



ORIGINAL RESEARCH PAPER

Gynaecology

A STUDY OF MATERNAL AND FETAL OUTCOME IN CARDIAC DISEASE COMPLICATING PREGNANCY AT A TERTIARY CARE HOSPITAL

KEY WORDS: CHD, MS, MR, RHD

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ABSTRACT

BACKGROUND: Cardiac disease complicating pregnancy is an indirect cause of maternal mortality. The incidence of cardiac disease during pregnancy has remained stable for many years even with 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 obstetrical outcome.

METHODS: A retrospective observational cross sectional study carried out in 96 patients with either congenital or acquired heart disease which included both corrected and uncorrected cardiac lesions at a tertiary care hospital during the period of 4 years from July 2011 to July 2015.

RESULTS: In present study the incidence of cardiac disease in pregnancy was observed to be 1.2%. In this study rheumatic etiology accounted for 47.8 of the cases followed by congenital heart disease accounting for 41.7%, myocardial disease for 6.3% and 4.2% of them rhythm disorders. Among the acquired rheumatic heart disease patients, mitral valvular disease accounted for majority of the acquired heart disease and mitral stenosis with regurgitation being the most predominant lesion in this study. Non cardiac complications like anaemia, diabetes, preeclampsia, epilepsy and hypothyroidism were noted. The newly detected heart disease in pregnancy was 10%. The mode of delivery that namely spontaneous vaginal delivery, instrumental delivery and cesarean section were 31.25%, 32.3% and 36% respectively. Adverse maternal outcome of cardiac failure, tachyarrhythmias and maternal death and adverse fetal outcome of preterm, IUGR, IUD and neonatal death were also noted.

CONCLUSIONS: A cardiac disease had a major impact on pregnancy. It was a multidisciplinary team work to have optimal maternal and foetal outcome in women with cardiac disease. Hence, constant vigilance was required throughout antenatal, intrapartum and postpartum period to avoid adverse outcomes.

INTRODUCTION:

Cardiac disease in a pregnancy is a high-risk pregnancy, which possess a significant challenge to an obstetrician. Cardiac disease in pregnant women most commonly due to RHD, CHD, and less commonly due to ischemic heart disease or cardiomyopathy. Though the frequency of RHD has decreased worldwide but still in developing countries like India, RHD is still predominant. Pregnancy makes a significant impact on cardiovascular system. Around 15-52% of cardiac abnormalities first diagnosed during routine antenatal check-ups or due to the signs and symptoms caused by physiological changes of pregnancy¹. At present 0.2-0.4% of all pregnancies in western countries are complicated by cardiovascular disease². The incidence of cardiac disease complicating pregnancies is 1 to 4 % in India³. The most common clinical features of cardiac lesion like breathlessness, pedal oedema, murmurs which mimic normal physiological changes in pregnancy posing a diagnostic difficulty for obstetricians. However, there is decreased incidence of cardiac disease in pregnancy due to improved facilities and surgical interventions early in childhood. The obstetric complications like pre-eclampsia, anaemia, preterm labor, foetal growth restriction further worsen the outcome and complicate the management of pregnancy with cardiac disease. Pregnancy related complications that compound the heart disease is ignored in the rural setup and patients rarely seek proper early care⁴. The objective of the study was to study the maternal and fetal outcome in heart disease complicating pregnancy and to correlate the maternal and fetal predictors of high risk with outcome.

METHODS:

This was a retrospective observational study carried out in a tertiary care hospital during the period from July 2011 to July 2015. A total of 96 patients with either congenital or acquired heart disease were studied which included both corrected and uncorrected cardiac lesions. A detailed history taking from the patient for the presence of dyspnoea, orthopnoea, paroxysmal nocturnal dyspnoea, chest pain, palpitation, hemoptysis, syncope, recurrent lower respiratory tract infection was done. History of rheumatic

fever in the past or monthly prophylactic therapy was noted. In previously diagnosed cardiac patients, details about the type of heart disease, medications, surgical correction, and performance in the previous pregnancies were noted. History of previous adverse cardiac events such as heart failure, myocardial infarction, stroke or cardiac arrest were recorded. In physical examination, the base line vitals and signs of cardiac lesion such as clubbing, cyanosis, dyspnoea, presence of distended neck veins, left parasternal heave, precordial thrill, ejection systolic murmur >3/6grade, diastolic murmur, rhythm disturbances, persistent split 2nd sound, loud P2, rales, presence of S3, S4, oedema, were noted. Cardiac lesion was confirmed by ECG, ECHO and colour Doppler. The maternal characteristics evaluated and included such as booking status, age of the patient, history of surgical intervention in the past and presence of associated co morbid conditions such as anaemia, preeclampsia, multiple pregnancy etc in the index pregnancy.

Follow up: Patient was reviewed with the cardiologist in each trimester and in the intrapartum and postpartum period. Patient was intensively monitored during the intrapartum period looking out for signs and symptoms of cardiac failure, arrhythmias, embolism, infective endocarditis and ensuring fetal well being with continuous cardiotocogram. Infective endocarditis prophylaxis and adequate analgesia was given. The second stage of labour was cut short by prophylactic outlet forceps/vacuum. Operative delivery was mainly for obstetric indications. Offspring of mothers with congenital heart disease were examined for recurrence of cardiac lesion clinically and were followed up by the paediatricians. The patients were monitored through the postpartum period for development of cardiac complications. The data collected was statistically analyzed to see the impact of cardiac disease on pregnancy and to evaluate the maternal and fetal outcome.

RESULTS:

H₀= The 2 attributes that adverse outcome that fetal and maternal And booking status of the cases is independent

H_{1a} The 2 attributes that adverse outcome that fetal and maternal And booking status of the cases is not independent

Table 1: Booking Status Vs Adverse Outcome

Booking Status	Adverse Outcome		
	Fetal	Maternal	Total
Booked	12	5	17
Un-booked	23	13	36
TOTAL	35	18	53

There exist no relation between Booked & Un-booked cases and adverse outcome of the pregnancy since the chi- square value is 2.31 which is less than the table value of 3.84 at degrees of freedom equal to 1 and the p- value is 0.630728. The result is not significant at p < .05.

Result:

Since the calculated chi-square value 2.31 which was less than the table value 3.84. So, the attributes that adverse outcome between booked and un-booked cases was independent and it was not statistically significant at p- value < 0.05 even though clinically evident that adverse fetal and maternal outcome was higher in un-booked cases than in booked cases.

Table 2: Maternal Characteristics, Age wise Distribution

Age	No. of pregnancy N=96	%
< 20 years	4	4.2
20-30 years	82	85.4
>30 years	10	10.4

A total of 96 pregnant women with cardiac disease were included in the study. Incidence of cardiac disease at our centre was 1.2%. Of the 96 patients, majority of patients were in the age group of 20-30 years (85.4%), 10.4% belonged to >30 years and 4.2% was in < 20 years (as shown in Table 2).

Table 3: Parity wise distribution

Parity	No. of pregnancy N=96	%
Primi	52	54.3
Multi	44	45.7

Among the 96 pregnant women 54.3% were primigravida and 45.7% multigravida (as shown in Table 3). Of the 96 women majority were booked 62.5% and 37.5% were in un-booked status. (as shown in table 4)

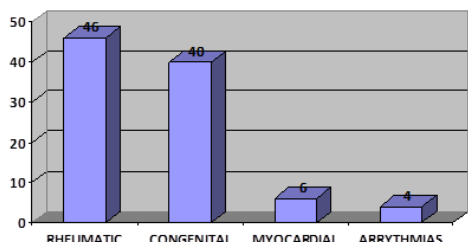
Table 4: Booking Status

Status	No. of pregnancy N=96	%
Booked	60	62.5
Un-booked	36	37.5

Table 5: Prevalence

Type of Heart Disease	No. of patients N=96	%
Rheumatic Heart Disease	46	47.8
Congenital Heart Disease	40	41.7
Myocardial disease	6	6.3
Rhythm Disorders	4	4.2

Figure 1: Distribution of Type of Heart Disease



The table 5 and figure 1 shows the distribution of type of heart disease of 96 pregnant women with both congenital and acquired

heart disease both corrected and uncorrected were enrolled in the study. Congenital heart disease accounted for 41.7%, acquired rheumatic heart disease accounted for 47.8% followed by 6.3% of myocardial disease and 4.2% of rhythm disorders. This shows that rheumatic heart disease accounts for 47.8% still the commonest in our country, followed by congenital heart disease, myocardial and rhythm disorders.

Table 6: Mode of delivery

Mode of Delivery	Number	Percentage
SVD	30	31.2%
Vacuum	22	22.9%
Outlet Forceps	9	9.4%
Emergency LSCS	24	25%
Elective LSCS	11	11.5%

The table 6 shows that most of the patients delivered by SVD 31.2% rest 22.9% by vacuum, of the 61 delivered by SVD, 51% was by assisted vaginal delivery either forceps or vacuum, to cut short the second stage of labour 25 % was by emergency LSCS, 11.5% by elective LSCS.

Table 7: Adverse Maternal Outcome

Adverse Outcome	No. of cases	%
Cardiac Failure	14	14.5%
Tachyarrhythmias	3	3.1%
Maternal Death	1	1%

The Table 7 shows different maternal adverse outcomes during pregnancy and in postpartum period. Heart failure (14.5%) was the commonest complication followed by tachyarrhythmias (3.1%) and maternal death (1%).

Table 8: Fetal Outcome

Fetal Outcome	No. of cases	%
Preterm	20	20.8%
IUGR	14	14.5%
IUD	1	1%
Congenital heart disease	1	1%
Neonatal death	1	1%

The Table 8 shows the different fetal outcomes. Among the adverse fetal outcome, preterm (20%) was the commonest followed by IUGR (14.5%), there was recurrence of one congenital heart disease, baby had AS mother was known case of MVP/MR. There was 1% each of IUD and neonatal death.

Table 9: Adverse Maternal and Fetal Outcome According to NYHA CLASS

NYHA CLASS	NUMBER	ADVERSE MATERNAL EVENTS N=14	ADVERSE FETAL EVENTS N=20
CLASS I	23	0	2(8.7%)
CLASS II	48	0	3(6.2%)
CLASS III	18	7 (38%)	12(66%)
CLASS IV	7	7(100%)	3(43%)

The Table 9 shows the NYHA class increases the percentage of adverse maternal outcome increases, in fetal outcome also it is more in cases of class III and class IV and there is statistical significance with p value 0.04.

Table 10 Correlation of severity of mitral stenosis and adverse outcome

ADVERSE OUTCOME	MILD MS N=21	MODERATE MS N=17	SEVERE MS N=7
FETAL			
IUGR	1(4.8%)	5(29%)	4(57%)
PRETERM	3(14%)	3(17.6%)	2(29%)
MATERNAL			
CARDIAC FAILURE	1(4.8%)	2(11.8%)	4(57%)
ARRHYTHMIA	0	0	1(14%)
MATERNAL DEATH	0	0	0

In the above said table 10 which shows 45 patients were in MS and Of the 7 patients who had severe MS all of them had either fetal / maternal adverse outcome. Moderate and mild MS tolerated the pregnancy well, hence the severity of mitral stenosis and associated pulmonary hypertension is directly associated with the adverse outcome with a statistically significant p value of 0.01.

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 1.21%. As most of the centers in our country being a referral centers, may not reflect the actual prevalence of this medical disorders in pregnancy. It accounts for important cause of maternal mortality in developing countries⁵. Present study shows the predominant lesion was rheumatic heart disease (47.8%) followed by congenital heart disease (41.7%), cardiomyopathy (6.25%) and rhythm disorders (4.2%). The observations in the present study were comparable with other studies done by Sheela et al (67%) and Balasaheb Vet al (73.9%)^{6,7}. However with increasing use of effective antibiotics against streptococcal bacterial cause in the rheumatic fever, the incidence has been greatly reduced. It accounts for about 30% of cardiac disease during pregnancy in developed countries and 90% off cardiac disease in developing regions^{8,9}. Out of 96 pregnant women in the present study group 37.5% underwent surgical corrections for cardiac disease. The results were comparable with studies conducted by Bhatla et al.¹⁰ Majority of the patients (74%) belong to NYHA class I and class II. The percentage of patients with NYHA class III and IV was 26% and had a poor outcome. These observations were comparable with the study done by Indira et al.¹¹ While studying the mode of delivery 61 patients delivered vaginally out of which 31 patients had instrumental vaginal delivery to cut short the second stage of labor. 35 patients had cesarean section. In the present study maternal complications were observed in 18 patients (18.75%) with cardiac disease. Among them the other medical and obstetric complications like anemia was seen in 10 patients, followed by Diabetes in 6 patients, pre-eclampsia in 5 patients, epilepsy in 3 patients, hypothyroidism in 6 patients, preterm in 20 patients and IUGR in 14 patients. We had found one maternal death in a patient with complex congenital heart disease in the present study and the cause of death was due to cardiac arrest in the post operative period. In the present study we had 14 cases who developed cardiac failure, 3 cases of arrhythmias, and 1 case of maternal death in this study.

CONCLUSION:

Patients with MS and pulmonary hypertension had significant adverse maternal and fetal outcome. Predictors of adverse maternal outcome and adverse fetal outcome which occurred in NYHA class III and IV was more and it was statistically significant during pregnancy in this study. About 10% of women in this study were diagnosed to have heart disease for the first time in this index pregnancy. In our study there was one maternal death, patient was known case of uncorrected congenital complex heart disease and she was late booked at 28 weeks gestation. In the present study 2 cases of HOCCM were seen there was no complication throughout the pregnancy. Similarly 5 patients with prosthetic valves on warfarin \leq 5mg throughout pregnancy had an uneventful pregnancy.

Cardiac disease is a major risk condition, which has adverse effect on pregnancy and its outcome. The incidence more or less remains the same in developing countries like India. Rheumatic heart disease is still the commonest heart disease in India. All corrected congenital acynotic heart disease tolerated pregnancy well. Maternal and neonatal morbidity and mortality can be reduced with adequate antenatal check ups and early detection of cardiac diseases.

REFERENCES

1. Uebing A, Steer PJ, Yentis SM, Gatzoulis MA. Pregnancy and congenital heart disease. *Br Med J*. 2006;332:401-6.
2. Vera RZ, Carina BL, Claudio B, Renata C, Rafael F, Jean MF. ESC guidelines on the management of cardiovascular diseases during pregnancy. *Eu Heart J*. 2011;3147-

- 97.
3. Bansode BR. Pregnancy and heart disease. *Assoc Physicians Ind*. 2010;773-6.
4. Sawhney H, Aggarwal N, Suri V, Vasishta K, Sharma Y, Grover A. Maternal and perinatal outcome in rheumatic heart disease. *Int J Gynaecol Obstet*. 2003;9-14.
5. Konar H. Medical disorders in pregnancy: who should see the woman?. *J Ind Med Assoc*. 2004;102:131.
6. Sheela CN, Karanth S, Patil CB. Maternal cardiac complications in women with cardiac disease in pregnancy. *Int J Pharm Biomed Res*. 2011;261-5.
7. Vijaya BC, Rekha GD, Preeti L. Maternal outcome in heart disease in pregnancy. *RRJMHS*. 2014;61-6.
8. Siu SC, Sermer M, Colman JM, Alvarez AN, Mercier LA, Morton BC, et al. Prospective multi-center study of pregnancy outcomes in women with heart disease. *Circ*. 2001;104(5):515-21.
9. Carapetis JR, Steer AC, Mulholland EK, Weber M. The global burden of group A streptococcal diseases. *Lancet Infect Dis*. 2005;685-94.
10. Bhatla N, Lal S, Behera G, Kriplani A, Mittal S, Agarwal N, et al. Cardiac disease in pregnancy. *Int J Obstet Gynecol*. 2003;82:153-9.
11. Indira I, Sunitha K, Jyothi. Study of pregnancy outcome in maternal heart disease. *IOSR J Dental Med Sci*. 2015;14(7):6-10.