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Research Article

Maternal and fetal outcome in cardiac disease complicating pregnancy at a tertiary centre in a rural area

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Abstract

Objective: To evaluate the maternal and fetal outcomes of pregnancies, complicated by cardiac disease in a developing country.

Material and Method: A retrospective analysis was carried out in 60 pregnant women with cardiac disease from June 2013 to June 2004 at a tertiary centre in Kolar.

Results: In the present study, the incidence of cardiac disease was 0.4%, out of which 33.3% were Congenital Heart Diseases and 66.7% were Rheumatic Heart Diseases. Mitral stenosis was seen in 51.3% of cases, mitral regurgitation alone was seen in 7.8% and with mitral stenosis in 35.9%. Anemia was seen in 50% of cases, pre-eclampsia in 23.7% and preterm labor in 18.4%.Spontaneous vaginal delivery was seen in 50%, induced in 5%, instrumental deliveries in 16.6% and cesarean in 28.4%. Surgical correction for cardiac disease was done in 24 patients (40%) of which 6 were during pregnancy. Cardiac complications were noted in 8 patients, of which 6 had CCF, 1 had pulmonary edema and one had atrial fibrillation. The incidence of small for gestational age was 28.3%. Maternal mortality was 3.3% and perinatal mortality was 6.6%.

Conclusions: Heart disease in pregnancy is a high risk condition and has a major impact on pregnancy. Rheumatic heart disease was the predominant cardiac problem in pregnancy. Associated obstetric complications along with lack of knowledge and ignorance regarding the pathology lead to unpleasant obstetric outcome. Maternal and perinatal morbidity and mortality can be reduced with proper antenatal, intrapartum and postnatal care in conjunction with cardiologist and neonatologist.

Keywords: CHD, RHD, mitral stenosis, pregnancy outcomes.

1. Introduction

Cardiac diseases complicate 1% of pregnancies, the commonest being rheumatic heart disease.[1]Heart disease during pregnancy is a challenge to obstetricians as common clinical features of cardiac lesions like breathlessness, pedal edema, and murmurs mimic normal pregnancy posing a diagnostic difficulty.[1-4]

Cardiac output increases by 30-50% during pregnancy and a further increase during labor and delivery imposes a burden on the diseased heart leading to complications and death. Cardiac disorders contribute to approximately 20.5% of maternal deaths.[1-5]

The ratio of RHD: CHD is decreasing due to improved pediatric care and improved surgical intervention early in childhood. Increasing number of women with cardiac disease is reaching the reproductive age due to the modern therapeutic options and moreover these patients are now attempting pregnancy multiple times due to improved availability of life saving modern therapy.[6]

Development of obstetric complications like pre-eclampsia, anemia, pre-term labor, and fetal growth restriction are commonly seen in patients with heart disease, that further worsen the outcome and complicate the management. It is essential to thoroughly evaluate patients for underlying cardiovascular disease in order to provide optimal care during pregnancy that plays a major role in the outcome.[7]

Pregnancy related complications that compound the heart disease is ignored in the rural setup and patients rarely seek proper early care.[8]

2. Objective

To study maternal and fetal outcome in pregnancy complicated by cardiac disease: at a tertiary center in a rural area.

3. Materials & Methods

The retrospective study was conducted at R. L. Jallapa Hospital, a Tertiary Referral Hospital over a period of 10 years, from July 2004 to June 2013. Total 60 pregnant women with cardiac disease admitted to maternity ward during this period were included in the study. The data were obtained from maternity registers, files and discharge summaries. The data regarding age, parity, gestational age, type of lesion, duration of disease, treatment history, maternal complications, mode of delivery, and indication of cesarean section, neonatal outcome and admission to NICU were noted. All pregnant women with history of cardiac disease or newly diagnosed for first time in pregnancy were included in the study, most of the patients were seen for first time during the labour. All conditions that mimic heart disease were excluded from the study. In cases of maternal mortality the cause of death was noted. The data were tabulated and analyzed with simple descriptive statistics.

4. Results

A total of 60 pregnant women with cardiac disease were included in the study. Incidence of cardiac disease at our Centre was 0.4%. Of the 60 patients, majority of patients were in the age group of 21-25 years (48.3%) and 21.7% belonged to 26-30 years (as shown in table-1).

Table-1: Maternal characteristics - Age Wise Distribution

S .No	Maternal age	Number (%)
1.	18-20 yrs	15(25%)
2.	21-25 yrs	29(48.3%)
3.	26-30 yrs	13(21.7%)
4.	31-35 yrs	3(5%)

Among the 60 pregnant women 56.7% were primigravida, 28.3% were second gravida and 15% were gravida 3 or more (as shown in Table 2). Of the 60 women majority were term gestation (76.7%) and 7.2% were pre-term gestation (Table-3).

Table -2: Parity Wise Distribution

S.No	Parity	Number (%)
1.	Primigravida	34(56.7%)
2.	Gravida 2	17(28.3%)
3.	Gravida 3 and more	9(15%)

Table-3: Maternal characteristics - Gestational Age Wise Distribution

S. No	Gestational age	Number (%)
1.	28 wks- 32wks	3(5%)
2.	33wks-36wk	4(6.7%)
3.	37wk-40wk	23(76.7%)
4.	>40wks	2(11.6%)

Most of the patient in the study had Rheumatic Heart Disease (66.7%), and rest had congenital heart disease (33.3%) as shown in table-4.

Table -4: Prevalence

Type Of Cardiac Disease	Number	Percentage
Congenital heart disease	20	33.3%
Rheumatic heart disease	40	66.7%

Most of the patients had single lesion (70%) and 18 patients (30%) had more than one lesion. The surgical correction was done in 40% of patients, of which 18 patients underwent surgery prior to pregnancy and 6 during pregnancy due to worsening of the disease, none of the patient had residual disease after surgery (Table-5a &Table-5b). Percutaneous transvenous mitral commisurotomy (PTMC) was performed in 6 pregnant women with mitral stenosis during second trimester (Table-5c)

Table – 5a: Distribution of Lesion and Surgical Correction.

Type of lesion	Number (%)
Single lesion	42(70%)
Multiple lesion	18(30%)

Table – 5b: Surgical intervention for underlying cardiac disease

Surgical correction	24(40)%
Prior pregnancy	18
During pregnancy	6

Table – 5c: Type of cardiac surgical interventions

Surgical correction	No. of patients
ASD closure	14
VSD closure	1
Mitral valve replacement	3
PTMC	6

The most common congenital heart disease seen in the study population was ASD (70%), VSD was seen in 3 patients and 1 patient had PDA. The most common lesion in patients with RHD was mitral stenosis (51.3%) followed by mitral stenosis and mitral regurgitation (35.9%).Aortic lesions were seen in 2 patients, one with aortic stenosis and one with mitral stenosis with aortic regurgitation(Table-6).

Table – 6: Type of lesion

Type Of Lesion	Number	Percentage
Congenital Heart Disease (20)		
ASD	16	70%
VSD	3	15%
PDA	1	5%
Rheumatic Heart Disease (39)		
MS	20	51.3%
MR	3	7.8%
MS+MR	14	35.9%
AS	1	2.5%
MS + AR	1	2.5%

The functional Class of disease as per NYHA classification in our study group is shown in table 7. Most of the patients had NYHA class II (53.3%). In study population it was seen that the outcome worsened as the Class of the disease increased, complications were more in NYHA Class III and IV.

Table – 7: Functional Class of the Disease

NYHA class	Number	Percentage
Class I	16	26.7%
Class II	32	53.3%
Class III	10	16.7%
Class IV	2	3.3%

Most of patients had vaginal delivery (71.6%) and cesarean section was done in 17 patients (28.4%) as in table 8. The labour was of spontaneous onset in 50% of patients and induced in 3 cases (5%). The indication for induction was postdated pregnancy and severe pre-eclampsia. In ten patients outlet

forceps were used to cut short the second stage of labour. The various indications for LSCS were fetal distress, cephalopelvic disproportion and malpresentations. Induction of labour was not done in instrumental and cesarean section group.

Table – 8: Mode of delivery

Mode of delivery	Number	Percentage
Vaginal delivery	**43**	**71.6%**
Spontaneous	30	50%
Induced	3	5%
Instrumental deliveries	10	16.6%
C-section	**17**	**28.4%**

The maternal complications were seen in 38(63.3%) pregnant women. The common non-cardiac complication noticed were anemia (50%), preeclampsia (23.7%) and preterm labour (18.4%). The other non-cardiac complications seen were eclampsia (2.6%), abruptio placentae (2.6%), PPH (5.2%), hypothyroidisim (2.6%) and LRTI (7.9%). Cardiac complications were seen in 9 cases out of which 7 required ICU care. The most common cardiac complication was CCF (6 patients). Pulmonary edema was seen in one patient with severe pre-eclampsia and one case of atrial fibrillation was noted. Among the 6 patients with CCF, 4 patients had anemia, one had pre-eclampsia and one had eclampsia. Of the 7 patients requiring ICU care, 5 patients recovered and there were two maternal deaths (3.34%). Of the two deaths seen, one was a case of severe Mitral stenosis with severe anemia in CCF, the other death was in a case of severe MS with severe pulmonary arterial hypertension with pneumonia with IUD.

Table – 9: Maternal Complications

Complications	Number	Percentage
Present	**38**	**63.3%**
Absent	**22**	**36.7%**
Non cardiac		
Anaemia	19	50%
Preterm	7	18.4%
Preeclampsia	9	23.7%
Eclampsia	1	2.6%
Abruptio placentae	1	2.6%
PPH	2	5.2%
Hypothyroidisim	1	2.6%
LRTI	3	7.9%
Cardiac(9)		
CCF	6	15.7%
Pulmonary edema	1	2.6%
Atrial fibrillation	1	2.6%
Pulmonary arterial hypertension	1	2.6%
Maternal mortality	2	3.33%

The small for gestation was seen in 28.3% of babies, prematurity were seen in 10% of babies and the other neonatal complications are shown in Table-10. A total of 20 babies required NICU care and the various indications are shown in table.10. There were 4 perinatal deaths, of which 2 were intrauterine deaths (at 28wks and at 34wks), one fresh stillborn (at 33wks) and one neonatal death (severe birth asphyxia, died after 3days of birth). The IUDs were seen at 28 and 34wks in mothers with RHD (mitral stenosis) with severe pre-eclampsia and eclampsia respectively, both had intrauterine fetal growth restriction and the scan at 20wks showed no congenital abnormalities.

Table – 10: Neonatal outcome

Complications	Number	Percentage
SGA	17	28.3 %
Prematurity	6	10%
Apgar score<7 at 1 min	6	10%
NICU admissions Birth asphyxia MAS/MSAF IUGR Preterm	20 5 3 7 4	33.3%
Perinatal mortality	4	6.67%

5. Discussion

Cardiac disease continues to be a risk factor for maternal and neonatal morbidity and mortality. The incidence of cardiac disease at our centre was 0.4%. In a study by Sheela *et al*, the incidence of cardiac disease in pregnancy was 1%.[9]

In our study, the predominant lesion was Rheumatic Heart Disease (66.7%) and most of the women had involvement of mitral valve.The results were comparable with studies done by Sheela *et al* (67%), Mahesh *et al* (64%) and Nilajkumar *et al* (80%).[7,9,10]

The ratio of RHD: CHDin our study was 2:1. The rheumatic heart disease is high in our centre due to lack of prevention, early detection with proper medical and surgical treatment, and proper follow-up of rheumatic fever in childhood, which could prevent complications during pregnancy.[9]

Mitral stenosis was the predominant lesion in our study (51.3%). Similar results were noted in the studies by Mahesh *et al* (44.6%) and by Nilajkumar *et al* (55%).[7,10]

Out of 60 pregnant women in the study group, only 24 (40%) had undergone surgical intervention for cardiac disease. The results were comparable with studies by Mahesh *et al*, Aggarwal *et al* and Bhatla *et al*.[7,8,11]

During pregnancy, 6 patients underwent surgical intervention due to deterioration of the cardiac status. We attribute the lack of awareness of heart disease and poor economic status in our patients as the cause of such deterioration.

Congenital heart disease accounted for 33.33% (20 cases), among which the Atrial Septal Defect was common (16 cases). Similar results were seen in studies by Sheela *et al* and Nilajkumar *et al*.[7,9]

Majority of the patients (80%) were in NYHA class I and class II. The results are comparable with studies by Mahesh *et al* and Sheela *et al*. The patients with NYHA class III and class IV were less in number and had the worst outcome. Similar observations were seen in studies done by various authors.[9-12]

In our study, most of the women went into spontaneous labour (50%) and majority was delivered vaginally (71.6%). The cesarean section (28.4%) was performed for various obstetric indications. The second stage was cut short by instrumentation in 16.6% of patients.

Maternal Complications were seen in 38 patients(63.3%) with cardiac disease, out of which the most common non-cardiac maternal complication was anemia seen in 19 patients (50%), followed by pre-eclampsia in 9 patients (23.7%) and pre-term labour in 7 patients (18.4%). Studies by Mahesh *et al* and Nilajkumar *et al* have shown similar results. Majority of complications were of non-cardiac origin that worsened the underlying cardiac lesion during pregnancy affecting the outcome. Thus the early diagnosis and treatment of complications such as anemia and pre-eclampsia can improve the outcome. Studies done by various authors have shown similar results.[7,10,13-15]

The cardiac complications were noted in eight patients, out of which six developed CCF, one developed pulmonary edema and the other had atrial fibrillation. All eight patients were treated in Intensive Care Unit, out of which six patients recovered and two died. Of two deaths seen, one was a case of severe Mitral stenosis with severe anemia in CCF; the other death was a case of severe MS with severe pulmonary hypertension, pneumonia and IUD. Both deaths occurred in cases of severe mitral stenosis; both cases were unbooked and came in labour which could have prevented by early detection and timely surgical intervention. The above findings suggest lack of awareness among the community about the heart disease and complications during pregnancy. Similar findings were in studies done by Mahesh *et al*.[10]

The small for gestation (28.3%) and prematurity (10%) were the common neonatal complications. Total 20 (33.33%) babies were admitted to NICU. The perinatal mortality was 6.6% in our study. The results were comparable to the studies done by Mahesh *et al*, Hanania *et al* and Suri *et al*.[10,16,17]

6. Conclusion

Heart disease in pregnancy is a high risk condition which has a major impact on pregnancy and its outcome. Rheumatic heart disease is the predominant cardiac problem affecting the pregnancy and its outcome. The early detection and treatment, proper follow up and correction prior to pregnancy shall improve the outcome and decrease the maternal morbidity and mortality in heart disease.

Maternal and perinatal morbidity and mortality can be reduced with early and frequent antenatal care in co-ordination with the cardiologist. The early detection and management of non-cardiac complications shall have a major impact on improvement of outcome

Educating the community about the cardiac disease and its complications, need for early detection of cardiac lesion, close follow up during antenatal period, intrapartum and postpartum care plays a vital role in a rural set up.

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