

## Perinatal Outcome in Pregnancy with Heart Disease at Tertiary Care Center

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### Abstract

Cardiac disease is an important cause of maternal mortality and morbidity both in antepartum and postpartum period. Objective of the present study was to determine the incidence, etiology and the type of the heart disease and maternal and fetal complication in pregnant women with heart disease. *Methods:* This study was conducted in the department of obstetrics and gynecology at Geetanjali medical college a tertiary care center Udaipur, 35 women with heart disease which were previously established or diagnosed during pregnancy were enrolled in the study over the period of 1 year. *Results:* In 35 women pregnancies were complicated by the heart disease in the study. The incidence of the heart disease were less than 1%. The principle cause of of the cardiac lesion was Rheumatic Heart Disease (RHD) (62.86%). While congenital heart disease was seen in 8.57%. Among the women who had RHD, mitral stenosis seen in 27.7% was most common lesion followed by MR in 18.18% and 4.55% patients of aortic lesions and combined valvular heart lesion in 13.66%. 1 (2.86%) patient had maternal mortality due to pulmonary edema with severe MS. Majority of the patients belonged to NYHA class 1. 57.14% underwent caesarean section and 42.86% underwent vaginal delivery. In Maternal complications 45.71% had preterm

deliveries and 40% had IUGR component. Various neonatal complications like low birth weight in 40% and prematurity in 34.29% and 14.29% required NICU admission, 11.43% were still births and one congenital heart lesion in 2.86%.

**Keywords:** Pregnancy with Heart Disease; Rheumatic Heart Disease; Maternal Complications; Fetal Complications.

### Introduction

Associated cardiac disease in pregnancy qualifies as a high risk group which poses a significant challenge to an obstetrician, since overlapping clinical features viz pedal edema, breathlessness, murmur coexist in pregnancy as well as primary cardiac disease. Cardiac disease is one out of the three major indirect causes of maternal mortality (20.5% maternal death) both in antepartum and post partum period [1-5].

In developing countries a large number of women become pregnant prior to seeking therapeutic evaluation and intervention for cardiac disease, many being first time diagnosed [6]. Conventionally cardiac disease in pregnancy is stratified as congenital and acquired types.

Cardiomyopathy (Hypertrophied, Restrictive) congenital heart disease with pregnancy is more common in developed countries yet acquired rheumatic heart disease in pregnancy group (various valvular lesions) is more common in our country [7].

Prevalence of heart disease in pregnancy varies from 3-3.5% [8] thereby complicating 1-4% of pregnancies in India [9]. Western countries have a figure of 1-3% maternal deaths with cardiac illness in pregnancy [10-11].

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Physiological changes of hemodynamics that occur in pregnancy are a volume expansion of plasma (above 50%) increased cardiac output (30-50%) along with a six fold increased risk of thrombosis [12].

In women with normal cardiac reserve hemodynamics changes of normal pregnancy are well tolerated. However decompensation occurs in diseased heart with resultant increase in maternal mortality and morbidity [10].

Around 15-25% of cardiac abnormalities are first diagnosed during routine antenatal checkups. It is natural that fetus will also be compromised in these mothers as fetal health depends upon adequate and continuous supply of well-oxygenated blood [10].

Development of obstetric complications like preeclampsia, preterm labour and fetal growth retardation are commonly seen in pregnant mothers with heart disease thereby worsening the overall outcome [6].

Thus, it is essential to conduct a thorough evaluation of such patients for any underlying cardiovascular disease to devise an optimal management algorithm. The presence of maternal heart disease affects the fetus with increased risk of spontaneous abortion and also such children when born carry increased risk of inheriting polygenic cardiac disease (3-5%) [13].

An early antenatal pickup of the cardiac disease, with precise multidisciplinary approach involving a collaboration of Obstetrician, Cardiologist, Anesthetist and pediatrician can bring out excellent results in majority of the cases [14].

The circulatory changes of pregnancy in the presence of maternal heart disease may result in adverse consequences even death of the mother or fetus [15].

The objective of our study was to determine the incidence, etiology and the type of the heart disease along with the evaluation of its resultants outcome both in mother and newborn.

## Methods

This was prospective observational study conducted in the department of obstetrics and gynecology at Geetanjali Medical College and Hospitals, a tertiary care center, Udaipur. The study period was from December 2016 to December 2017. 35 women with heart disease which were previously established or diagnosed during pregnancy were enrolled in the study. Included in our study were

all pregnant women with congenital or acquired cardiac lesion or delivered patients with heart disease who were referred to our hospital but those with associated medical disorder like diabetes mellitus, pulmonary disease, renal disease or any other endocrinological disease were excluded from this study. A structured detailed proforma was used to gather the essential information regarding heart disease in pregnancy. Baseline data recorded included were age, parity, gestational age, cardiac medications, thorough clinical examination including chest and cardiovascular auscultation, ECG and 2D echocardiographic assessment of left and right ventricular systolic function. Modern therapeutic measures, good referral system and timely advice of physicians and cardiologists was taken. All the patients were monitored for development of any cardiac lesion (Congestive cardiac failure, arrhythmia, thromboembolisms, infarctions, endocarditis) or obstetric complications. The mode of delivery whether vaginal, use of instruments and the need for LSCS was duly recorded. During postnatal period, all patients were followed up till discharge for any obstetrical, cardiac and neonatal complications. At the time of discharge patients along with their spouses were counseled regarding the various contraceptive methods. All the patients were persuaded to continue the cardiac management after delivery.

## Results

A total of 35 pregnant women with cardiac disease were included in the study. Incidence of cardiac disease at our center was <0.5%. Of the 35 patients, majority of patient were in the age group of 18-25 years (68.7%) and 20% belonged to 26-35 years (as showed in Table 1).

Among the 35 pregnant women 62.86% were primigravida, 17.14% were second gravida and 20.0% were third gravida. Of the 35 women, majority were term gestation 55% and 45% were preterm gestation (as shown in Table 2).

The functional class of disease as per NYHA classification most of the patients had NYHA class 1 (42.86%). In study population it was seen that the outcome worsened as the class of the disease increased, complications were more in NYHA class 3,4 (as shown in Table 3).

Most of the patient in the study had rheumatic heart disease 62.86%, followed by congenital heart disease 8.57% and coronary heart disease in 3%.

The surgical correction was done in 80.71% of which 7 patients underwent surgery prior to pregnancy and 1 during pregnancy, none of the patients had residual disease after surgery.

The most common lesion in patients with RHD was mitral stenosis (27.27%) followed by mitral regurgitation (18.18%). Aortic lesions were seen in 1 (4.55%) patient, 2 (9.09%) with tricuspid regurgitation, 4 (18.18%) with combined MS+PAH and MS+TR are in 3 (13.66%) patients. (as shown in table 4).

The maternal complications were seen in 16 pregnant women. The common non-cardiac

complication noticed preterm delivery 16 (45.71%), IUGR 14 (40.0%), anemia in 5 patients (14.26%). The other non cardiac complications seen were PIH in 3 (8.57%) PPRM in 1 (2.86%), oligohydramnions in 1 (2.86%), hemolytic anemia in 1 (2.86%). Cardiac complications were seen in 2 cases with pulmonary edema in 1 (2.86%), hypertensive cardiac failure in 1 (2.86%) and there was one maternal death (2.86%). Cause of the death was severe MS with pulmonary edema with congestive cardiac failure (as shown in table 5).

Most of patients had caesarean section in 20 (57.14) cases and vaginal delivery in 15 (42.86). The

**Table 1:** Demographic characteristics

Demographic Variables	Cases N=35 Mean SD	Control N=35 Mean SD	P Value
Age of Women (Years)	26.21+/- 7.59	28+/-3.89	0.074
BMI of Women (Kg/M <sup>2</sup> )	23.93+/-4.22	23.63+/-2.88	0.729
Birth Weight of Baby (KG)	2.17+/-0.61	2.7+/-0.45	<0.001

**Table 2:** Demographic characteristics

Gravida	Cases (%) N=35	Number of Pregnant Women Control (%) N=35	P value
Primigravida	22(62.86)	21(60.0)	>0.05
Gravida 2	6(17.14)	8(22.6)	
Gravida 3	7(20.0)	6(17.14)	

**Table 3:** Distribution of cases according to nyha classification

Nyha Class	Cases (%)
1	15(42.86)
2	13(37.14)
3	6(17.14)
4	1(2.86)
Total	35(100)

**Table 4:** Distribution of cardiac lesion

A. Cardiac Lesion	Cases (%) N=35
Rheumatic Heart Disease	22 (62.86)
1.MS	6 (27.27)
2.MR	4 (18.18)
3.MS+MR	2 (9.09)
4.AR	1 (4.55)
5.TR	2 (9.09)
6.MS+PAH	4 (18.18)
7.MS+TR	3 (13.66)
B. Congenital Heart Disease	3 (8.57)
C. Coronary Heart Disease	3 (8.57)
D. Cardiac Surgery	8 (17.14)
1. Prosthetic Mitral Valve	3 (37.5)
2. Prosthetic Aortic Valve	2 (5.71)
3. Balloon Mitral Valvotomy	3 (37.5)

various indications for LSCS were fetal distress, cephalopelvic disproportion and malpresentations. Induction of labor was not done in caesarean section group (as shown in table 6).

The neonatal outcome as follows like low birth weight in 14(40.0%), prematurity was seen in 12 (34.29%). A total 30 (85.71%) babies required NICU care birth asphyxia in 5 (14.29%), APGAR<7 in 8 (22.86%), there were 4 (11.43%) Still births and one congenital heart lesion in 1 (2.86%). (as shown in table 7 and 8).

## Discussion

Cardiac disease contributes to be a major risk factor for maternal and neonatal morbidity and mortality. Although the incidence of cardiac disease in pregnancy more or less remain unchanged but various factors leading to cardiac disease during pregnancy widely varies with different study population and study period. The incidence of cardiac disease in pregnancy in our study was 0.4-0.5%. Similar study by Sheela et al., the incidence

**Table 5:** Maternal complications (n=35)

	Obstetric complication	Cases (%) N=35	Control (%) N=35	P value
1	Anemia	5(14.26)	5(14.26)	>0.05
2	Chronic htn	2(5.71)	3(8.57)	>0.05
3	Pih	3(8.57)	8(22.86)	>0.05
4	Preterm	16(45.71)	2(5.71)	<0.001
5	Pprom	1(2.86)	3(8.57)	>0.05
6	Oligohydramnions	1(2.86)	8(22.86)	0.032
7	Iugr	14(40.0)	5(14.26)	0.032
	<b>Cardiac complications</b>			
1	Maternal mortality	1(2.86)	NIL	1.00
2	Pulmonary edema	1(2.86)	NIL	1.00
3	Hypertensive cardiac failure	1(2.86)	NIL	1.00
4	Hemolytic anaemia	1(2.86)	NIL	1;00

**Table 6:** Mode of delivery

Mode of Delivery	Cases (%)N=35	Control (%)N=35	P value
Vaginal Delivery	15(42.86)	18(51.43)	>0.005
LSCS	20(57.14)	17(48.57)	

**Table 7:** Significance of difference of apgar score of baby

Apgar score of the baby	Case N=35 Mean+/-SD	Control N=35 Mean+/-SD	P value
	7.42+/-2.98	8.57+/-0.7	0.030

**Table 8:** Neonatal outcome (n=35)

Complications	Cases (%) N=35	Control (%) N=35	P Value
Nicu admissions	30(85.71)	2(5.71)	<0.001
Low birth weight	14(40.0)	4(11.43)	0.014
Prematurity	12(34.29)	4(11.53)	<0.046
Birth asphyxia	5(14.29)	3(8.57)	>0.05
Apgar<7	8(22.86)	1(2.86)	0.032
Congenital heart disease	1(2.86)	NIL	1.00
Still birth	4(11.83)	NIL	1.00
Neonatal mortality	NIL	NIL	NIL

of cardiac disease in pregnancy was 1% [16]. However, the lowest incidence reported is 0.42% in Devabhaktuni study [17] and highest incidence was reported in Vidhyadhar study [18].

With increasing use of effective antibiotics against streptococcal bacteria the incidence of rheumatic heart disease has been greatly reduced [19].

Rheumatic heart disease complicates about 0.3 to 3.5% of women in the childbearing period with a global figure of 1% maternal mortality in the developing countries [20].

Present study shows the predominant lesion was rheumatic heart lesion (62.86%). Similar study by Mahesh et al noted prevalence as 44.6%. In our patients of RHD, mitral valve disease was commoner affliction 54.54% [21,22] followed by aortic valve 4.55%, congenital heart disease 8.57%. The observations in the present study were comparable with other studies done by Sheela et al 67% and Balasaheb et al 73.9% [16,24].

Out of 35 pregnant women in the present study group 17.14% had cardiac surgery before conception. Around 20 patients (57.14%) underwent LSCS while 15 (42.8) had normal vaginal delivery. The results were comparable with studies conducted by Bhatla et al. [7].

Majority of the patients (80%) belong to NYHA class 1 and class 2. Similar findings were seen in other studies [7,23]. The percentage of patients with NYHA class 3 and 4 was (20%) and had a poor outcome. The observations were comparable with the study done by Indira et al. [25].

Hsiesh et al in their study reported that out of foeto-maternal deaths 75% patients were in NYHA class 3 and 4. [30].

Out of 35 patients, one patient underwent a successful elective cesarean section at term with concomitant mitral valve replacement under cardiopulmonary bypass. Surgery was done due to critical mitral stenosis (<0.6cm<sup>2</sup>) with severe pulmonary hypertension (grade 4 NYHA), both fetal and maternal outcomes were excellent. This was only second such case reported in our country.

Despite of potential significant maternal morbidity in most patients with cardiac diseases, satisfactory outcome can be expected with careful antenatal, intrapartum and postpartum management with multidisciplinary approach [14,31].

In the present study maternal complications were observed in patients with cardiac disease. Among them were anemia 14.2%, PIH 8.57%, chronic hypertension 5.7%, PPROM 2.6%,

oligohydramnios 2.8%, hemolytic anemia 2.8% and IUGR 40%. Similar observations are reported with Burlingame J et al., Barbosa PJ et al., Korgeal M et al., Sheela et al., Kovavisarach E et al., Sermer M et al., Nqayana T et al. [6,21,16,22,26-28].

In the present study we had 30 NICU admissions, due to low birth weight in 14 neonates, prematurity in 12 neonates, birth asphyxia in 5 neonates, APGAR <7 in 8 neonates. We found 4 still births and 1 neonate with congenital heart lesion and with nil neonatal mortality. Results were comparable with Prameela et al. [29].

We had found one maternal death in the present study and the cause of death was due to pulmonary edema with congestive heart failure (NYHA 4).

## Conclusion

Association of cardiac illness in pregnancy has a significant bearing on maternal morbidity and mortality. In India specifically the reality of rheumatic heart disease further augments this grim scenario.

However making a concerted efforts to antenatally pickup, identify and evaluate this problem along with a multidisciplinary structured approach involving obstetrician, anesthetist, cardiologist and pediatrician can bring out rich dividends.

### *Compliance with Ethical Standards*

*Conflict of Interest:* None.

*Ethical Statement* All procedures performed were with the standard of institutional research ethical committee.

*Informed Consent* Informed consent was obtained from all individuals who participated in the study.

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