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Case Series

Cardiac disease in pregnancy

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ABSTRACT

Cardiac disease is an important cause of maternal morbidity and mortality. It can invariably affect fetus with variable intensity depending upon nature of cardiac disease in mother. Cardiac disease can affect women antenatally, in labor and even in post-partum period. It is a case series of 12 cases who presented to labor room in a particular unit at SSG hospital, Baroda over a period of 1 year starting from 1st May 2022 to 30th April 2023. Mean age at presentation was 24.8. 3 women were having valvular heart disease while 4 were having peri-partum cardiomyopathy (PPCM), 4 were having atrial septal defect (ASD), 1 was having ventricular septal defect (VSD). Associated medical comorbidities and obstetrical factors were evaluated. 2D ECHO findings of all cases were recorded. Risk assessment must be done for the mother and fetus to minimize the effect of cardiac disease in pregnancy. Joint consultation with cardiologist should be done in already known case of cardiac disease.

Keywords: Mortality, 2D ECHO, Congenital heart disease

INTRODUCTION

Cardiac disease is an important cause of maternal morbidity and mortality. It can invariably affect fetus with variable intensity depending upon nature of cardiac disease in mother. There is increased incidence of cardiac disease among pregnant patients as with improved medical research, life expectancy in preexisting cardiac disease is increased, with widespread use of diagnostic tools and institutional deliveries. But trends are changing from high prevalence of rheumatic heart disease to pregnancy related cardiomyopathy due to improved living standards and increased age at conception, obesity, lifestyle related comorbidities, while the prevalence of congenital heart disease has been almost same. Cardiac disease can affect women antenatally, in labor and even in post-partum period. But maximum chances of compromise are around 32 weeks when physiological plasma expansion is highest with cardiac load during ante-natal period and just after delivery. In UK, cardiac disease is the most common cause of indirect maternal mortality and in India also it is the major cause of maternal mortality and morbidity. There are variety of heart diseases which can complicate pregnancy. They are broadly divided into congenital and acquired. The acquired group includes rheumatic heart disease, cardiomyopathies, and ischemic heart disease. From these first one is more common in developing countries while the rest two are more common in developed countries. The overall incidence of cardiac disease in pregnancy is 1-4%, but tertiary referral centers have a higher incidence for obvious reasons.[1]

CASE SERIES

It was a case series. The study was conducted at Baroda medical college, SSG hospital affiliated to MS university. The duration of study was 1 year, from 1st May 2022 to 30th April 2023 in one obstetric unit. This study included total 12 cases of cardiac diseases in pregnancy. Here is a case series of 12 cases which is described as below: Average age of presentation was 24.8 years.

Table 1: Classification according to type of cardiac disease.

Type of cardiac disease	Total patients
Valvular heart disease (RHD)	2
Peripartum cardiomyopathy	4
Congenital heart disease	3 ASD
	1 Post ASD repair (RA PTFE patch)
	1 unrepaired peri membranous VSD
Valvulopathy with mechanical heart valve	1 Treated MVP

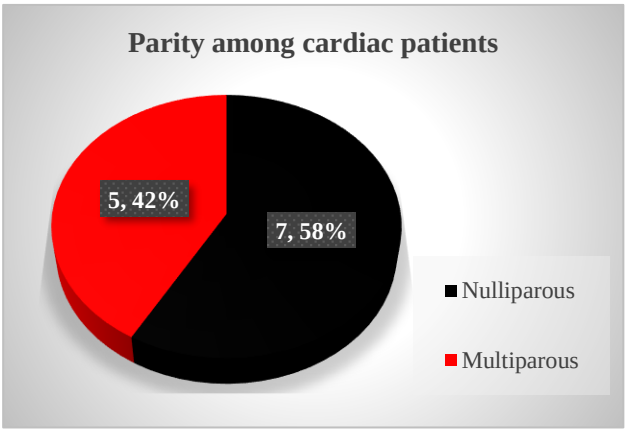

Figure 1: Parity among cardiac disease patients.

Table 2: Associated other obstetric risk factors and medical comorbidities.

Associated risk factor or comorbidity	Number of patients
Hypothyroidism	4
BOH	1 (Previous 4 first trimester abortions)
IVF conception	1
Eclampsia	1
Pre-eclampsia (with and without the severe features)	4
Obesity	3
Elderly gravida	2
Multi fetal gestation	1
Missed abortion	1
Moderate anaemia	2
Thrombocytopenia	1
Dengue NS1 positive	1
Previous 2 LSCS	1

Only 8 out of 12 women had associated risk factors and 4 women were not having any associated morbidity along with cardiac disease.

Out of 12 women only one was having positive family history as her mother was having heart disease but was asymptomatic.

Table 3: Interventions done in cardiac patients.

Interventions done	Number of patients
LSCS	3 (2 elective LSCS and 1 emergency LSCS)
Normal vaginal delivery	7
Suction and evacuation under short GA	1 (for missed abortion)
Induction of labor	3
Blood transfusion	4
Thyroxine treatment	3
ICU monitoring	12
PE and eclampsia management	1
Thromboprophylaxis and reversal for the mechanical valve	1
Post-partum monitoring	1

Table 4: 2D ECHO findings of cardiac patients.

S. no.	2D ECHO findings
1	ASD 15 mm with left to right shunt, LVEF-60%, RVSP-39 mm Hg, mild PAH
2	LVEF-45%, trivial MR, E/O grade I diastolic dysfunction, mild global hypokinesia of LV, trivial MR
3	Mild MR, Mild PAH, LVEF-55%
4	LVEF-62%, ASD-7.99 mm, left atrium-borderline dilated, ?8 mm septum secondum with left to right flow, trivial MR, mild TR, mild PAH, grade I diastolic dysfunction
5	Dilated RA and RV? ASD, severe PS, LVEF-55%, MVP with grade II MR
6	LVEF-56%, post ASD repair with no leakage seen
7	Small restrictive peri-membranous VSD with left to right shunt with gradient of 100 mmHg (Std 5-6 mm), mild MR, mild TR, mild PAH, normal LV function, EF 55-60%
8	LVEF-30%, global LV hypokinesia, moderate LV systolic dysfunction, LV mildly dilated
9	LA and LV-dilated, global LV hypokinesia, poor LV systolic function, LVEF-25%, mild pericardial effusion around heart
10	LVEF-25%, trivial MR, E/O grade II diastolic dysfunction, global hypokinesia of LV, trivial MR
11	Dilated LA, moderate MR, mild MS, LVEF-55%, MV area 1.9 cm^2
12	Dilated LA, severe MS, trivial TR, thickening of mitral valve cusps

Out of 4 women with PPCM, one was diagnosed when she underwent tests for fitness for elective LSCS for previous

two LSCS at a referring facility as incidental finding as patient was asymptomatic, one was diagnosed in post-op period after emergency LSCS for breech presentation by increased cardio-thoracic ratio on CXR-PA view for decreased bilateral lower lung zone air entry, one was diagnosed during first stage of labor due to sudden drop of sPO2 without any previous complaints and one was diagnosed in previous pregnancy having PPCM and has residual defect and in this pregnancy her LVEF was the 25%.

One ASD case was diagnosed in the 5th month of amenorrhea (MOA) in current pregnancy due to complaint of mild dyspnea. One ASD case was diagnosed due to complaints of mild dyspnea in last pregnancy. Rest all cases were diagnosed with different cardiovascular symptoms which developed beforehand pregnancy.

Out of total 12 women, only 5 were symptomatic during the stay at obstetric unit, out of which 2 were having NYHA grade 1, two were having NYHA grade 2 while one was having NYHA grade 3. Out of total 12 women, only 6 were in labor during admission at obstetric unit. Only 4 women had elevated levels of CKMB above normal range, out of them 3 were patients of PPCM while one was having ASD.

DISCUSSION

Previously it was known that valvular heart disease was the commonest etiology for cardiac disease in pregnancy. Farhan et al did a study for heart disease in pregnancy-clinical pattern and prevalence at a cardio-maternal unit at Iraq in 2019 and found that from 252 patients with heart disease 34.1% was valvular disease, followed by congenital heart disease in 30.5%, cardiomyopathy in 29.8%, pulmonary hypertension in 4% and ischemic heart disease in 1.6%.[2]

Shrestha et al did a systemic review and meta-analysis of prevalence and outcome for pregnancy with heart disease in South Asia, included 25 studies in final quantitative synthesis and found the result that prevalence of heart disease in pregnancy was 1.46%. From that 70.25% had rheumatic heart disease and 18.1% had congenital heart disease. Pooled maternal mortality rate was 26.14/1000 pregnant women.[3]

In our study average age was 24.8 years. A case series of 19 patients was done from 2014 to 2020 in Morocco, which stated that the average age of sample was 32.6 years. There only 26.3% were in labor, blood tests showed microcytic anaemia in 37.37%, thrombocytopenia in 26.3%.[4]

In our study, therapeutic termination was done in 8.3%, normal delivery in 70% cases and C-section in 30% cases. Which if compared to case series of 19 cases where therapeutic termination was done in 15.8%, vaginal delivery in 73.7% and cesarean section was done in 10.5% cases.[4]

The cardiac disease in pregnancy can also increase the chances of obstetrical complications, which can be additively hazardous to medical complications. Poli et al did a study-factors related to maternal adverse outcomes in pregnant women with cardiac disease in low-resource settings and concluded that 90.8% had RHD, 6.2% had cardiomyopathies and 3.1% had CHD, PPH was seen in 12.3%, preeclampsia was present in 13.8%. in this setting, 80% delivered vaginally, 18.5% had undergone C-section and 4.6% underwent termination of pregnancy for miscarriage.[5]

In our study, from 12 cases one was diagnosed during intra-partum, one was diagnosed in post-partum period while rest of the cases were identified in ante-natal period. Lumsden et al studied high burden of cardiac disease in pregnancy at a national referral hospital in western Kenya, total 92 cardiac cases with 242 controls were evaluated. Median age in cases was 26 years and in controls it was 28 years. Medical comorbidity was seen in 11 in cases while in 9 patients in controls which was not statistically significant. While evaluating timing of cardiac diagnosis, 50 were identified before pregnancy, 22 were identified during pregnancy (1 in<14 weeks, 5 in 14-27+6 weeks, 16 in >28 weeks), 5 were identified intra-partum and 16 were identified post-partum.[6]

There are various predictive scores available, which uses different parameters to calculate risk from disease. Silversides et al did CARPREG II study for pregnancy outcomes in women with heart disease in which 1938 pregnancies were included. Cardiac complications occurred in 16% of pregnancies and were primarily related to arrythmias and heart failure. The frequency of pulmonary edema has decreased over time. Ten predictors of maternal cardiac complications were identified.[7]

Shyamsundar et al did a clinical study on maternal heart disease complicating pregnancy at tertiary care hospital and found that prevalence of cardiac disease in pregnancy was 0.39%, 60% patients were in the age group of 20-24 years, multigravidas (56.6%) were slightly more than nulligravida (43.4%). RHD was the dominant cardiac condition and VSD was the most common congenital heart disease.[8] While in our study most common congenital heart disease was ASD.

In 2010, study done by Drenthen and et al for predictors of pregnancy complications in women with congenital heart disease showed that most prevalent complications were arrythmias followed by heart failure and the factors associated with these were presence of cyanotic heart disease (corrected/uncorrected), the use of cardiac medication before pregnancy, and left heart obstruction.[9]

Even when the diagnosis of deadly cardiac disease is made in pregnancy, timely diagnosis and proper management

can save most women on time. Bužinskienė et al presented a clinical case of a 30-year-old nulliparous woman who was diagnosed with mitral valve disease with critical stenosis, grade II/III mitral valve insufficiency, moderate-severe pulmonary hypertension, heart failure stage C, and NYHA functional class II.[10]

In valvular heart disease, the maternal and fetal complications depend on the degree of valvular damage, LVEF and pulmonary edema.[11] Pregnancy and cardiac disease they both predispose to thromboembolic events.[12]

LMWH is considered safest drug for prophylaxis of thromboembolism during pregnancy with heart disease requiring prophylaxis.[12] In our study only one patient needed thromboprophylaxis due to mechanical valve. Although acute myocardial infarction is a rare event in women of reproductive age, pregnancy increases the risk 3- to 4-fold.[14]

In cardiac diseases number of pregnancies should be kept minimum as with each pregnancy the life of mother is at utmost risk, so appropriate contraception should be encouraged. Underuse of long-acting effective contraceptives is responsible for unplanned pregnancies and produces unnecessary obstetric burden on these patients.[15]

CONCLUSION

Though contributing to a smaller number of pregnancies, cardiac diseases pose great risk to the pregnancy if occurs. Risk assessment must be done for the mother and fetus to minimize the effect of cardiac disease in pregnancy. Joint consultation with cardiologist should be done in already known case of cardiac disease. Obstetricians should pay attention and they must be able to distinguish the cardiac complaints as they might simulate normal changes of pregnancy. Diagnostic modalities should be encouraged in suspected cases. Optimization of maternal health should be done preconceptionally in known cardiac patients. Frequent OPD visits, infective endocarditis prophylaxis, thromboprophylaxis, avoidance of cardiac overload, cut shortening of second stage of labor, use of concentrated oxytocin, avoidance of ergometrine etc. should be done for better management of cardiac patients.

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