

Maternal and Fetal Outcome of Cardiac Disease in Pregnancy: A Retrospective Study at Tertiary Institute

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Abstract

Introduction: Cardiac disease in pregnancy is still a major cause of maternal and fetal mortality. Although the reported incidence varies between 0.1 and 4%, 1–3 cardiac disease remains a significant cause of maternal death worldwide. The incidence of cardiac disease during pregnancy has remained stable for many years even with a significant decrease in the occurrence of rheumatic heart disease (RHD) as this decrease is being compensated by significant increase of pregnancy in women with congenital heart disease (CHD). Therefore, in this study, we aim to analyze the incidence of cardiac disease in pregnancy and to assess the maternal and fetal outcome.

Materials and Methods: The retrospective study was carried out in 47 women with cardiac disease in a tertiary institute over a period of 2 years.

Results: In the present study, incidence of cardiac disease at our centre was 0.081%. RHD was the most common heart disease in pregnancy (70.21%) followed by CHD (23.40%) and peripartum cardiomyopathy (6.38%). Among RHD, mitral valve stenosis was most common followed by mitral stenosis with mitral regurgitation. Number of vaginal deliveries was 36 and cesarean was done in 11 patients.

Conclusions: A cardiac disease is a high-risk pregnancy. It is a multidisciplinary teamwork to have optimal maternal and fetal outcome. Hence, constant vigilance is required throughout antenatal, intrapartum, and postpartum period to avoid adverse outcomes.

Key words: Complications, Congenital heart disease, MS, Outcome, Rheumatic heart disease

INTRODUCTION

Cardiac disease in a pregnancy is a high-risk pregnancy, it possesses a significant challenge to an obstetrician. In western countries about 0.2–0.4% of all pregnancies are complicated by cardiovascular disease.^[1] The incidence of cardiac disease is 1–4% of pregnancies in India.^[2] In India, the prevalence of cardiovascular diseases in pregnancy lied between 0.3 and 3.5%. In

the presence of maternal heart disease, the circulatory changes of pregnancy may result in decompensation or death of mother or fetus.^[3] Cardiac disease in pregnancy is the important indirect cause of maternal mortality globally.^[4] The most common heart diseases in pregnancy are RHD and CHD while ischemic heart disease and cardiomyopathy are less common. Although RHD is the most common cardiac disease in developing countries, it is uncommon in developed countries.^[5] Pregnancy is associated with various physiologic changes in cardiovascular systems such as an increase in plasma volume and cardiac output and increase in heart rate. Thus, the most common clinical features of cardiac disease such as breathlessness, pedal edema, and murmurs mimic normal physiological changes in pregnancy posing a diagnosing difficulty

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for obstetricians. The heart rate comes to normal level within 10 days after the delivery while it takes 3 months for stroke volume, cardiac output, and systemic vascular resistance to return to pre-pregnancy level.^[6]

The obstetrical complications such as pre-eclampsia, anemia, preterm labor, and fetal growth restriction further worsen the outcome and complicate the management of pregnancy with cardiac disease.

Pregnancy-related complications that compound the heart disease are ignored in the rural setup and patients rarely seek proper early care.^[7]

Aims and Objective

The aim of this study is to analyze the incidence of cardiac disease in pregnancy and to assess the maternal and fetal outcome.

MATERIALS AND METHODS

This was a retrospective study carried out at the Department of Obstetrics and Gynaecology, SMGS Hospital, GMC, Jammu, over the period of 2 years from October 2017 to September 2019.

A total of 47 pregnant women with cardiac disease admitted during the study period were included in the study. The data were obtained from medical records and files.

The following factors were examined such as demographic information, diagnosis, course in the hospital, management, and maternal and fetal outcome.

Inclusion Criteria

Pregnant women with a history of or newly diagnosed cardiac disease were included in the study.

Exclusion Criteria

All conditions mimicking heart disease were excluded from the study.

The data collected were statistically analyzed to see the impact of cardiac disease on pregnancy and to evaluate maternal and fetal outcome.

RESULTS

A total of 47 pregnant women with cardiac disease were included in the study. The incidence of cardiac disease at our center was 0.081%. Of 47 patients, majority of patients were in the age group of 22–25 years (46.8%) and 22.53% belonged to 18–21 years [Table 1].

Table 2 shows the distribution of patients according to parity. Among the 47 pregnant women, 38.29 were primigravida, 25.53% were second gravid, 19.14% were gravida 3, and about 17.02% were gravida 4 and more.

Of 47 patients, majority were term gestation (51.06%), about 31.94% were pre-term and 17.02% were post-term [Table 3].

Most of the patients in the study had rheumatic heart disease (RHD) (70.21%) followed by congenital heart disease (CHD) (23.40%) and peripartum cardiomyopathy (6.38%) as shown in Table 4.

The most common CHD seen in our study was atrial septal defect (ASD) (54.54%), ventricular septal defect (VSD) was seen in 4 patients, and pulmonary stenosis was seen in 1 patient. The most common lesion in patients with RHD was mitral stenosis (57.57%) followed by mitral stenosis with mitral regurgitation (24.24%) followed by mitral regurgitation (15.15%). Aortic lesion was seen in one patient who presented with aortic stenosis [Table 5].

In our study, the surgical correction was done in 8 patients, 3 patients underwent ASD closure, 1 patient VSD closure, in 3 patients mitral valve replacement was done, and in 1 patient patent ductus arteriosus closure was done [Table 6].

Most of patients had vaginal delivery (76.59%) and cesarean section was done in 11 patients (23.40%) as shown in Table 7. The labor was of spontaneous onset in 44.68% of patients and induced in 3 cases (6.38%). In 12 patients, outlet forceps were used to cut short the second stage of labor. The various indications for LSCS were fetal distress, cephalopelvic disproportion, and malpresentation.

The common noncardiac complications noticed were anemia (38.29%), pre-term labor (23.40%) and pre-eclampsia (12.76%) and abruption placentae (2.12%). Cardiac complications were seen in patients. The most common cardiac complication was CCF (3 patients). Pulmonary edema was seen in 2 patients [Table 8]. Atrial fibrillation was seen in 1 patient. Maternal mortality was seen in 2 cases in our study. The cause of death was atrial fibrillation in 1 patient and other patient died due to severe pulmonary hypertension.

Intrauterine growth restriction (IUGR) was seen in 29.78% of patients, pre-maturity was seen in 23.40% of babies [Table 9]. The other neonatal complications were birth asphyxia, low Apgar score, and meconium. A total of 15 neonates were admitted in neonatal intensive care unit (NICU).

Table 1: Distribution of patients according to age

Age (years)	n (%)
18–21	12 (25.53)
22–25	22 (46.8)
26–29	8 (17.02)
30–35	5 (10.63)

Table 2: Distribution of patients according to parity

Parity	n (%)
Primigravida	18 (38.29)
Gravida 2	12 (25.53)
Gravida 3	9 (19.14)
Gravida 4 and more	8 (17.02)

Table 3: Distribution according to the gestational age at which patient came to hospital

Gestational age (weeks)	n (%)
28–32	4 (8.51)
33–36	11 (23.40)
37–40	24 (51.06)
>40	8 (17.02)

Table 4: Prevalence of cardiac disease

Type of cardiac disease	n (%)
Congenital heart disease	11 (23.40)
Rheumatic heart disease	33 (70.21)
Peripartum cardiomyopathy	3 (6.38)

Table 5: Type of lesion

Type of lesion	n (%)
Congenital heart disease (11)	
ASD	6 (54.54)
VSD	4 (36.36)
PS	1 (9.09)
Rheumatic heart disease (33)	
MS	19 (57.57)
MR	5 (15.15)
MS+MR	8 (24.24)
AS	1 (3.03)

DISCUSSION

Cardiac disease is a major risk factor for maternal and neonatal morbidity and mortality. In our study, the incidence of cardiac disease was 0.081%. In a study by Pujitha *et al.*,^[8] the incidence of cardiac disease in their study was 0.21%. The predominant lesion in our study was RHD (70.21%) followed by CHD (23.40%) and peripartum cardiomyopathy (6.38%). Puthija *et al.* also found similar results in their study, RHD (62.6%) was the most common lesion in their study followed by CHD

Table 6: Distribution of patients according to cardiac surgical interventions

Surgical correction	n
ASD closure	3
VSD closure	1
Mitral valve replacement	3
PDA closure	1

ASD: Atrial septal defect, VSD: Ventricular septal defect PDA: Patent ductus arteriosus

Table 7: Distribution of patients according to mode of delivery

Mode of delivery	n (%)
Vaginal delivery	36 (76.59)
Spontaneous	21 (44.68)
Induced	3 (6.38)
Instrumental deliveries	12 (25.53)
Cesarean section	11 (23.40)

Table 8: Maternal complications

Complications	n (%)
Non-cardiac	
Anemia	18 (38.29)
Pre-eclampsia	6 (12.76)
Abruptio placentae	1 (2.12)
Cardiac	
CCF	3 (6.38)
Pulmonary edema	2 (4.25)
Atrial fibrillation	1
Pulmonary artery hypertension	1 (2.12)
Maternal mortality	2

Table 9: Neonatal outcome

Complications	n (%)
IUGR	14 (29.78)
Preterm	11 (23.40)
Apgar score <7 at 1 min	7 (14.89)
Birth asphyxia	5 (10.63)
Meconium	3 (6.38)
NICU admission	15 (31.91)

IUGR: Intrauterine growth restriction, NICU: Neonatal intensive care unit

(21.8%) and peripartum cardiomyopathy (15.6%). Shaifali Patil *et al.*^[9] also report RHD as the most predominant lesion in their study. The observations were also comparable with other studies done by Sheela *et al.*^[10] The incidence of rheumatic fever has been greatly reduced because of increasing use of effective antibiotics against streptococcal bacteria.

The most commonly found valvular lesion in our study was mitral stenosis (57.57%) followed by mitral stenosis with mitral regurgitation (24.24%) followed by mitral regurgitation (15.15%). Aortic valve was involved in

1 patient in whom aortic stenosis was present. Puthija *et al.*^[8] also found mitral valve as the most common lesion in their study (56.3%) followed by aortic valve disease (6.25%). Mitral stenosis was also found to be the most common lesion in study by Shaifali Patil *et al.*^[9]

RHD affects about 0.3–3.5% of women in the childbearing period with a global use of 1%.^[11] It is responsible for 30% of cardiac disease during pregnancy in developed countries and 90% in developing countries.^[12,13]

Of 47 patients, in the present study, 10.64% underwent surgical correction for cardiac disease. However, in study by Puthija *et al.*^[8] about 40.6% patients underwent surgical correction and same results were shown by study conducted by Bhatla *et al.*^[14] While studying the mode of delivery, 36 patients delivered vaginally, of which 12 patients had instrumental vaginal delivery to cut short the second stage of labor and 11 patients had cesarean section. The results were comparable with study conducted by Puthija *et al.*^[8]

The most common obstetric complications were anemia which was seen in 18 patients, followed by pre-term in 11 patients, pre-eclampsia in 6 patients, and abruption placentae in 1 patient. The results were comparable with study done by Puthija *et al.*^[8] The most common cardiac complications were CCF seen in 3 patients, followed by pulmonary edema (2 patients), atrial fibrillation (1 patient), and pulmonary hypertension (1 patient). In our study, maternal mortality was seen in 2 cases. One patient developed atrial fibrillation and other died due to severe pulmonary hypertension. Puthija *et al.*^[8] in their study reported one maternal death.

In this study, we had 15 NICU admissions due to birth asphyxia, IUGR, pre-term, and MSAF. Results were comparable with Puthija *et al.*^[8] and Prameela *et al.*^[15]

CONCLUSIONS

Cardiac diseases in pregnancy are high-risk condition and have a major impact on pregnancy and maternal and fetal outcome. This study results conclude that RHD is still a predominant cardiac problem affecting pregnancy. The early detection, treatment, prevention of infections, proper follow up, and correction before pregnancy can improve the pregnancy outcome and decrease the maternal morbidity. Cardiac disease in pregnancy is common public health problem in developing countries. Hence, each

patient coming to OPD or during labor even without symptoms should be auscultated by a doctor. Educating the community about the early ANC registration, regular ANC, identification of risk factors, and actions should be taken before onset of the disease. Regular antenatal screening, identification of risk factors, and early diagnosis and treatment of the diagnosed heart disease in pregnancy are recommended measures to improve the outcomes of pregnancy and hence to reduce maternal and fetal morbidities.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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