHODS

This study was carried out at Coronary Care Unit (CCU), Department of Cardiology, Liaquat University Hospital Hyderabad from 1st February to 30th April 2005.

Inclusion Criteria:

1. History: based on clinical features favoring congestive heart failure like dysponea, orthopnea, third heart sound, basal lung crepitation, raised JVP and oedema feet in the last month of pregnancy and within five months after delivery and no previous identifiable cause of heart failure irrespective of race, parity, socioeconomic status and geographic distribution.
2. Radiological: X-ray chest showing cardiomegally in the last month of pregnancy and within five months after delivery.
3. Echocardiographic: M-Mode / 2D / Doppler Echocardiography on the basis of EF <40% and LVEDD >57 mm. Equipment used was Toshiba nemio 2D Doppler Echocardiography Machine.

Exclusion Criteria:

1. Patients with known cardiomyopathy, valvular heart disease and pericardial disease.
2. On echocardiography, normal LV systolic function.
3. Development of signs of heart failure before last month of pregnancy and after 5 months of labour.

Definitions of parity included; primipara: 1st delivery, multipara: 2—4 babies delivered, grand multipara: >5 babies delivered.

RESULTS

All 30 patients belonged to poor socioeconomic class (**Table I**). Mean age of patients was 29.1 years (range 21-42 years). Mean parity was 4 (range 1-8). Majority of patients was multipara (83.3%). Five patients (16%) had gestational hypertension, 3(10%) had twin pregnancy while 3(10%) were smoker. Out of 30 patients, 25(83.3%) presented with shortness of breath and orthopnea (NYHA Class-IV), 5(16%) with shifted apex beat and 3rd heart sound (**Table II**). All patients also showed cardiomegally on x-ray chest. Echocardiograpically, 21(70%) patients had dilated left ventricle (LVIDD>57mm) ranging from 55-75 and reduced ejection fraction i.e. <40% ranging from 18-40%. Nine patients (30%) had normal size left ventricle and generalized left ventricular hypokinesia and reduced EF (<40%). Eighteen (60%) patients were having moderate MR on echocardiography.

TABLE I:
DISTRIBUTION OF RISK FACTORS AMONG CASES (n=30)

RISK FACTOR	NUMBER OF CASES (%)
Socioeconomic class (poor)	30(100)
Age	
17 to 21 years	5(16.7)
21 to 25 years	5(16.7)
25 to 30 years	9(30)
30 to 42 years	11(36.6)
Parity	
Primipara	1(3)
Multipara	25(83.3)
Grand multipara	4(13.3)
Gestational hypertension	5(16.7)
Twin pregnancy	3(10)
Smoking	3(10)
Tobacco chewing	4(13.2)

TABLE II:
CLINICAL FEATURES IN PATIENTS OF PPCMP (n = 30)

SYMPTOM	NUMBER OF CASES (%)
Dysponea	
I	5(16.7)
IV	25(83.3)
Orthopnea	25(83.3)
Pedal oedema	30(100)
Tachycardia	30(100)
Displaced apex beat	5(16.7)
S 3 sound	5(16.7)
Raised JVP	30(100)

DISCUSSION

Peripartum cardiomyopathy is uncommon but life threatening condition of unknown aetiology that occurs in peripartum period in otherwise healthy women but usually associated with one or more risk factors. In this study, we found multiple risk factors associated with PPCMP including poor socioeconomic class, late age of pregnancy, multiparity, twin pregnancy, gestational hypertension, smoking and tobacco chewing. However, most common factors found were poor socioeconomic class, late pregnancy age and multiparity respectively. In poor socioeconomic class, poor nutrition, poor hygiene, stress or other physiological factors may have contributed towards the disease. All age groups from 21—42 years were at a risk of developing cardiomyopathy but it was more marked in patients aged >30 years. There were 5 patients in age group 17—21 years, 5 in 21-25 years, 9 in 25-30 years and 11 patients in the age range of 30-42 years. In a study of Witlin AG, et al it has been reported that pregnancy over the age of 30 years has a higher risk of developing PPCMP.[17] However, Elkayam U, et al in a study have reported that age greater than 28 years is associated with increased risk of PPCMP.[15] Age related aetiological factor is not exactly known, but the role of infection (recurrent), immunology, nutritional status and toxic substance exposure may all be relevant. Another major risk factor in this study was multiparity. Peripartum cardiomyopathy was seen from primipara to multipara and grand multipara but parity of more than 4 was a greater risk factor for developing PPCMP that has also been reported by Masood et al.[10] Most of patients in this series, developed symptoms during one month after delivery. Most of the patients during this period also developed weakness and some of them developed anaemia. This may be related to trauma of pregnancy and poor nutrition. Witlin AG, et al in their study found that patients develop PPCMP within two months after delivery.[17] In their opinion, these patients develop myocarditis probably secondary to viral, toxic, bacterial or immunological reasons. In a study of Ansari AA, the immunological role of development of PPCMP has also been reported.[18] Mason JW, et al and Bozkurt B, et al have also supported immunological basis of development of PPCMP as their patients improved following immunosuppressive therapy.[19-22] Gestational hypertension found in 5 patients (16%) of this series is in contrast to 43% figure as reported by Elka Yamu, et al.[15] Three patients (10%) in our study had toxaemia of pregnancy which is also in contrast to O'Connell JB, et al who have reported 27% of their patients with toxaemia of pregnancy[21], however, study by Masood, et al have reported 16.6% of their patients with toxaemia.[10] In our study, 3(10%) patients had twin pregnancy but, Elka Yamu, et al have reported 13% of their patients with PPCMP having twin pregnancy.[15] Three (10%) of our patients were smokers and 13.3% were tobacco users. This is in agreement with Masood, et al.[10] Since this is a preliminary study in our set up with smaller sample size so, its findings may be interpreted with caution. There is also a need to investigate patients with cardiomyopathy having risk factors discussed above by biomarkers like CRP immunological markers (g1, g2, g3 against cardio myosin), interleukin, B type natriurtic peptide and viral genomes. And also, there is need to collaborate with gynaecology and obstetrics departments for acquiring more accurate data in this regard.

CONCLUSION

Peripartum cardiomyopathy is an uncommon disease of unknown cause that affects women in the child-bearing age. It may recur and is associated with high morbidity and mortality. Diagnosis of disease is challenging and requires vigilance. Initial data of 30 patients reported here shows peripartum cardiomyopathy as such having un-known aetiology but associated with certain risk factors. The most common factor in our series is poor socioeconomic status followed by pregnancy with increasing age (>29 years) and multiparity (>4 para). Other less common risk factors include twin pregnancy, gestational hypertension, toxaemia of pregnancy, smoking and tobacco chewing. Therefore, it is suggested that a national registry should be established and a review of current knowledge about this condition should be prepared for publication for peer and public awareness. Further evaluation of biomarkers is also recommended.

REFERENCES

1. Gouley BA, McMillan TM, Bellet S. Idiopathic myocardial degeneration associated with pregnancy and especially the puerperium. Am J Med Sci 1937; 19:185-199.
2. Melvin KR, Richardson PJ, Olsen EG, et al. Peripartum cardiomyopathy due to myocarditis. N Engl J Med 1982; 307:731-734.
3. Demakis JG, Rahimtoola SH, Sutton GC, et al. Natural course of peripartum cardiomyopathy. Circulation 1971; 44:1053-1061.
4. Demakis JG, Rahimtoola SH. Peripartum cardiomyopathy. Circulation 1971; 44: 964-968.
5. Chapa GB, Heiberger HB, Weinert L. Prognostic value of echocardiography in peripartum cardiomyopathy. Obstet Gynecol 2005;105 (6):1303-8.
6. Lampert MB, Lang RM. Peripartum cardiomyopathy. Am Heart J 1995;180:860-870.
7. Cunningham FG, Pritchard JA, Hankins GD, et al. Peripartum heart failure: idiopathic cardiomyopathy or compounding cardiovascular events? Obstet Gynecol 1987;67:157-168.
8. Ventura SJ, Peters KD, Martin JA, et al. Births and deaths: United States, 96. Mon Vital Stat Rep 1997; 46(1suppl2):1-40.
9. Farber PA, Glasgow LA. Viral myocarditis during pregnancy: encephalomyocarditis virus infection in mice. Am Heart J 1970;80:96-102.
10. Hameed M, et al. Risk factors associated with peripartum cardiomyopathy. Pak Heart J 2003;36:4-8.
11. Mone SM, Sanders SP, Colan SD. Control mechanisms for physiological hypertrophy of pregnancy. Circulation 1996; 94: 667-672.
12. Pierce JA. Familial occurrence of postpartal heart failure. Arch Intern Med 1962; 111: 163-166.
13. Massad LS, Reiss CK, Mutch DJ, et al. Family peripartum cardiomyopathy after molar pregnancy. Obstet Gynecol 1993; 81: 886-888.
14. Pearl W. Familial occurrence of peripartum cardiomyopathy. Am Heart J 1995; 129: 421-422.
15. Elkayam U, et al. Pregnancy associated cardiomyopathy: clinical characteristics and comparison between early and late presentation. Circulation 2005;111(16): 2050-5.
16. Costanzo-Nordin MR, O'Connell JB. Peripartum cardiomyopathy in the 1980's: aetiologic and prognostic consideration and review of the literature. Prog Cardiol 1989; 2:225-239.
17. Witlin AG, Mable WC, Sibai BM. Peripartum cardiomyopathy; an ominous diagnosis. Am J Obstet Gynecol 1997;176:182-188.
18. Ansari AA, Neckelmann N, Wang YC, et al. Immunologic dialogue between cardiac myocytes, endothelial cells. Clin Immunol Immunopathol 1993; 68:208-214.
19. Bozkurt B, Villaneuva FS, Holubkov R, et al. Intravenous immune globulin in the therapy of peripartum cardiomyopathy. J Am Coll Cardiol 1999;34:177-180.
20. Midei MG, DeMent SH, Feldman AM, et al. Peripartum myocarditis and cardiomyopathy. Circulation 1990; 81:922-928.
21. O'Connell JB, Costanzo-Nordin MR, Subramanian R, et al. Peripartum cardiomyopathy: clinical, haemodynamic, histologic and prognostic characteristics. J Am Coll Cardiol 1986; 8:52-56.
22. Mason JW, O'Connell JB, Herskowitz A, et al. A clinical trial of immunosuppressive therapy for myocarditis. N Engl J Med 1995;333:269-275.

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