

## ORIGINAL ARTICLE

# Cardiac Disease complicating Pregnancy: A Tertiary Care Center Experience

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## ABSTRACT

**Introduction:** Cardiac disease in pregnancy is a major problem worldwide, particularly in developing countries. It often poses a difficult clinical scenario with the responsibility of the treating obstetrician also extending to the unborn fetus. In the present study, we aim to know the maternal and fetal outcomes in pregnancies complicated by cardiac disease.

**Materials and methods:** All pregnant patients with cardiac disease who delivered at our institution during 2014 to 2016 were evaluated to look for the final pregnancy outcomes.

**Results:** Out of 36 study cases, 44.44% had no maternal complications, while 88.89% had good fetal/neonatal outcome. The commonest maternal cardiac complication was sustained tachyarrhythmia/bradycardia followed by pulmonary edema, while intrauterine growth restriction was encountered in fetal outcome.

**Conclusion:** Multidisciplinary team management of cardiac disease, led by an experienced obstetrician and cardiologist, reduces the adverse outcomes in pregnancies complicated by cardiac diseases.

**Keywords:** Fetal outcomes, Maternal heart disease, Pregnancy outcomes.

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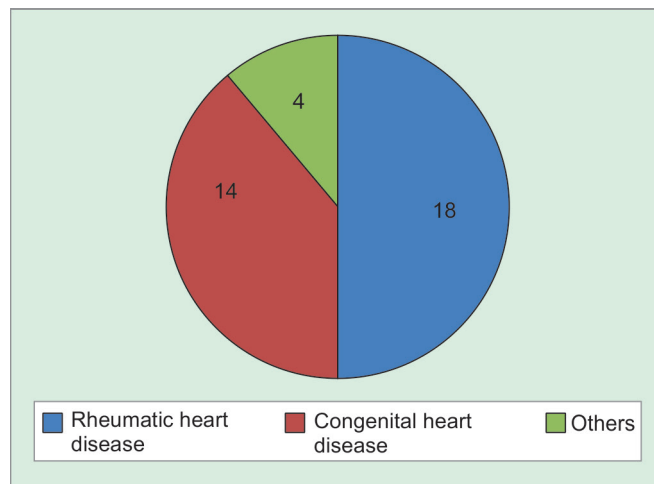
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## INTRODUCTION

Cardiac disease is an important cause of indirect maternal morbidity and mortality in pregnancy, with a reported incidence of 2% in pregnancies in India.<sup>1</sup> Cardiac disorders contribute to 20.5% of maternal deaths.<sup>2</sup>

In India, the most common cardiac disease encountered during pregnancy is rheumatic heart disease followed by congenital heart diseases (Graph 1).<sup>3-5</sup> Dramatic advance in open heart surgery in India has made women with



Graph 1: Type of cardiac disease

congenital heart diseases to survive till childbearing age and the availability of lifesaving modern therapy gives them an option of pregnancy and motherhood. Also there is a rising incidence of acquired heart diseases probably attributable to the changing modern lifestyles. Obstetric complications like preeclampsia, anemia, preterm labor, and intrauterine fetal growth restriction are common in these women. Early diagnosis and a careful multidisciplinary management are mandatory for a good pregnancy outcome.

## AIMS

- To know the incidence and type of heart disease in pregnancy during the study period.
- To study the maternal outcomes in cardiac disease complicating pregnancy.
- To study the fetal outcomes in cardiac disease complicating pregnancy.

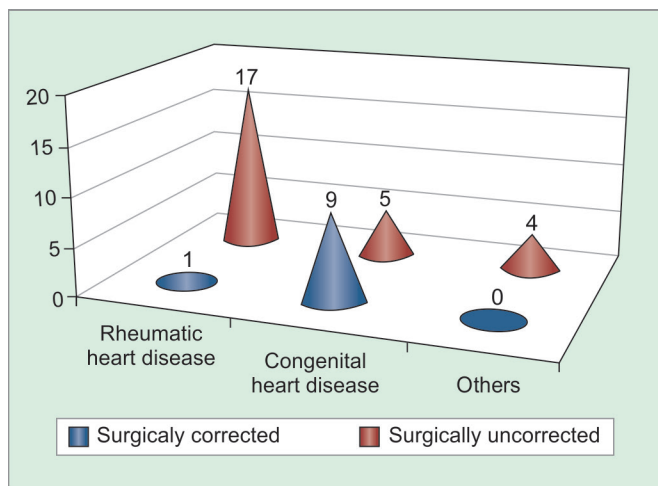
## MATERIALS AND METHODS

The present study is a descriptive study consisting of prospective data. It was conducted at RajaRajeswari Medical College & Hospital, Bengaluru, Karnataka, India a multispecialty tertiary care and referral center in Bengaluru from January 2014 to January 2016. During the study period, there were 36 pregnant women with cardiac diseases. These included both booked cases in antenatal outpatient department and unbooked emergency cases reporting directly to labor room, who gave consent for the study.

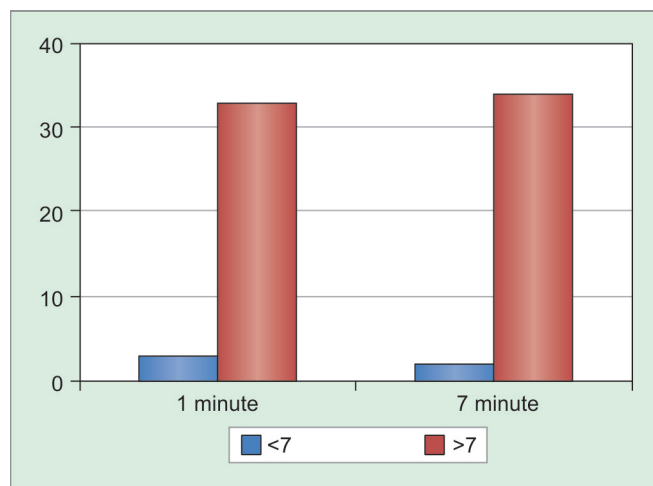
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Graph 2: Surgically corrected and noncorrected cases



Graph 3: Appearance, pulse, grimace and activity respiration scores at birth

**Inclusion Criteria**

- All pregnant women with heart diseases
- Pregnancy duration of ≥28 weeks gestation
- Singleton pregnancies.

**Exclusion Criteria**

- Any comorbid conditions like anemia, thyroid disorders which mimic cardiac diseases.

The women were grouped under three broad groups: Rheumatic heart disease, congenital heart disease, and others. All the groups were further subdivided into surgically corrected and uncorrected (Graph 2).

Baseline data included age, parity, and period of gestation. Detailed obstetric and cardiac history was taken with thorough clinical examination to rule out comorbid conditions. Cases graded as per New York Heart Association (NYHA) functional classification system. Routine investigations like blood group, complete blood count, blood sugar, serology, coagulation profile, and electrocardiography and echocardiography were done and clinical diagnosis was confirmed. A multidisciplinary team consisting of obstetricians, cardiologists, and anesthesiologists managed the patients. The above groups were studied for maternal complications like cardiac arrhythmias, pulmonary edema, cardiac failure, maternal mortality, period of gestation of delivery, and mode of delivery. Also the fetal complications like fetal intrauterine growth restriction, Appearance, pulse, grimace, activity respiration (APGAR) scores at birth, birth weight, and fetal/neonatal death were studied. Data were collected in a predesigned pro forma and entered in MS Excel and analyzed using Statistical Package for the Social Sciences version 2.0 (Graph 3).

**RESULTS**

Out of 4,142 delivery cases, 36 were diagnosed with cardiac disease, giving an incidence of 00.87%. In the

present study group, a good outcome was observed in 44.44% of pregnant women and in 88.89% of fetuses. The results are tabulated from Tables 1 to 9.

**DISCUSSION**

In the present study, the incidence was 0.89%. Sethuraman et al<sup>6</sup> observed 0.96% of cardiac diseases in pregnancy. The incidence varies between 0.30 and 3.5%, as shown in various studies like Sugrue et al<sup>7</sup> and McFaul et al.<sup>8</sup>

Majority of women in the present study belonged to the age group of 20 to 24 years (Table 1) and 58.33% of women were multiparous (Table 2), similar to the observations made by Mangala et al<sup>4</sup> and Bagde et al (Tables 1 and 2).<sup>9</sup>

Table 1: Distribution of patients according to age

Age (years)	Number	Percentage
20–24	23	63.89
25–29	09	25.00
30–34	03	08.33
35–40	01	02.78
Total	36	100.00

Table 2: Distribution of patients according to parity

Parity	Number	Percentage
Primigravida	15	41.67
Multigravida	21	58.33
Total	36	100.00

Table 3: Distribution of patients based on NYHA functional classification during present pregnancy

New York heart association class	Number	Percentage
Class I	09	25.00
Class II	23	66.89
Class III	01	02.78
Class IV	03	08.33
Total	36	100.00

**Table 4:** Distribution of patients based on type of cardiac disease

Type	Number	Percentage
<i>Rheumatic heart disease</i>		
Mitral stenosis	08	22.22
Mitral stenosis with mitral regurgitation	04	11.11
Mitral valve prolapse	03	08.33
Aortic stenosis	02	05.56
Tricuspid regurgitation	01	02.78
<i>Congenital heart disease</i>		
Atrial septal defect	10	27.77
Ventricular septal defect	04	11.11
Patent ductus arteriosus	–	–
Fallot's tetralogy	–	–
<i>Others</i>		
Peripartum cardiomyopathy	02	05.56
Complete heart block	01	02.78
Atrial myxoma	01	02.78
Total	36	100.00

**Table 5:** Distribution of cases according to maternal complications

Complications	Number	Percentage
Nil	16	44.44
<i>Cardiac</i>		
Sustained tachyarrhythmia/bradycardia	04	11.11
Pulmonary edema	03	08.33
Cardiac failure	02	05.55
<i>Noncardiac</i>		
Postpartum hemorrhage	04	11.11
Puerperal sepsis	0	0
<i>Obstetric</i>		
Anemia (Hemoglobin < 9 gm/dL)	05	13.88
Preeclampsia	01	02.79
<i>Mortality</i>		
Total	36	100.00

**Table 6:** Period of gestation at delivery

Period of gestation (weeks)	Number	Percentage
28–31	01	02.78
32–36	03	08.33
37–40	30	83.33
>41	02	05.56
Total	36.00	100.00

**Table 7:** Mode of delivery

Mode	Number	Percentage
Lower segment cesarean section	15	41.67
Normal vaginal delivery	14	38.88
Instrumental vaginal delivery	06	16.67
Postmortem hysterotomy	01	02.78
Total	36	100.00

**Table 8:** Distribution of cases according to the fetal outcomes

Outcomes	Number	Percentage
Good fetal/neonatal outcome	32	88.89
Intrauterine growth restriction	02	05.55
Preterm	01	02.78
Intrauterine fetal death/still birth	01	02.78
Total	36	100.00

**Table 9:** Distribution of babies according to birth weight

Birth weight (kg)	Number	Percentage
<2	01	02.78
2–2.4	03	08.33
2.5–2.9	27	75.00
3–3.4	04	11.11
≥3.5	01	02.78
Total	36	100.00

On evaluating for NYHA functional class, 66.89% were under NYHA class II followed by NYHA class I (Table 3). This finding is comparable with the results of Indira et al.<sup>10</sup>

The most common group of cardiac disease was rheumatic heart disease 50.00% of cases, in which one case was surgically corrected, while 39.00% of cases were of congenital heart disease with surgically corrected cases of 64.28%. Similar observation was made by Mangala et al.<sup>4</sup> All cases of rheumatic heart disease were on antibiotic prophylaxis. The commonest lesion in rheumatic heart disease was mitral stenosis accounting for 22.22% (Table 4). This was found to be 38.5% in the study done by Konar and Chaudhuri.<sup>11</sup> In congenital heart disease, atrial septal defect was the commonest lesion followed by ventricular septal defect (Table 4), similar to the study of Gore et al.<sup>12</sup> In the present study, we also observed two cases of

peripartum cardiomyopathy, one congenital heart block and a rare case of atrial myxoma.

On evaluating the maternal complications, 44.44% had no adverse complications. Similar finding was observed in Stangl et al<sup>13</sup> and Avila et al studies.<sup>14</sup> The most common complication encountered was anemia (13.88%) followed by sustained tachyarrhythmias/bradycardia and postpartum hemorrhage. One case (02.79%) of maternal death due to peripartum cardiomyopathy was observed. The mortality rate was 2.7% in Avila et al study (Table 5).<sup>14</sup> Table 6 shows distribution of cases according to period of gestation at delivery.

Out of the 36 cases, 30 (83.33%) patients delivered during the gestational age of 36 to 40 weeks of pregnancy (Table 6). The patient with complete heart block underwent emergency LSCS at 38 + weeks in view of non-reassuring non stress test. Permanent pacemaker

was inserted in the postoperative period. Case of atrial myxoma had an elective LSCS with myxoma excision at 31 weeks, with the indication being severe mitral stenosis with cardiac failure.

In the study group, 41.67% of the women underwent lower segment cesarean section (LSCS), with previous LSCS being the commonest indication. Uneventful normal vaginal delivery cases were of 38.88%. The rate of cesarean section was 52% in Mangala et al study (Table 7).<sup>4</sup>

The patient with complete heart block underwent emergency LSCS at 38 + weeks in view of nonreassuring nonstress test. Permanent pacemaker was inserted in the postoperative period. Case of atrial myxoma had an elective LSCS with myxoma excision at 31 weeks, with the indication being severe mitral stenosis with cardiac failure.

The fetal/neonatal outcome was good in 88.89%. Commonest complication was intrauterine growth restriction (5.55%). Hemodynamic compromise secondary to valvular stenosis and the resulting decrease in uterine blood flow are the probable explanation for intrauterine growth restriction. One case of intrauterine fetal death noted, which accounts for 2.78% (Table 8). This is comparable to the 2.00% reported in literature.<sup>15</sup> Preterm labor and low birth weight are known as major neonatal complications in women with heart disease in pregnancy. During the study period, 72.72% of the babies were born at term and only 27.27% were preterm. A similar observation was made in a South Indian descriptive study.<sup>16</sup> Also, 75.00% of babies were between 2.5 and 2.9 kg and only 2.78% of babies were having a birth weight of <2 kg (Table 9). This indicates that the perinatal outcome depends on the severity of symptoms during pregnancy rather than the duration or type of cardiac disease. Appearance, pulse, grimace, activity respiration score at birth was >7 in 91.66% at 1 minute and 94.44% at 5 minutes.

## DRAWBACKS

- It is a single-center study.
- Limited number of study cases.
- Analysis of pregnancy outcomes in the early trimesters like miscarriages, fetal anomalies not done.
- No long-term follow-up of the cases.

## CONCLUSION

Heart disease in pregnancy is a high-risk comorbidity with a major impact on the mother and the fetus. This study supports the fact that a proper maternal evaluation and an institutional delivery can improve the prognosis in a patient with cardiac disease complicating pregnancy. A multidisciplinary approach is ideal in dealing with and preventing complications. It is mandatory to counsel the

patients for contraception and family planning wherever necessary. It is also necessary to follow up these patients during subsequent pregnancies.

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