

A retrospective study on fetomaternal outcome in women with heart disease in a tertiary care hospital of Eastern India

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Abstract

Aim: To assess the maternal and fetal outcomes of pregnancies complicated by heart disease in a tertiary care hospital.

Methods: The present retrospective study was conducted in the department of Obstetrics and Gynaecology, IMS & SUM Hospital, Bhubaneswar, Odisha from February 2016 to January 2021. A total of 288 cases of pregnant women with heart disease were studied. The sociodemographic data like age, parity, gestational age of presentation, mode of delivery, type of heart disease, maternal and perinatal complication were noted from hospital records and studied. The kind of heart disease and the patient's status according to the New York Heart Association (NYHA) categorization were used to interpret perinatal and maternal outcomes.

Results: Rheumatic heart disease and congenital heart disease were found to be 87.5 percent and 12.5 percent, respectively. According to the NYHA functional classification, 55.6, 36.1, and 8.3 percent of the patients were in NYHA classes I, II and III-IV, respectively. There was no maternal mortality in this study. In 16 (11.1%) of the cases, there was maternal morbidity. In this series, there were six perinatal deaths (4.2 percent). The NYHA stage I-II and stage III-IV groups had no significant differences in birth weight, gestational age at delivery, or perinatal morbidity ($P>0.05$), while the NYHA stage III-IV group had considerably greater maternal morbidity and caesarean delivery rates ($P=0.001$).

Conclusion: The vast majority of the patients belonged to an excellent functioning group. The maternal cardiac classification and maternal morbidity have a substantial relationship.

Keywords: cardiac disorders, pregnancy, maternal morbidity

Introduction

About 1% of pregnancies are complicated by heart disease ^[1, 2] and managing these situations can be difficult for the entire team caring for the mother and fetus. Maternal and perinatal morbidity and mortality in pregnancies affected by cardiac problems varies depending on the kind of disorder, the patient's functional level and pregnancy difficulties ^[3]. In pregnancies complicated by cardiac abnormalities, congestive heart failure, arrhythmias, infective endocarditis, respiratory tract infections, an increase in the number of medicines required, and the necessity for hospitalisation are all major issues ^[3, 4]. Rheumatic and congenital heart illnesses account for the majority of heart diseases seen during pregnancy, with ischemic heart disease and cardiomyopathies making up a small percentage ^[5, 6]. Rheumatic heart disease (RHD) is the most frequent cardiac condition in underdeveloped nations, accounting for a significant portion of maternal mortality ^[7]. In individuals with congenital heart disorders, advances in cardiovascular surgery have resulted in longer survival and an improved quality of life (CHD). After the procedure, even patients with significant heart abnormalities may have term pregnancies. In wealthy countries nowadays, the rate of CHD-affected pregnancies outnumbers the rate of RHD ^[8]. Advances in cardiology and obstetrics have resulted in significant improvements in the management of pregnant women with heart diseases, with many individuals experiencing no complications during their pregnancy. Even if the most advanced treatment methods are adopted, it must be recalled that the physiological changes that occur during pregnancy are a significant burden for pregnant heart disease patients. These patients require a multidisciplinary approach, with an obstetrician and a cardiac expert working together.

Furthermore, this management must begin prior to conception, the family should be advised about the potential hazards, and optimal settings for conception must be maintained. In a tertiary care institution in Eastern India, a retrospective study was conducted to assess the maternal and perinatal morbidity and mortality associated with heart illness during pregnancy.

Materials and methods

Between February 2016 and January 2021, a total of 288 pregnancies complicated by heart disease were

assessed retrospectively in the department of Obstetrics and Gynaecology, IMS & SUM Hospital.

The mothers' and newborns' antenatal follow-up records, as well as their medical records, were investigated. The patients were divided into four categories based on the functional categorization of the New York Heart Association (NYHA) ^[9].

Maternal age, parity, nature of the underlying heart lesion, NYHA functional class, presence of hypertension (blood pressure $\geq 140/90$ mm Hg), cardiac intervention prior to pregnancy, cardiac medication, and anticoagulant therapy, if any, were all collected at the first antenatal appointment. Anticoagulant-treated women were given heparin until the end of the 12th week of pregnancy, following which oral anticoagulants were started and continued until the 36th week of pregnancy, when they were switched back to heparin, which was stopped at the onset of labour and restarted 6 hours later.

All of the women underwent electrocardiography and echocardiography. In CHD patients, foetal echocardiography was conducted. During labour, all patients were given antibiotics to prevent infective endocarditis. Chi square test and Student's t tests were used in statistical evaluation.

Results

Tables 1 and 2 demonstrate the demographic and clinical characteristics of pregnant individuals with cardiac disease. Heart disease was discovered for the first time in 34 (12%) of the patients during pregnancy. According to the New York Heart Association functional classification, the patients were distributed as follows: 55.6, 36.1 and 8.3 percent in NYHA stage I, II, and III-IV, respectively. The average gestational week was 38.2 ± 4.5 , and the average birth weight was 3047 ± 883 gm. There was no maternal death, but six incidences of perinatal mortality were discovered.

Table 3 shows the distribution of patients according to the NYHA staging system and the types of heart illnesses and valve abnormalities. For RHD and CHD, the rates of cardiac disorders were 87.5 and 12.5 percent, respectively. The most frequent valve condition was found to be mitral valve stenosis (alone in 78 instances and with other valve abnormalities in 48 cases). 14 (33.3%) of the 42 patients with a mitral valve area of 1.5 cm^2 were in the NYHA stage III-IV group, and 34 (81%) required digoxin therapy. Despite this, all 84 mitral valve stenosis patients had cardiac failure during pregnancy. They were given medical care and were delivered on time.

Table 1: Demographic characteristics of pregnant patients with cardiac disorders

Parameters	N=288
Age (mean \pm SD)	29.2 \pm 4.9
18-35 [n (%)]	234 (81.2)
<18 or >35 [n (%)]	54 (18.8)
Nulliparous [n (%)]	128 (44.4)
Time to diagnose [years, mean \pm SD]	9.2 \pm 7.9
During pregnancy [n (%)]	34 (12)
<10 years [n (%)]	158(55)
10-20 years [n (%)]	82 (28)
>20 years [n (%)]	14 (5)
NYHA functional classification [n (%)]	
Stage I	160 (55.6)
Stage II	104 (36.1)
Stage III-IV	24 (8.3)

Table 2: Clinical characteristics of pregnant patients with cardiac disorders (N = 288)

Parameters	Value
Gestational age at birth (week, mean \pm SD)	38.2 \pm 4.5
Birth weight (g, mean \pm SD)	3047 \pm 883
Cesarean section [n (%)]	146 (51)
Perinatal mortality [n (%)]	12 (4.1)
Maternal morbidity [n (%)]	32 (11.1)
Maternal mortality	-

Table 3: Distribution of the patients according to the type of cardiac disease, valvular disorder and NYHA classification

Variables	N (%)	I	II	III-IV
Rheumatic heart disease	252 (87.5)	144	92	16
Mitral stenosis	78	42	30	6
Mitral regurgitation	36	32	4	
Aortic stenosis	4		4	
Aortic regurgitation	8		6	2
Multivalvular lesion	104	54	42	8
Prosthetic valves	22	16	6	
Congenital heart disease	36(12.5)	16	12	8
Atrial septal defect	12	6	4	2
Ventricular septal defect	12	4	4	4
Bicuspid aorta	6	4		2
Epstein anomaly	4	2	2	
Tetralogy of fallot	2	2		

Discussion

In this study, heart illness was discovered in 12% of the women during the index pregnancy. In two other studies, 13.5 and 42% of women were diagnosed with heart illness for the first time during pregnancy, according to Bhatla *et al.* [7] and Desai *et al.* [4]. Routine cardiovascular examinations in the prenatal clinic are therefore critical for early diagnosis and suitable treatment.

Rheumatic heart disease accounts for 87.5 percent of cardiac illnesses in our clinic's patients. Egypt [10], India [7] and Latin American countries [11] have all reported similar findings. Mitral stenosis is the most frequent lesion among RHD patients who are pregnant [4]. In the majority of patients, the mitral valve was damaged alone or in combination, which is consistent with Egyptian and Indian studies [7, 10].

The volume of blood that can flow through the constricted valve during diastole limits the rise in cardiac output in mitral stenosis. The maternal heart rate rises during pregnancy, shortening the diastole and lowering left ventricular filling. This can result in decreased cardiac output, increased left atrial pressure, and overt cardiac failure in some circumstances. A common cause of worsening is an arrhythmia, most commonly atrial fibrillation caused by the elongation of the left atrium. During pregnancy, about 40% of women with mitral stenosis show some clinical deterioration in heart function [12].

Recent advancements in paediatric cardiology and cardiac surgery have allowed a growing number of women with congenital heart disease to thrive long into their reproductive years. Despite the rarity of maternal mortality in pregnant women with congenital heart disease, maternal cardiac and neonatal problems are significant [13-15]. Women with congenital heart disease are at a higher risk of having a baby with congenital heart disease, hence fetal echocardiography, conducted by a fully certified fetal cardiologist, should be offered to them [15].

The maternal functional level in which the patient enters pregnancy determines the likelihood of a successful pregnancy outcome [11]. The vast majority of our patients (92%) were in the good functioning group (NYHA classes I and II). In most other series [1, 7, 10], similar percentages for NYHA classes I and II are reported. In terms of birth weight, gestational age at delivery, and perinatal morbidity and death, there was no significant difference between the NYHA stage I-II and stage III-IV groups. This could be related to the large percentage of women with good functional status. Our NYHA III-IV group, on the other hand, had considerably higher maternal morbidity. This finding supports previous studies, which have shown that cardiovascular maternal morbidity correlate with the maternal functional status [1, 5].

Conclusion

Finally, patients with heart problems who are pregnant must be treated in a multidisciplinary manner. To reduce maternal mortality and morbidity while also improving fetal outcomes, obstetrics and cardiology experts must work together. These patients must get preconception counselling, and in some situations, cardiac surgery must be performed prior to conception. Except for the minority of individuals with severe disease requiring medical or surgical therapy before pregnancy, and those with lesions where pregnancy is contraindicated, pregnancy is usually a successful outcome with proper management and teamwork.

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