

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20185436>

Original Research Article

## Study of cardiac disease and its outcome in pregnancy

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**Received:** 07 November 2018

**Accepted:** 04 December 2018

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### ABSTRACT

**Background:** Pregnancy comes as a temporary complication in the disease process of a patient with a cardiac lesion. It is the 4<sup>th</sup> common cause of maternal mortality and one of the most important non-obstetrical causes of maternal death. Previously most women with diagnosed heart disease were advised to avoid pregnancy and labor and termination was advised. But in modern obstetrical practice, pregnancy in a patient with a heart disease is no longer an unacceptable hazard. The objective of this study is to find out incidence of cardiac diseases in pregnancy, to evaluate their management and to find out maternal and fetal outcome in pregnancy with cardiac disease.

**Methods:** This study is a prospective cohort study in which an analysis of maternal and fetal outcome in 30 cases of cardiac diseases in pregnancy was carried out in the department of Obstetrics and Gynaecology in our institute at Civil hospital Ahmadabad from 01/01/2017 to 31/12/2017. The study included all known case of RHD, CHD, or newly diagnosed case or surgically corrected case with prosthetic heart valves during current pregnancy.

**Results:** Majority of women having pregnancy with cardiac disease were in the age group of 20-30 years. Majority of them were primigravida and suffered from rheumatic heart diseases with grade 1 NYHA severity. Majority of women got delivered by normal vaginal delivery with healthy fetal outcome. Most of the babies born to cardiac mother had their baby weight ranging between 2.0-2.5kg.

**Conclusions:** The results of present study indicate that heart disease forms a considerable proportion of medical illness complicating pregnancy. Cardiac disease presents problems both to the obstetrician and as well as to the physician, cardiologist and to the neonatologist. But the majority of pregnancies complicated by heart disease are uneventful with a favorably good outcome for both the mother and the fetus.

**Keywords:** Congenital heart disease, Congestive cardiac failure, Postpartum intrauterine contraceptive device

### INTRODUCTION

Pregnancy comes as a temporary complication in the disease process of a patient with a cardiac lesion. Prevalence of heart disease in pregnancy varies from 0.3%-3.5%<sup>1-3</sup> It is the fourth common cause of maternal mortality and one of the most important non-obstetrical cause of maternal death.<sup>4,5</sup> Previously most women with diagnosed heart disease were advised to avoid pregnancy and were counseled for termination. But in modern obstetrical practice, pregnancy in a patient with heart disease is no longer an unacceptable hazard. Joint

management between the obstetrician and the cardiologist has improved the outcome of pregnancy and has reduced the maternal risks.<sup>7</sup>

Disease pattern varies widely when developed and underdeveloped countries are compared (Uelen and Glechen 1982). In U.S.A. and Western Europe incidence of RHD has declined. In India and Nigeria acute and chronic RHD still constitutes a major health problem among pregnant women.<sup>8</sup> Though heart disease is often a worrying problem, the study shows that outcome of pregnancy is generally satisfactory and majority of the

patients with proper management achieve normal vaginal delivery after spontaneous onset of labour. The aims and objectives of this study are to find out incidence of various cardiac diseases in pregnant women in a tertiary care center, evaluate causes and management of heart disease with pregnancy, to find out causes leading to cardiac decompensation and possible prophylactic measures, to assess maternal and fetal outcome and prognosis.

## METHODS

This study is a Prospective Cohort Study in which an analysis of maternal and fetal outcome in 30 cases of cardiac disease in pregnancy was carried out in the department of Obstetrics and Gynecology in our institute at Civil Hospital Ahmedabad from 01/01/2017 to 31/12/2017. Data were collected in a pre- designed form. No data or any information was collected without permission of patient, participation in this research was fully voluntary. All data were analyzed by using computer based Statistical Package for Social Science (SPSS 16) programmed. Statistical analysis was performed, categorical variables was presented in the form of frequency and percentage.

### Inclusion criteria

- Patients who were known case of RHD or diagnosed during present pregnancy
- Patients with congenital heart disease
- Patients with prosthetic heart valves and surgically corrected heart disease.

## RESULTS

Total 30 cases of pregnancy with cardiac disease out of 9439 deliveries during period from 01/01/2017 to 31/12/2017 were studied in terms of maternal and fetal outcomes. Total 9439 patients were registered as indoor patients at our setup during the study period. Prevalence of cardiac disease during the study was 0.32% (3.2 cases per 1000 deliveries). This study was conducted at our hospital and the obstetric and fetal outcome of 30 patients with heart disease was studied during my residency. In addition to routine antenatal workup, cardiologists decided type and severity of cardiac lesion and also evaluated patient with heart disease.

In present study 19(65%) were emergency cases which were referred from outside because CHA being a tertiary care center and 11 (35%) cases were already booked in ANC OPD and were knowing about their ailment and were under regular treatment of physician and cardiologist.

Below is the table showing type of heart disease with etiological distribution. RHD still constitutes the major group of heart disease in pregnancy, especially in the developing countries. In present series Table 1 shows

RHD consisted 20 out of 30 cases which account for 66.7%.

Various authors ranging from 4% to 8% have described the proportion of CHD. In this study Table 1 shows that CHD constitutes 30.98 % of total cases of heart disease may be due to easy availability of diagnostic techniques like 2D-Echo. So, trivial conditions like bicuspid aortic valves and mitral valve prolapse have also been increasingly recognized in minimally symptomatic patients.

**Table 1: Etiological distribution.**

Type of cardiac disease	No. of cases	%
Rheumatic heart disease	20	66.7
Cardiomyopathy	01	3.3
Atrial septal defects	04	13.3
Patent ductus arteriosus	01	3.3
Tetralogy of Fallot	02	6.7
Mitral valve prolapse	01	3.3
Bicuspid aortic valves	01	3.3
Total	30	100

Table 2 shows there were 18 primi gravidae, 08 second gravidae, 02 third gravidae and 02 multigravidae patients. Probably parity has no adverse effect on heart diseases (Pinto Rosurio 1975).

**Table 2: Relationship of gravidity with heart disease.**

Gravidity	RHD	CHD	PPCM	Others	Total
Primi	12	05	00	01	18
2 <sup>nd</sup>	05	01	01	01	08
3 <sup>rd</sup>	02	00	00	00	02
≥4 <sup>th</sup>	01	01	00	00	02
Total	20	07	01	02	30

Table 3 shows most of the patients were in Grade I and II of NYHA classification. With proper care and management normal labor and delivery were achieved in most of these patients. The patients of Grade III and IV were immediately hospitalized because as the grade increases, the maternal and fetal prognosis worsens. In present study out of 30 patients, 26(86.7%) patients had full term deliveries while 04 (13.3%) patients had pre-term deliveries.

**Table 3: Occurrence of severity of heart disease (NYHA grading).**

Grade	No. of patients	Percentage
I	18	60
II	09	30
III	01	3.3
IV	02	6.7

The patients with heart disease normally have spontaneous normal vaginal delivery in most of the cases.

In present study 36.7% had normal vaginal delivery and 56.7% had LSCS (Table 4).

**Table 4: Mode of deliveries.**

Mode of Delivery	No. of patients	%
Vaginal Delivery	11	36.7
LSCS	17	56.7
Forceps assisted vaginal delivery	02	6.6

The indications of the cesarean were most of the time due to cardiac indication (Table 5).

**Table 5: Indications of LSCS.**

Indication	No. of patients
Malpresentation	01
Fetal Distress	01
Cardiac	08
IUGR	01
Prev CS	06
Total	17

Table 6 shows that total 06 patients developed complications. Out of 30 cases 04 developed CCF, pleural effusion and pulmonary edema.

**Table 6: Occurrence of various complications.**

Complications	Rheumatic heart disease	Congenital heart disease
Congestive cardiac failure	01	01
Pneumonia	-	-
Pleural effusion	02	01
Pulmonary edema	01	01
Thromboembolism	01	-
Maternal mortality	01	01
Hematuria	-	01
Wound gap	01	-

2 maternal mortalities occurred- both due to acute cardiorespiratory arrest with cardiogenic shock with severe pulmonary hypertension.

No patient developed acute rheumatic fever probably due to improved and regular prophylaxis by Inj. Benzathin Penicillin 1.2 MU IM every 21 days which is very effective drug in preventing attacks of rheumatic fever.

Most of the patients who developed complications belonged to NYHA grade 3 to 4 from the very beginning and thus this shows that as the functional grade increases the incidence of cardiac decompensation also increases. The fetal outcome in RHD (especially with corrected valvular pathology) is usually good and only a little different from those in patients who don't have heart disease.

As shown in Table 7, 50% of babies were healthy. It also shows that 43.3% had low birth weight. Thus, prematurity is very common in patients with heart disease and this in turn leads to babies who are more prone to hypothermia and septicemia.

**Table 7: Fetal outcome.**

Outcome	No.	%
Healthy	15	50
Intra-uterine growth restriction	01	3.3
Low birth weight	13	43.7
Neonatal intensive care unit admission	05	16.6
Neonatal death	02	6.7

There was not a single case of postdatism in the study. In this study as per Table 8 we had 17% of babies who had weight less than  $\leq 2$  kg and 47% had weight between 2.1 to 3 kg. Thus total 62% babies were of low birth weight in this study. Only 01 baby had birth weight more than 3 kg. This indicates that patients with heart disease normally deliver a baby having birth weight slightly less than that of the other normal pregnant patients.

**Table 08: Weight of newborn.**

Weight (kg)	Number of newborn	%
$\leq 2$	05	16.67
2.1-2.5	14	46.67
2.6-3.0	10	33.33
$> 3$	01	3.33
Total	30	100

The incidence of maternal mortality from 0.6% to 8% by various authors has been reported. In this study out of 30 cases 02 maternal mortalities reported. Thus, we had case fatality ratio of 6.67%.

**Table 9: Contraception.**

Contraception Method	No. of patients
Barrier	18
PPIUCD	05
Per Op TL	1

With improvement in the available medical care, proper and well facilitated ICCU, the care of the patient with heart disease should not be a major problem for the modern obstetrician and cardiologist. In present study in Table 9 18 cases were advised for barrier contraceptives as they are the safest contraceptives in cardiac patients. In 05 patients with corrected valvular heart diseases, with normal cardiac function and taking regular penicillin prophylaxis, postpartum IUCD CuT 380 A insertion was done with all aseptic precautions and were advised for follow up after 6 weeks and explained all the warning symptoms. 1 per op TL was done while performing cesarean section.

## DISCUSSION

Pregnancy contributes to significant hemodynamic changes i.e. 30-50% increase in cardiac output, stroke volume and intravascular blood volume. Also, there is 15-25% increase in heart rate. All these changes can lead to cardiac decompensation in cardiac patients. The obstetrician is the key person responsible for the health of mother and the infant during the pregnancy and delivery. If pregnancy is complicated by heart disease, interdisciplinary approach and regular supervision of the patient during pregnancy can achieve best results.<sup>1</sup> The present study reflects the fetomaternal outcome of cardiac disease in pregnancy in our hospital, a tertiary care centre in Uttarakhand. In present study prevalence of heart disease is 0.32%. The incidence of registered patients is 35.22% and emergency cases referred from outside were 64.78%. Thus, being a tertiary care center most of the cases were referred from outside.

RHD is still a major group of heart disease in pregnancy among which mitral valve disease is the commonest.<sup>2</sup> RHD constituted 66.7% cases of all cardiac diseases during present study. Various authors have reported proportion of RHD from 60% by McFaul et al to 95% by Dumir and Sethi et al (1983). In US and Western Europe the incidence of RHD has shown a declining trend over the last few decades. In India and other developing countries RHD still constitutes a major health problem amongst pregnant women. The contributing factors being low socio-economic status, overcrowding in the houses, illiteracy and limited access to medical care.<sup>2,3</sup>

The majority of the patients were of age <30 years of age and among them most were between 21-25 years of age. Majority of the patients were primigravida as they are being counseled regarding the risk of maternal morbidity and mortality in subsequent pregnancies.

It is important to grade the patients under NYHA classification for proper management and conduct, grade III and IV patients need immediate admission and also fetal and maternal outcome worsen in them. But in present study most of them fall under Grade I (18 patients) and Grade II (09 patients).

Antibiotics prophylaxis is must in all cases of RHD for prevention of infective endocarditis. Out of 20 cases of RHD, all were taking Penicillin prophylaxis already and they were advised to continue the same. So, as a result not a single patient presented with a rheumatic fever nor developed during their period of hospitalization.

Heart disease patients normally have spontaneous vaginal delivery but in present study 36.7% patients had normal vaginal deliveries and 56.7% had LSCS for cardiac indications while 6.6% underwent instrumental (ventouse/forceps) vaginal deliveries.<sup>9</sup> Cardiac failure, pleural effusion AND pulmonary edema developed in total 6 cases (20%). Out of 6 cases 2 cases already

presented to us with complications, 1 at 35 weeks of gestation and the other with 30-32 weeks of gestation. 1 patient developed acute CHF and pulmonary edema while doing cesarean section and 1 developed after 6 days of postpartum period. These patients required intensive care monitoring immediately.

Fetal outcome in cardiac patients is usually good and only a little different from those patients who do not suffered from heart disease.<sup>10-15</sup> 13.3% of patients in present study had preterm deliveries thus preterm labor is common in patients with cardiac diseases. Not a single patient had postdatism. 43.6% of the babies were of low birth weight and most of the babies weighed between 2.0-2.5 kg and there was 01 IUGR (3.33%) baby. It was noted that the furosemide and digoxin given to the patients of heart disease do not cause any harm to the fetus.

Throughout the study 02 maternal mortalities occurred- both due to acute cardiorespiratory arrest with cardiogenic shock with severe pulmonary hypertension. Thus, making case fatality ratio of 6.67%. Also 02 neonatal mortality noted contributing 6.7% cases. Thus, majority of pregnancies complicated by heart disease in this study had uneventful course with favorable maternal and fetal outcome.

The patient of heart disease should be explained the risk of oral contraceptives like thromboembolic diseases, hypertension, hyperlipidemia etc. which can further aggravate her ailments. The intrauterine device is included in WHO category II medical criteria and can lead to infection and subsequent endocarditis in damaged heart. The conventional barrier form of contraception like condom, diaphragm and foam are safe in all patients however their low efficiency must be considered while recommending them.<sup>15,16</sup> Barrier contraception should be the ideal choice for these patients, but modern CuT-380 A can also be used when benefits outweigh risks as stated by WHO (medical eligibility criteria category II).

## CONCLUSION

The results of present study indicate that heart disease forms a considerable proportion of medical illness complicating pregnancy.

Cardiac disease presents problems both to the obstetrician and as well as to the physician, cardiologist and to the neonatologist. But the majority of pregnancies complicated by heart disease are uneventful with a favourably good outcome for both the mother and the fetus.

The time to learn about the safety or hazards of pregnancy in such patients is prior to pregnancy. The management includes intensive care throughout pregnancy and also during labor and postpartum. The earliest signs of complication need to be watched for

vigilance with combined efforts from the obstetrician, a physician and a cardiologist and is mandatory for successful course and outcome of pregnancies complicated by heart diseases.

The newer investigations liked 2D-Echo and TEE are becoming easily accessible for the patients and also are better intensive care unit services available so that management of patients with heart diseases with pregnancy should not be a big problem in the future.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Patel TL, Pandey KS, Ambaliya A. Study of cardiac disease and its outcome in pregnancy. Int J Reprod Contracept Obstet Gynecol 2019;8:262-6.