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A Study of Maternal and Foetal Outcome of Pregnancy with Heart Disease

Mangala A. Shinde[1], Pallavi Y. Untwal[2]

Author's Affiliation:
[1]Professor and HOD, Department of Obstetrics and Gynaecology, Government Medical College, Latur, Maharashtra 413512, India.
[2]Speciality Medical Officer, Lokmanya Tilak Municipal Medical College and Lokmanya Tilak Municipal General Hospital, Sion, Mumbai, Maharashtra 400022, India.

Corresponding Author:
Mangala A. Shinde,
Professor and HOD, Department of Obstetrics and Gynaecology, Government Medical College, Latur, Maharashtra 413512, India.
E-mail: mashinde13@gmail.com

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Abstract

Introduction: Heart disease during pregnancy increases maternal morbidity and mortality, it should be managed very meticulously by team of experts from various specialties viz. obstetricians, cardiologists and cardiovascular surgeons, anaesthetist, and neonatologist. The evaluation of patients with cardiovascular disease should ideally begin prior to conception so that appropriate evaluations can be made without putting the foetus or mother at risk. *Aims and objectives:* 1) To study the foetal outcome and perinatal mortality in patients of pregnancy with heart disease. 2)To study the maternal mortality in patients of pregnancy with heart disease. *Materials and Method:* In the present prospective study all the cases of heart disease in pregnancy admitted in obstetrics and gynaecology department of Dr.V.M.G.H. Solapur during the study period were enrolled. All the selected patients underwent detailed antenatal evaluation. Detailed medical history along with routine obstetric history was elicited regarding duration of disease, medication. All the enrolled cases were followed up to the delivery. All these cases were analyzed with regard to their age, type of cardiac lesion, NYHA status and mode of delivery, obstetric and medical complication, and maternal death if any. Foetal outcome was recorded by parameters namely gestational age (term or preterm), birth weight, admission to neonatal intensive care unit (NICU), and neonatal death if any. *Results:* Majority of the patients were in the age group of 20-29yrs. Rheumatic heart disease was the most common heart disease with NYHA Class I. Spontaneous vaginal delivery was conducted in 70% (n=21) cases. Ventouse was applied to cut short second stage of labour in 3.3% (n=1) cases. Caesarean section was done in 26.6% (n=8) cases, of which 3.3% (n=1) were elective and 23.3% (n=7) were emergency. Out of total 30 live birth babies, 43.3% (n=13) babies were low birth weight and 56.7% (n=17) were having birth weight ≥ 2.5 kg. Among 30 babies, 23.3% (n= 7) were admitted to NICU. Perinatal mortality was 64.5 per 1000 live births in pregnancy with heart disease. There were no maternal deaths among enrolled pregnant patients with heart disease during study period. *Conclusion:* Thus we conclude that the most common mode of delivery among the pregnant women with heart disease was spontaneous vaginal delivery followed by emergency caesarean section with foetal distress as the common indication. For NICU admission foetal distress, mothers in intensive care unit and IUGR were the common indication. The perinatal mortality was 64.5 per 1000 live births in pregnancy with heart disease where as no maternal deaths among the study patients noted.

Key words: Heart Disease in Pregnancy; Outcome; Perinatal Mortality Rate.

Introduction

Cardiac disease during pregnancy has substantial morbidity and mortality. Incidence of heart disease ranges from 0.4% to 1.0% among different populations of the world. Valvular heart disease constitutes the majority of all causes of heart disease during pregnancy. It is the most common cause of indirect maternal death in high-income countries [1].

In developed countries, the aetiology of heart disease during pregnancy is changing, with increasing numbers of women with congenital heart disease (prevalence 75%) and fewer with rheumatic heart disease (prevalence 20%) [2,3]. In developing countries, rheumatic heart disease remains one of the major causes of death related to pregnancy [4]. In developing countries, rheumatic heart disease is found in 60% to 80% of the pregnant women with heart disease, and 10% to 30% have a congenital disorder including congenital valve disorders [5,6].

As heart disease during pregnancy increases maternal morbidity and mortality, it should be managed very meticulously by team of experts from various specialties viz. obstetricians, cardiologists and cardiovascular surgeons, anaesthetist, and neonatologist. The evaluation of patients with cardiovascular disease should ideally begin prior to conception so that appropriate evaluations can be made without putting the foetus or mother at risk [7]. Many studies have shown that vaginal delivery is safe and well tolerated in most patients with cardiovascular disease [5,6,8] and specifically with valvular heart disease [9]. Cesarean section is potentially associated with a higher rate of complications [9]. It is usually recommended for obstetric indications, and occasionally in a patient with cardiac instability. In the present study we tried to study the maternal and foetal Outcome of Pregnancy with heart disease.

Aims and Objectives

1. To study the foetal outcome and perinatal mortality in patients of pregnancy with heart disease.
2. To study the maternal mortality in patients of pregnancy with heart disease.

Materials and Method

The present prospective study was at Dr. V.M.G.H. Solapur to study the heart disease in pregnancy. For the purpose of study the permission from the institutional ethics committee was obtained before staring the study. The total duration of the study was two years. All the cases of heart disease in pregnancy admitted in obstetrics and gynaecology department at the tertiary care centre during the period of October 2012 to September 2014 were enrolled in the study.

All the selected patients underwent detailed antenatal evaluation including ultrasonography (USG) and antenatal checkup. Detailed medical history along with routine obstetric history was elicited regarding duration of disease, medication i.e. penicillin prophylaxis, anticoagulant drug therapy or other cardiac surgery prior to pregnancy and any complication in previous pregnancy as given in proforma. Severity of lesion was evaluated with 2D-ECHO measuring valve area, pressure gradients across valve and pulmonary arterial and venous pressure gradient and left ventricular ejection fraction. We also evaluated all those cases which required any operative cardiac intervention in either this pregnancy.

All the enrolled cases were followed up to the delivery. Patients were allowed to go in spontaneous labour unless having any obstetric indication for induction of labour or caesarean section. However, instrumental vaginal delivery was performed to cut short second stage of labour whenever required. However those who had previous LSCS were given a short trial of scar. Few of the selected cases underwent planned LSCS for recurrent indication with prior anaesthetic & cardiologic check-up. Infective endocarditis prophylaxis was given to all patients irrespective of type, severity of heart disease also operative procedures were done or not. Thus all the protocols followed during management of these cases were similar so as to minimize the intra cohort bias.

All these cases were analyzed with regard to their age, type of cardiac lesion, NYHA status and mode of delivery, obstetric and medical complication, and maternal death if any. Foetal outcome was recorded by parameters namely gestational age (term or preterm), birth weight, admission to neonatal intensive care unit (NICU), and neonatal death if any. Data was collected, compiled and analyzed using appropriate statistical test. Descriptive data was expressed as percentage, whereas continuous data was expressed as Mean ± Standard Deviation.

Results

During study period, we enrolled total 39 pregnant patients with heart disease. It was seen that majority of the patients in the present study were in the age

group of 20-24yrs (51.3%) followed by 25-29yrs (20.5%). The mean age of patients, was 24.6 ± 5.2 years. The youngest and oldest patients were 17 years and 38 years old respectively.

It was observed that rheumatic heart disease was the most common heart disease (74.4%). Congenital heart disease was found in 20.5% (n = 8) patients whereas other lesions in 5.1% patients. In 38.46% (n=15) patients heart disease was diagnosed during the present pregnancy, whereas in 61.54% (n=24) patients heart disease was diagnosed in previous pregnancy or before. Among known heart disease (n = 24) cases, 79.2% (n=19) were having rheumatic heart disease, and 20.8% (n=5) were having congenital heart disease.

Out of the 39 patients 66.7% (n=26) patients were from NYHA Class I, followed by 23.1% (n = 9) from NYHA Class II, 2.6% (n = 1) from NYHA Class III and 7.7% (n = 3) from NYHA Class IV. Depending upon NYHA functional class, patients were categorized into low risk and high risk group. Low risk group included NYHA Class I and Class II whereas high risk group included NYHA Class III and Class IV patients. There were 89.7% (n = 35) patients in low risk group and 10.3% (n = 4) patients in high risk group.

Out of the 39 pregnant heart disease patients, 9 patients were still undergoing ANC care and yet to deliver during study period. Total 30 deliveries were carried out among the 39 included pregnant heart disease cases. Spontaneous vaginal delivery was conducted in 70% (n=21) cases. Ventouse was applied to cut short second stage of labour in 3.3% (n=1) cases. Caesarean section was done in 26.6% (n=8) cases, of which 3.3% (n=1) were elective and 23.3% (n=7) were emergency.

There were 31 foetuses delivered (including 1 twin delivery) from 30 deliveries. There was 1 intrauterine death. Thus among 30 live foetuses, 13.3% (n=4) were preterm and 86.7% (n=26) were term.

The mean birth weight of 30 live babies was

Table 1: Distribution according to various characteristics of patients

		Frequency	Percent
Age Groups (in years)	< 20	03	7.7
	20 – 24	20	51.3
	25 – 29	08	20.5
	30 – 34	05	12.8
	≥ 35	03	7.7
Type of Heart Disease	Rheumatic Heart Disease	29	74.4
	Congenital Heart Disease	08	20.5
	Other lesions	02	5.1
Heart disease in previous pregnancy	Diagnosed in previous pregnancy or before	24	61.5
	Diagnosed in current pregnancy	15	38.5
NYHA Class	Class – I	26	66.7
	Class – II	09	23.1
	Class – III	01	2.6
	Class – IV	03	7.7

Table 2: Mode of Delivery and Gestational Age at the delivery

		Frequency (n=30)	Percent
Mode of Delivery	Vaginal Spontaneous	21	70
	Vaginal Instrumental	01	3.3
	LSCS Elective	01	3.3
	LSCS Emergency	07	23.4
Gestational Age	Preterm	04	13.3
	Term	26	86.7

2.55±0.43 kg. The minimum birth weight was 1.8 kg whereas the maximum weight was 3.4 kg. Out of total 30 live birth babies, 43.3% (n=13) babies were low birth weight and 56.7% (n=17) were having birth weight ≥ 2.5 kg.

Among 30 babies, 23.3% (n= 7) were admitted to NICU. One baby was admitted because of low birth weight due to intrauterine growth restriction (IUGR) i.e. small for gestational age (SGA). Birth weight of the baby was 1.8 kg and was kept under NICU care for 5 days after which it was discharged. Four admissions were due to perinatal asphyxia, and were

Table 3: Distribution according to fetal outcome

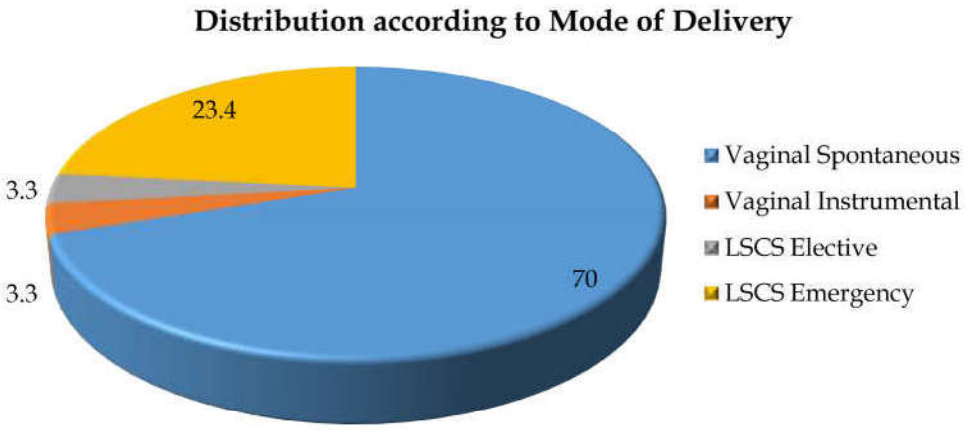
		Frequency	Percent
Birth Weight (kg)	1.5 – 2	02	6.7
	2 - 2.5	11	36.7
	2.5 – 3	12	40.0
	≥ 3	05	16.6
NICU Admission	Admitted	07	23.3
	Not admitted	23	76.7
Foetal Outcome	Live*	29	93.6
	Intrauterine Death (IUD)	1	3.2
	Early Neonatal Death	1	3.2

*including 1 twin delivery

Table 4: Perinatal mortality rate amd maternal mortality rate

	Rate (per 1000 births)
Perinatal mortality in pregnancy with heart disease	64.5
Maternal Mortality rate	0.00

Fig. 1:



kept under NICU care for 3 – 4 days. All of them recovered after receiving NICU care and were discharged. Two babies admitted in NICU because their mothers were in intensive care unit. Of the 7 babies admitted to NICU, 1 baby died because of asphyxia due to meconium aspiration syndrome. Baby was delivered by emergency LSCS done for foetal distress. Birth weight of the baby was 2.3 kg.

There were 31 babies delivered, including one twins delivery. Of the 31 babies delivered, 1 was intrauterine death, 30 were live. Among the 30 live babies, 1 baby died due to respiratory distress in early neonatal period i.e. within 7 days of birth. At the end of study, there were 29 live babies.

There were 2 perinatal deaths among 31 born foetuses; one was intrauterine death and one was early neonatal death. Therefore, perinatal mortality was 64.5 per 1000 live births in pregnancy with heart disease. There were no maternal deaths among enrolled pregnant patients with heart disease during study period.

Discussion

The mean age of patients, was 24.6± 5.2 years. In the present study the youngest and the oldest patient were 17 years and 38 years respectively. However, maximum patients were in age group of 20 – 29 years. Konar et al [10], Ashwini et al [11] and Shrinivas et al [12] reported range of age-wise incidence between 20 – 30 years which was comparable with the present study.

In the present study of pregnant heart disease cases, 74.4% cases had rheumatic heart disease, 20.5% cases had congenital heart disease, and 5.13% cases had other cardiac lesions. The results of the present study are comparable to that of Ashwini et al [11], Shrinivas et al [12], Nayak et al [13], Asgar et al [14], Bangal et al [15] and Bagade et al [16]. Rheumatic heart disease is still predominant cause of heart disease in the country. Among the 39 cases, 38.46% (n=15) cases were diagnosed to have heart disease for the first time during present pregnancy while

remaining 61.54% (n=24) cases were known heart disease cases. Among known heart disease (n = 24) cases, 79.2% (n=19) were having rheumatic heart disease, and 20.8% (n=5) were having congenital heart disease.

In the present study, 66.7% cases were NYHA class I, 23.1% cases were of NYHA Class II, 2.6% cases were NYHA class III and 7.6% cases were NYHA class IV. The findings of present study are comparable to that with Konar et al [10], Ashwini et al [11], Nayak et al [13], Bagade et al [16], Chinchwade et al [17] and Nagmani et al [18]. Depending upon NYHA functional class, patients were categorized into low risk and high risk group. Low risk group included NYHA Class I and Class II whereas high risk group included NYHA Class III and Class IV patients. There were 89.7% (n = 35) patients in low risk group and 10.3% (n = 4) patients in high risk group.

In present study of pregnant heart disease cases, out of the 39 cases, 30 delivered either vaginally or by LSCS, and 9 cases were still undergoing antenatal care and yet to be delivered. Out of the 30 deliveries, 73.3% were vaginal delivery, 26.7% were caesarean delivery. Results of the present study are comparable with those reported by Konar et al [10] (66.80%) and Ashwini et al [11] (71.60%). As compared to present study, Nayak et al [13] and Nagamani et al [18] reported lower rates of vaginal deliveries, i.e. 53.3% and 58.6% respectively.

Ventouse was applied to cut short second stage of labour in 3.3% (n=1) cases. Caesarean section was done in 26.6% (n=8) cases, of which 3.3% (n=1) were elective and 23.3% (n=7) were emergency. Emergency caesarean sections were done for obstetrical indications i.e. in two cases caesarean sections was done as patients were previous LSCS in active labour, whereas 5 were done for foetal distress. Elective caesarean section was done in patient with twins with first baby with non-vertex presentation.

In the present study out of the total 30 deliveries, 86.7% were term deliveries and 13.3% were preterm. There were no post-term deliveries. The findings of the present study were comparable with the study done by Asghar et al [11], Bangal et al [15] and Nagamani et al [18] where majority of the deliveries were term deliveries (80%, 89% and 86.2% respectively). Other authors, namely Ashwini et al [11] (18%) and Nayak et al [13] (20%) reported more of the preterm deliveries as compared to the present study (13.3%).

The mean birth weight of 30 live babies was 2.55±0.43 kg. The minimum birth weight was 1.8 kg whereas the maximum weight was 3.4 kg. Out of total 30 live birth babies, 43.3% (n=13) babies were low birth weight and 56.7% (n=17) were having birth weight ≥ 2.5 kg. Similar incidence of low birth weight babies was reported by Asghar et al [14] (42.55%). The incidence reported by Bangal et al [15] was higher (60%) than present study. And Nayak et al [13] (33.33%) reported the incidence of low birth weight less than present study as given above.

Among 30 babies, 23.3% (n= 7) were admitted to NICU. One baby was admitted because of low birth weight due to intrauterine growth restriction (IUGR) i.e. small for gestational age (SGA). Birth weight of the baby was 1.8 kg and was kept under NICU care for 5 days after which it was discharged. Four admissions were due to perinatal asphyxia, and were kept under NICU care for 3–4 days. All of them recovered after receiving NICU care and were discharged. Two babies admitted in NICU because their mothers were in intensive care unit. Of the 7 babies admitted to NICU, 1 baby died because of asphyxia due to meconium aspiration syndrome. Baby was delivered by emergency LSCS done for foetal distress. Birth weight of the baby was 2.3 kg.

There were 31 babies delivered, including one twins delivery. Out of the 31 babies delivered, 1 was intrauterine death, 30 were live. Among the 30 live babies, 1 baby died due to respiratory distress in early neonatal period i.e. within 7 days of birth. At the end of study, there were 29 live babies. Therefore, perinatal mortality was 64.5 per 1000 live births in pregnancy with heart disease. The perinatal mortality in the present study was lower as compared to that reported by Nayak et al [13] (100 per 1000 live births), Nagamani et al [18] (133 per 1000 live births). However Asghar et al [14] (20 per 1000 live births), Bangal et al [15] (50 per 1000 live births), Konar et al [10] (40 per 1000 live births), Ashwini et al [11] (66 per 1000 live births) and Shrinivas et al [12] (50per 1000 live births) had reported perinatal mortality still lower than that reported by us.

In the present study, there was no maternal mortality in pregnant heart disease cases. Similar findings were also reported by Bangal et al [15] where there was no mortality in their study. Nagamani et al [18], Ashwini et al [11], Nayak et al [13] and Konar et al [10] reported maternal mortality of 5%, 3.3%, 3.3% and 1.1% respectively.

Conclusion

Thus we conclude that the most common mode of delivery among the pregnant women with heart disease was spontaneous vaginal delivery followed

by emergency caesarean section with foetal distress as the common indication. For NICU admission foetal distress, mothers in intensive care unit and IUGR were the common indication. The perinatal mortality was 64.5 per 1000 live births in pregnancy with heart disease where as no maternal deaths among the study patients noted.

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