



## Original Research Article

### Prospective Study on Heart Disease Complicating Pregnancy

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#### A B S T R A C T

#### Keywords

Heart disease,  
Maternal  
mortality,  
Pre pregnancy  
counseling,  
Maternal and  
fetal outcome

Heart disease complicating pregnancy is no more a nightmare, but still poses a challenge to the attending obstetrician. Women mostly invite trouble when they present late for antenatal check up and thereby potentially increase morbidity and mortality. This paper is a prospective study conducted on 150 pregnancies in women with heart disease, so as to evaluate the type of heart disease, maternal and fetal outcomes of these patients. Despite declining rheumatic heart disease in western world, in India it still holds an upper hand and in our study it was 70%. Congenital heart disease, reported to be only 20 % and among the miscellaneous group, cardiomyopathy was the leading cause. Mitral stenosis with combined mitral regurgitation was the commonest lesion in 45% of cases. Almost 60% of women delivered by cesarean section and in majority the indication was post section pregnancy (31.8%), followed by pre eclampsia. Clinical relevance is that pregnancy complications like hypertension and diabetes are added risk for cardiovascular disease and likely to cause adverse outcome. There were 5 maternal deaths in this group, and all of these women were unbooked invariably and, majority belonged to lower socioeconomic class and got admitted late with NYHA class III and IV symptoms. This shows that the lacunae mainly lie in lack of pre pregnancy counseling, delayed referral and lack of family support from the ignorant rural population.

#### Introduction

Prevalence of heart disease in pregnancy is 0.3–3 % worldwide (McFaul *et al.*, 1998). In developing countries like India, Rheumatic heart disease is still predominate and comprises 56–89% (Siu *et al.*, 2001). Which reflect on poor sanitary condition, causing repeated childhood streptococcal infection in

rural areas which goes unnoticed. On the contrary many women with congenital heart disease survive into reproductive age group due to improved medical and surgical management than past, and reproduce a reasonably fair obstetric and fetal outcome. The irony is that they neglect the possibility

of irreversible hemodynamic deterioration that pregnancy might impose; on the long term health of the mother (Mann *et al.*, 2015) and fail to adopt a small family norm. This also shows the lack of awareness of contraception among these women.

Hemodynamic changes in pregnancy are profound and start as early as first trimester and abrupt during labor and delivery. Hence heart disease is problematic for both mother and fetus. Some get unmasked during antenatal period for the first time (Roos – Heselink *et al.*, 2009), and early diagnosis require high index of suspicion. In our society many are paradoxically masked due to social stigma and marital issues. Added are the risk when complicated by gestational hypertension and diabetes. Hence, a multidisciplinary team approach with close collaboration of both obstetrician and cardiologist is recommended, so mode, timing and place of delivery could be planned.

### **Materials and Methods**

The study was conducted in the department of Obstetrics and Gynecology from August 2011 to July 2014 at NRI Medical College & General Hospital, Guntur District after approval by Ethical Committee of the Institution. It is a tertiary care hospital covering a wide rural population of Chinakakani, Guntur District, Andhra Pradesh.

Details of the type of heart lesion, functional class at the time of first visit, medication, prior surgeries done were all recorded. Type of Heart disease was confirmed by cardiologist and categorized based on detailed cardiac evaluation, ECHO and ECG findings. Detailed data of the age, parity, social status, obstetric and fetal outcome and intervention performed were recorded. Management of these women was done

according to the standard protocol by team approach of both obstetrician and cardiologist. Infective endocarditis prophylaxis was given wherever it was indicated, as per the guidelines.

Statistical data calculated as simple percentage.

### **Results and Discussion**

During the 3 year period we had total of 8,217 deliveries. Among them, 150 women with heart disease complicating pregnancy delivered. The following demographic data was noted. Most of them belonged to lower socioeconomic group (Class 111-Class 1V).

Majority had acquired heart disease accounting to 70%, while congenital lesion was only 20% and the miscellaneous group including cardiomyopathy accounted to 10% (Table 5).

Among those with rheumatic heart disease mitral regurgitation was the predominant lesion and reported to be 42.72% (Table 6), and combined lesion of mitral stenosis with regurgitation was 45%.

Over the last few decades women with congenital heart disease fare well and become pregnant. ASD was the commonest and well tolerated lesion reporting to be 9%, followed by VSD. Three cases had Tetralogy of fallot (1.8%) (Table 7).

Combining the data of 12 patients with miscellaneous cardiac lesion, cardiomyopathy was the commonest and there were 8 cases (Table 8). Forty four cases out of 150 were, post operative cardiac surgery status at the time of pregnancy. Principal valve involved was mitral valve, twelve underwent mitral valvotomy, eighteen cases had mitral valve replacement

and three women had aortic valve replacement (Table 9). Five cases were following ASD closure, three had VSD closures and two were corrected for Tetralogy of Fallot.

Women with mechanical valve replacement received anticoagulants (heparin or warfarin) during their pregnancy. These patients received either low molecular weight heparin (LMWH) or unfractionated heparin (UFH), or oral anticoagulants depending on their gestational period, labor or post partum status, as per protocol. We did encounter one antenatal woman with multiple peripheral emboli (one brachial artery and two femoral artery) at 20 weeks of pregnancy, as she stopped using anticoagulant on her own. She underwent embolectomy of three vessels and we could save not only life of both mother and baby, but also salvage her limbs. Her subsequent pregnancy 2 years later was uneventful.

On analyzing the obstetric outcome, half of them were primigravidas (51%), and up to 80% had term deliveries and 20% delivered preterm. In our study cesarean section rate was high, almost 60%, probably because 31.8% of cases were post section pregnancy (Table 10). Pre eclampsia was next major indication for cesarean section (Table 11). All cesareans were done for obstetric indication only. 35% delivered by normal vaginal delivery and 4 % had instrumental delivery. One woman landed in peripartum hysterectomy for severe atonic post partum haemorrhage. Overall maternal mortality during the time period was 24 out of 8,217 deliveries and heart disease contributing to maternal death was 5 (21%).

Apart from 150 cases delivered, sixteen more antenatal women with heart disease had termination of pregnancy in view of severity of heart disease; the commonest indication was global hypokinesia with

cardiomyopathy and severe pulmonary hypertension. Two cases had termination in view of Eisenmeingers.

Among 150 deliveries, 20% were preterm deliveries and there were total of 8 perinatal deaths, with 1 still born. 2 intrauterine deaths and 5 neonatal deaths

Hemodynamic changes of pregnancy may compromise a limited cardiac reserve, and produce adverse outcome. And also pregnancy related hypertension and diabetes are independently associated with an increased 10 year cardiovascular risk (Fraser *et al.*, 2012). Our study was mainly to analyze type of lesion, maternal and fetal outcome in pregnant women with heart disease.

The incidence of heart disease in our study was 1.82%. In other studies approximately 2% of pregnancies were associated with cardiovascular disease (Suman Puri *et al.*, 2013).

Acquired heart disease was more frequent, almost 70% and comparable to other studies from developing nations (Suman Puri *et al.*, 2013; Devabhaktuni *et al.*, 2009). Despite being in the modern antibiotic era, we still lag behind in reducing the incidence of Rheumatic Heart Disease. It shows lack of awareness and timely treatment of streptococcal infection, at primary prevention level. It also coincides with the fact that majority (81%), belonged to lower socioeconomic class. Among valvular heart disease mitral was commonly encountered, 45% had MS with MR and 42.72% had only MR. In our study only one patient had Pulmonary stenosis. Among the miscellaneous group (12 cases) cardiomyopathy was the major contributor and four patients developed peripartum cardiomyopathy. There was no maternal death among the cardiomyopathy patients.

In our study 44 cases had prior cardiac surgery. Majority had surgeries in our own institution and worth mentioning is that all of them invariably had a favorable outcome. One positive reason may be that they were indirectly on regular follow up and pregnancy was well planned.

Although all cesarean were for obstetric indication, majority of women in our study delivered by cesarean-section (60%), probably because most of them were post section pregnancies, shows that among this unique group primary section must be decided judiciously, to cut down the added morbidity of repeat cesarean. The joint Japanese working (JCS 2010 Guidelines) group also recommends assisted vaginal delivery for these women, and the cardiac indications for cesarean section include cardiac dysfunction, patient at risk of hemodynamic instability, pulmonary hypertension, uncontrolled arrhythmia, mechanical valve prosthesis, and patients with cyanosis (JCS, 2010).

Also important is these women should be counseled on contraception with great care and thereby plan their family, because although they have successful pregnancy outcome, pregnancy and pregnancy related complications can hamper the long term cardiac status and health of the mother. The Centre for Maternal and Child Enquiries recommends that every woman with known cardiac disease should be offered pre-conception counseling, to ensure that those at risk of cardiac or obstetric complications enter pregnancy well informed and also with a clear management plan (Cantwell *et al.*, 2011).

India's maternal mortality rate declined 16% in 2011-12 from 2007-09, according to data from Registrar General. Although the MMR dropped from 212 deaths per 100,000 live births in 2007-09 to 178 in 2010-12, India is

behind the target of 103 deaths per live births to be achieved by 2015 under the United Nations-mandated Millennium Development Goals (MDGs). With total of 8,217 deliveries in our institution during the study period, we had 24 maternal deaths accounting to MMR of 292 PER 100,000 live births. Our institution was a tertiary care referral center catering mainly the rural population and gets delayed referrals, and our MMR was higher and not comparable. Among 24 maternal deaths, 5 were due to heart disease contributing to 20% of overall maternal mortality.

In our study we had 5 maternal deaths, invariably all of them were unbooked, from lower socioeconomic class and presented late with New York Heart Association CLASS III & IV. Among the five, one patient presented with severe primary pulmonary hypertension and one was referred with severe Mitral stenosis at 6 month and also subjected for emergency valvotomy. Rest of the lesions, involved the mitral valve and presented with severe pulmonary hypertension and failure.

Out of 150 deliveries, none of the babies had evidence of congenital heart disease and overall we had 8 perinatal deaths and some babies lost follow up.

Educating, mainly the ignorant women of their cardiac status and creating awareness of contraception among this unique group will help them make an informed decision and plan their pregnancy, so as to avoid termination and its undue effects. Besides successful outcome of both mother and baby, pregnancy and pregnancy related condition can affect the long term health of these women; hence it's necessary that these women restrict their conception and counseled accordingly.

**Table.1** Booking status

<b>Booking status</b>	<b>No of patients</b>	<b>Percentage</b>
Booked	84	56
Unbooked	66	44

**Table.2** Socioeconomic status

<b>Socioeconomic status</b>	<b>No of patients</b>	<b>Percentage</b>
Class 1 -11	28	19
Class 111-1V	122	81

**Table.3** Age distribution

<b>Age</b>	<b>No. of Patients</b>	<b>Percentage</b>
<21	17	11.3
21-30	126	84
>30	7	4.6

**Table.4** Parity distribution

<b>Parity</b>	<b>No. of Patients</b>	<b>Percentage</b>
G1	77	51
G2	43	29
G3 and more	30	20

**Table.5** Type of cardiac lesion

<b>Type of cardiac lesion</b>	<b>No of patients(n-150)</b>	<b>Percentage</b>
Acquired	105	70
Congenital	30	20
Other cardiac diseases	15	10

**Table.6** Acquired heart disease

Sl. No.	Acquired Heart Disease	Frequency	Percentage
1	Mitral stenosis	33	30.9
	Mild –moderate	23	21.8
	Severe	10	9
2	Mitral Regurgitation	45	42.72
	Mild-moderate	38	35.4
	Severe	07	7.2
3	Aortic stenosis	05	4.5
	Mild –moderate	02	1.8
	Severe	03	2.7
4	Aortic Regurgitation	08	7.2
5	Tricuspid Regurgitation	21	19.09
6	Pulmonary Arterial Hypertension	24	21.81
	Mild –moderate	21	19
	Severe	03	2.7

**Table.7** Congenital lesions

Type of lesion	No of patients	Percentage
Atrial septal defect	14	09
Ventricular septal defect	10	6.3
Patent ductus arteriosus	03	1.8
Tetrology of fallot	03	1.8

**Table.8** Other cardiac lesions

Other Cardiac Conditions	Frequency	Percentage
Dilated cardio myopathy	04	2.72
Peripartum cardiomyopathy	04	2.72
Pulmonary stenosis	01	0.9
Supra ventricular tachycardia	01	0.9
Ventricular arrhythmias	01	0.9
Post myocardial infraction	01	0.9

**Table.9** Post cardiac surgeries

<b>Post Cardiac Surgery</b>	<b>No. of surgeries (n: 44/150)</b>	<b>Percentage</b>
Mitral ValveReplacement	18	12
Percutaneous Balloon Mitral Valvotomy	12	08
Aortic Valve Replacement	03	02
Tricuspid Valve Replacement	01	0.6
Atrial septal defect	05	3.3
Ventricular septal defect	03	02
Tetrology of fallot	02	1.3

**Table.10** Maternal outcome

<b>Gestational age at delivery</b>	<b>No of cases</b>	<b>Percentage</b>
Term	120	80
Preterm	30	20
<b>Mode of Delivery</b>		
Vaginal	53	35
Caesarean	90	60
Outlet forceps	06	4
Cesarean hysterectomy	01	1
<b>Maternal Deaths</b>	05	3.3

**Table.11** Indication for cesarean section

<b>Indication</b>	<b>No of cases</b>	<b>Percentage</b>
Pre-eclampsia	11	7.27
Oligohydramnios	08	5.4
Overt diabetes	08	5.4
Hypothyroidism	07	4.5
Graves disease	01	0.09
Abruptionplacentae	01	0.09
Placenta Previa	01	0.09
Past dates	04	2.7
Jaundice	01	0.09
Anaemia	07	4.5
RH -ve	03	1.8
Post Cesarean Pregnancy	48	31.8

In conclusion, Pre conception counseling, with regular antenatal checkup in close collaboration of both obstetrician and cardiologist and planned delivery in multidisciplinary hospital can produce a promising outcome. Prompt and timely referral of these women with potential complication, to tertiary care, will markedly reduce the maternal mortality. Heart disease is second indirect cause contributing to maternal mortality in India (Kulkarni and Huligol, 2001) and it is important that we help these women to realize their serious situation and act accordingly.

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