ISSN (Print): 2663-9491 ISSN (Online): 2789-6897

Original Article

Study of risk factors and in hospital outcome of patients with Peripartum Cardiomyopathy in a tertiary Hospital of Bangladesh

DOI: https://dx.doi.org

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Received: 30 OCT 2021
Accepted: 08 OCT 2021
Published: 11 NOV 2021

Published by:
Sheikh Sayera Khatun Medical College Gopalganj, Bangladesh

How to cite this article:
Hossain S, Ahmed MU, Parvez MS, Debnath D, Rahman MM, Das AK, Ghosh TP, Rahman MM. Study of risk factors and in hospital outcome of patients with Peripartum Cardiomyopathy in a tertiary Hospital of Bangladesh. The Insight [Internet]. 2021 Nov. 11 [cited 2021 Nov. 11];4(01):62-7. Available from: https://bdjournals.org/index.php/insight/article/view/89

ABSTRACT

Background: *Peripartum cardiomyopathy is an uncommon cause of heart failure associated with pregnancy that can lead high maternal mortality in developing countries. The risk factors and in hospital outcome of this condition remains poorly understood.* ***Methods and Materials:*** *This prospective observational study was conducted from January 2016 to December 2020 in the department of cardiology, Enam Medical College and Hospital, Savar, Dhaka, Bangladesh. PPCM was diagnosed as left ventricular ejection fraction (LVEF) ≤ 45% toward the end of pregnancy or within 05 months after delivery by standard Echocardiographic evaluation. In this study 63 cases of PPCM enrolled, excluding other causes of heart failure.* ***Results:*** *The mean age of the studied populations was 26.0±6.4 years. Study of risk factors were anaemia 22 (34.9%), Chronic hypertension 19(30.2%), pre-eclampsia 13(20.6%), Gestational DM 14(22.2%), dyslipidaemia 10(15.9%), Hypothyroidism 07(11.1%), Primiparity 42(66.6%) and Multiple Pregnancy 21(33.3%). In hospital complications were cardiopulmonary arrest 11(17.4%), pulmonary edema 17(26.9%), cardiogenic shock 28(44.4%), thromboembolism 6(9.5%), need for DC cardioversion 15(23.8%) and mechanical ventilator support 10(15.9%), death was 8(12.7%), discharged with stable heart failure 55(87.3%) and mean hospital stay was 6±2.4 days.* ***Conclusion:*** *This study concluded that risk factors for Peripartum Cardiomyopathy are anemia, chronic hypertension, pre-eclampsia, gestational DM, dyslipidaemia and hypothyroidism and most of them were primipara. All women having clinical features suggestive of heart failure in peripartum period should be evaluated using echocardiography and other*

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diagnostic criteria. Multicenter population-based study needed to find out the incidence and prevalence of PPCM in our population for prevention and control of this condition.

Keywords: Peripartum Cardiomyopathy, Pre-eclampsia, Myocarditis.

The Insight 2021; 4(1): 62:67

INTRODUCTION

Peripartum cardiomyopathy (PPCM) is defined as an idiopathic cardiomyopathy that presents with heart failure secondary to left ventricular (LV) systolic dysfunction toward the end of pregnancy or within 05 months after delivery, in the absence of any other cause of heart failure. PPCM is a diagnosis of exclusion, and the majorities are diagnosed at postpartum. Although the LV may not be dilated, the ejection fraction is nearly always reduced below 45% [1]. The epidemiology of peripartum cardiomyopathy has been reported in various countries and areas, and the incidence of peripartum cardiomyopathy differed among these reports.

PPCM involves systolic dysfunction of the heart with a decrease of LVEF and associated congestive cardiac failure and an increased risk of atrial and ventricular dysarrhythmias, thromboembolism and even sudden cardiac death [2].

PPCM and pregnancy-associated cardiomyopathy are part of the same clinical spectrum, and some patients may present with PPCM symptoms earlier than the last gestational month. Until specific etiologies are identified, PPCM remains a diagnosis of exclusion [3].

Patients with peripartum cardiomyopathy present with typical symptoms and signs of heart failure. The majority of cases occur after delivery and in the immediate post partum period. The diagnosis requires echocardiograpic information and rests on the presence of left ventricular systolic impairment. Medical treatment of peripartum cardiomyopathy is similar to treatment of congestive heart failure. Immunosuppressive therapy can be considered for women with myocarditis. Maternal mortality from peripartum cardiomyopathy in United States has been reported to be 25-50% [4, 5]. So, we designed the study protocol to find out the risk factors and in hospital outcome of patients of peripartum cardiomyopathy in our population.

METHODS AND MATERIALS

This was a prospective observational study and conducted from January 2016 to December 2020 in the department of cardiology, Enam Medical College and Hospital, Savar, Dhaka, Bangladesh. Peripartum cardiomyopathy was diagnosed as heart failure secondary to left ventricular systolic dysfunction; LVEF ≤ 45% toward the end of pregnancy or within 05 months after delivery, in the absence of any other cause of heart failure. In this study, 63 cases of PPCM were enrolled from 1-month ante partum to 5 months postpartum. Patients with previous history of cardiac disease including valvular heart disease, cardiomyopathy of other causes and pulmonary artery hypertension either primary or secondary and heart failure due to fluid overload or other causes were excluded. Informed written consent was taken from patient or patient's attendant. Patient's demographic data, presenting complaints, proper personal, family, obstetrical history and in hospital outcomes were recorded in data sheet. Chronic hypertension was taken as elevated blood pressure of >140/90 mm of Hg on three occasions before pregnancy and pre-eclampsia as blood pressure of >140/90 with proteinuria after 20 weeks of pregnancy.

ECG, CXR and Echocardiography by Philips Affinity 70 machine using 2-D, M-

Mode and Colour Doppler parameters were recorded at admission, during discharge and at follow up. LVEF was measured by Echocardiography with Simpson's method and considered low when ≤ 45%. Patients were treated according to 2018 ESC Guidelines for the management of heart failure during and after pregnancy and treatment medications and complications are noted. Recovery was assessed by improvement in NYHA classes of dyspnoea and LVEF by Echocardiography.

RESULTS

The age of the studied populations was 26.0±6.4 (Mean ± SD) years, BMI was 26.6±4.0 (Mean ± SD) kg/m^2, SBP was 118.4±24.6 mmHg, DBP was 86.2±18.7 mmHg (Table-1). The Risk factors studied population were anaemic 22 (34.9%), Chronic hypertension 19(30.2%), pre-eclampsia 13(20.6%), Gestational DM 14(22.2%), dyslipidaemia 10(15.9%), Hypothyroidism 07(11.1%), Primiparity 42(66.6%) and Multiple Pregnancy 21(33.3%) (Table-2). In table-3, Clinical presentations of the patient's; majority presented with NYHA class IV SOB 29(46.0%), NYHA class III 21(33.3%), chest pain 38(60.3%), palpitation 27(42.9%), cough 26(41.3%), fatigue 29(46.0%) and antepartum presentation were 18(28.6%) and postpartum were 45(71.4%). Induction of labor needed in 15(23.80%) patients, caesarian section needed 46(73.0%) and normal vaginal mean hospital stay 6±2.4 days. delivery was 17(27.0%). Alive baby was 56(88.9%) and 7(11.1%) were death. In table-4, studied population's ECG had sinus tachycardia 51(81.0%) and sinus bradycardia was 5(7.93%), Ventricular ectopics had 28 (44.4%), left ventricular hypertrophy 12(19.0%), Poor R wave progression in precordial leads V1-V4 were 38(60.3%), Right Bundle Branch Block 11(17.46%), Left Bundle Branch Block 8(12.7%), Ventricular Tachycardia was 16(25.39%) and Atrial fibrillation was 19(30.2%). In table-5, Echocardiographic findings; LVEF<30% were 34(53.9%), LVEF 30-40% were 24(38.1%), LVEF 41-45% were 05(17.5%) and mean LVEF were 29.29±11.06%. Mitral regurgitation was found in 48, out of them MR-Grade I were 27(56.2%), MR-Grade II were 13(27.1%), MR-Grade III were 06(12.5%) and MR-Grade IV were 02(4.1%). PASP <35 mm Hg were 38(60.3%), PASP 36-45 mm Hg were 15(23.8%), PASP 46-60 mm Hg were 8(12.7%) and PASP >60 mm Hg were 2(3.2%). Presences of Left ventricular thrombus were in 6(9.5%) and Pericardial effusion were in 3(4.8%). In Table-6: study of in hospital complications, cardiopulmonary arrest developed in 11(17.4%), pulmonary edema 17(26.9%), cardiogenic shock 28(44.4%), thromboembolism 6(9.5%), Need for DC cardioversion 15(23.8%), mechanical ventilator support needed 10(15.9%), in hospital death was 8(12.7%), discharged with stable heart failure 55(87.3%) and

Table 1: Study of Baseline characteristics of the population (n=63)

Variables	Mean ± SD
Age (years)	26.0±6.4
BMI (kg/m^2)	26.6±4.0
SBP (mmHg)	118.4±24.6
DBP (mmHg)	86.2±18.7

Table 2: Study of Risk factors of the population (n=63)

Risk factors	Frequency (%)
Anaemia	22(34.9%)
Chronic Hypertension	19(30.2%)
Pre-eclampsia	13(20.6%)
Gestational DM	14(22.2%)
Dyslipidaemia	10(15.9%)
Hypothyroidism	07(11.1%)
Primiparity	42(66.6%)
Multiple	21(33.3%)

Pregnancy	

Table 3: Study of Clinical presentations, mode of delivery (n=63)

Clinical presentations	Frequency (%)
NYHA class	
Class II	13(20.6%)
Class III	21(33.3%)
Class IV	29(46.0%)
Chest pain	38(60.3%)
Palpitation	27(42.9%)
Cough	26(41.3%)
Fatigue	29(46.0%)
Ante partum presentation	18(28.6%)
Postpartum presentation	45(71.4%)
Induction of labor	15(23.80%)
Mode of delivery	
Normal vaginal delivery	17(27.0%)
Caesarian section	46(73.0%)

Table 5: Echocardiographic findings of the study population (n=63)

Echocardiographic findings	On admission
LVEF <30(%)	34(53.9%)
LVEF 30-40(%)	24(38.1%)
LVEF 41-45(%)	05(17.5%)
Mean LVEF (%)	29.29±11.06
Mitral regurgitation(n=48)	
Grade I	27(56.2%)
Grade II	13(27.1%)
Grade III	06(12.5%)
Grade IV	02(4.1%)
Pulmonary artery systolic pressure (mmHg)	
<35	38(60.3%)
36-45	15(23.8%)
46-60	8(12.7%)
>60	2(3.2%)
Left ventricular thrombus	6(9.5%)
Pericardial effusion	3(4.8%)
Baby condition	
Alive	56(88.9%)
Death	7(11.1%)

Table 4: ECG findings of the study population (n=63)

Variables	Frequency (%)
Sinus tachycardia	51(81.0%)
Sinus bradycardia	5(7.93%)
Ventricular ectopics	28(44.4%)
Left ventricular hypertrophy	12(19.0%)
Poor R wave progression in precordial leads V1-V4	38(60.3%)
Right Bundle Branch Block	11(17.46%)
Left Bundle Branch Block	08(12.7%)
Ventricular Tachycardia	16(25.39%)
Atrial fibrillation	19(30.2%)

Table 6: In Hospital Complication of the study populations (n=63)

Complications	Frequency (%)
Cardiopulmonary arrest	11(17.4%)
Pulmonary edema	17(26.9%)
Cardiogenic shock	28(44.4%)
Thromboembolism	6(9.5%)
Need for DC cardioversion	15(23.8%)
Need for Mechanical ventilator	10(15.9%)
In Hospital death	8(12.7%)
Discharge with stable heart failure	55(87.3%)
Hospital stay (days)	6±2.4

DISCUSSION

In this study the mean age of the patients was 26.0±6.4 (Mean ± SD) years, BMI was 26.6±4.0 (Mean ± SD) kg/m^2. Similar observation was found by Fatema N et al. [6] they reported most of the women (83%) were aged 20–30 years and 38% were primipara. There are some studies where most of women were older than 30 years [3, 7-10] it was probably due to geographical variations. More than

half of our patients (54.1%) were obese with BMI ≥ 30 indicating obesity as a risk factor [11, 12]. Study of risk factors showed 22(34.9%) are anaemic, 19(30.2%) hypertension, 14(22.2%) diabetes mellitus, 13(20.6%) pre-eclampsia and 10(15.9%) dyslipidemia. Common reported risk factors for PPCM were gestational hypertension, preeclampsia, poor antenatal care, low socioeconomic conditions and long term use of tocolysis as found in various studies [3,7-10]. In this study majority of the patients 38(60.3%) were presented with chest pain, 29(46.0%) with SOB of NYHA class IV, 27(42.9%) with palpitation, 26(41.3%) with cough, 29(46.0%) with fatigue and 45(71.4%) at postpartum presentation. Forty-six (73.0%) babies had caesarian section and 7(11.1%) were death. Shah et al. [13] reported majority of patients presented with NYHA class III 18(29.5%) & IV 35(57.5%) dyspnea. Other presenting complaints were chest pain 36(59%), palpitation 27(44.3%), cough 27(44.3%) and fatigue 30(49.2%). Other risk factors were chronic hypertension 19(31.1%), preeclampsia 12(19.7%), multiple pregnancy 5(8.2%), long term tocolytics 13(21.3%) and anemia 21(34.4%). Similar studies done by Memon et al.[7], Sharieff and Zaman[10]. In our study 56(88.9%) were live birth and 7(11.1%) were perinatal deaths. Same results were found in Sakakibara et al [14] where 82% babies were live birth and 18% perinatal deaths.

Admission ECG in this study was sinus tachycardia 51(81.0%), sinus bradycardia was 5(7.93%), left ventricular hypertrophy 12(19.0%), Ventricular ectopics 28(44.4%), Ventricular Tachycardia was 16(25.39%) and Atrial fibrillation was 19(30.2%) but in most studies, sinus tachycardia (68.4%), left ventricular hypertrophy (78.8%) and T wave inversion (47.3%) were more frequent findings[13, 15-18]. Echocardiographic findings of this study; Mean ejection fraction was 29.29±11.06 and it was universally reduced. Presence of Mitral regurgitation was found in 48 patients, out of them moderate to severe MR were 08(16.6%) and Pulmonary artery hypertension found in 25(39.6%). Presences of Left ventricular thrombus were in 06(9.5%). The Echocardiographic findings of our study are about consistent with most of the studies.[19, 20-22] in this study we found cardiopulmonary arrest developed in 11(17.4%), pulmonary edema 17(26.9%), cardiogenic shock 28(44.4%), pericardial effusion 3(4.8%), thromboembolism 6(9.5%), Need for DC cardioversion 15(23.8%) and 10(15.9%) patients needed mechanical ventilator support. Fatema et al [6] found in their study 10(14%) presented with thromboembolism. These findings are almost similar outcome in many studies [9, 10].

We found in hospital death were 8(12.7%), discharge with stable heart failure were 55(87.3%) and mean hospital stay was 6±2.4 days. In study of Fatema et al[6], maternal mortality was 8 (13%) and Shah et al[13]. mean hospital stay was 6.62±2.31 days and in hospital death were 9(14.8%).

CONCLUSION

This study concluded that risk factors for Peripartum Cardiomyopathy are anemia, chronic hypertension, pre-eclampsia, gestational DM, dyslipidaemia and hypothyroidism and most of them were primipara. All women having clinical features suggestive of heart failure in peripartum period should be evaluated using echocardiography and other diagnostic criteria. Multicenter population-based study needed to find out the incidence and prevalence of PPCM in our population for prevention and control of this condition.

CONFLICT OF INTEREST

No conflict of interest.

FUNDING

None

ETHICAL APPROVAL

Ethical approval was taken from the ethical review board of the hospital.

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