

A prospective observational study on maternal and fetal outcome in pregnancies with maternal cardiac diseases

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Abstract

Aim: This prospective study on maternal and fetal outcome in pregnancies with maternal cardiac diseases.

Methodology: The study was conducted in the Department of Obstetrics and Gynaecology, Modern Government Maternity Hospital, Petlaburj, Osmania Medical College, Hyderabad from September 2019 to September 2020.

Results: 100 cases of heart disease complicating pregnancy were studied. The prevalence of heart disease among the women who delivered here was 1.29%. Of 100 women, 86 were admitted for safe confinement and 14 cases were admitted for first trimester abortion. 33% of the women were diagnosed to have heart disease for first time in pregnancy. Of these, RHD was seen in 19% of cases, MVP seen in 6%, CHD in 7% cases, CHB in 1%. Teenage pregnancy with heart disease was found in 11 cases. Rheumatic heart disease is seen in 56% of the cases and congenital heart disease in 29% of the women. 98 women (98%) had NYHA class I or II symptoms. Isolated MS was seen in 19 cases (33.34%). ASD was the commonest congenital heart disease, seen in 10 (34.48%) women. ASD with PHT is seen in 2 cases. 23 women had undergone cardiac corrective surgeries. Of these surgery for congenital heart disease was done in 15 patients, 8 patients underwent surgery for RHD. 56 women (65.20%) delivered by Cesarean section and 30 (34.8%) by vaginal route. Intraoperative complications and postoperative complications were seen in 6 cases. The number of NICU admissions was 35. 6 babies were preterm. One maternal death (1%) was noted during our study. Pulmonary embolism with cardio respiratory Arrest in the postop period found to be the cause.

Conclusion: Universal access to obstetric and cardiac care and use of standard treatment protocol will definitely improve the outcome in women with cardiac disease.

Keywords: NICU, cardiac care, ECHO findings, cesarean section, NYHA

Introduction

About 1-3 % of pregnancies are complicated by heart disease ^[1, 2]. Heart disease constitutes the major non-obstetric cause of maternal deaths. Cardiac diseases in pregnancy are broadly classified into congenital and acquired. The acquired group includes rheumatic heart disease, cardiomyopathies, ischemic heart disease. Among acquired group, rheumatic heart disease is

commonest in developing countries including India [3, 4]. Ischemic heart diseases and cardiomyopathies are common in the developed countries.

In normal pregnancy, there is a raise in stroke volume and cardiac output [1, 3]. These changes are further aggravated in heart disease. Comorbidities like anemia, urinary tract infections, pre-eclampsia increase the burden on the heart and aggravate heart failure. Hence, antenatal mothers with heart disease need close monitoring and careful follow up. With advances in the comprehensive cardiac and obstetric care, the pregnant women are having safe motherhood. Many of the studies conducted previously were retrospective and in small series. Prospective study was done over a period of 12 months among women attending a government hospital for safe confinement, termination of pregnancy and intensive care.

Aim and Objectives

1. To analyses the outcomes of pregnancies- both maternal and fetal complicated with maternal cardiac diseases.
2. To study the various maternal and fetal morbidity parameters in pregnancies complicated by heart disease and to find their incidence.
3. To study the factors contributing to maternal and fetal morbidity and mortality in cardiac disease.

Materials and Methods

This prospective study on maternal and fetal outcome in pregnancies with maternal cardiac diseases was done in the Department of Obstetrics and Gynaecology, Modern Government Maternity Hospital, Osmania Medical Colleg, Hyderabad. This is a government referral centre for all the surrounding hospitals. The study was conducted over the period of 12 months from September 2019 to August 2020.

All pregnant women diagnosed to have heart disease and admitted to the hospital for either safe confinement or terminations of pregnancy, any cardiac complications were included in the study. Pregnant women with heart disease and labour pain admitted through casualty are also included.

Inclusion criteria

1. All patients with heart disease complicating pregnancy irrespective of gestational age – without any other medical illness.
2. Pregnant women diagnosed to have cardiac disease during hospital stay.

Exclusion criteria

1. Pregnant patients with associated medical illness like anemia, PIH, chronic kidney disease, GDM are excluded from the study.
2. Those who did not give consent for the study.

Pregnant women with cardiac disease in NYHA class I and II are admitted at 36 weeks of gestation. NYHA class III and IV are admitted to hospital at once the diagnosis is made. Cardiac symptoms if arise at any period of gestation are admitted immediately and intensive care is given to such patients. Conditions precipitating heart failure like anemia, infections, preeclampsia should be treated promptly. Drugs taken by cardiac patients should be revised and cardiology opinion to be obtained. Penicillin prophylaxis is given in RHD. Infective endocarditis prophylaxis-Inj. Ampicillin (50mg/kg) and Inj. Gentamycin (3mg/kg).

Caesarean delivery is done for obstetric indications few cardiac indications for LSCS are pulmonary hypertension, Eisenmenger syndrome, Coarctation of aorta. During labour patient is kept in bed in propped up position, nasal oxygen administered. IE prophylaxis if needed is administered. Strict monitoring of vital signs, restriction of IV fluids, cardiac drugs to be continued in intrapartum period when needed. Second stage of labour is curtailed by applying outlet forceps with liberal episiotomy. Episiotomy wound is sutured in layers. In the postpartum period patient is monitored.

for PPH, pulmonary edema, LRI and special precautions are taken to prevent these complications. Cardiologist review should also be obtained in postpartum period. Breast feeding was started as early as possible. Babies were examined by pediatrician. All newborn babies are immunized as per national schedule.

Obstetric outcome

Obstetric complications observed in mother are missed abortion, incomplete abortion, preterm labour, one maternal death due to atrial fibrillation with embolic manifestation. Otherwise, women are delivered by natural labour, Lscs or by assisted vaginal delivery.

Cardiac outcome

Cardiac complications observed were pulmonary edema, intra op fall in saturation, sudden worsening of NYHA grade or sudden cardiac arrest and cardiac death.

Neonatal outcome

Neonatal outcomes observed were low birth weight, preterm birth, small for gestation, IUGR, large for gestation, baby with single umbilical artery, respiratory distress syndrome. These babies require admission to NICU.

Postnatal women who delivered are counselled for adapting any of the available forms of contraception and also the risks involved in future pregnancies should be explained to the patient and her partner, which is most important. Birth spacing for a minimum of three years should be advised for primigravida mothers. Puerperal sterilization is advised for the women who have completed their families. In women in whom PS could not be done, vasectomy is advised to their spouse. In the women who have not completed their family or in whom sterilization procedures could not be carried out IUCDs are inserted under strict aseptic precautions with infective endocarditis prophylaxis.

Results

This study was conducted in the Department of Obstetrics and Gynaecology, Modern Government Maternity Hospital, Petlaburj, Osmania Medical College, Hyderabad. A total number of 100 pregnant women with heart disease were included in the study.

Table 1: Obstetric Score

	Frequency	Percentage
Primi	52	52.0%
Multi	48	48.0%
Total	100	100

Among the 100 pregnant women with heart disease admitted to the hospital 52 were Primi gravida and multigravida were 48 in numbers. Prevalence of heart disease in our hospital is

1.29%.

Table 2: Socio-economic status

	Frequency	Percentage
III	48	48.0%
IV	52	52.0%
Total	100	100

In our study 48 pregnant women belongs to socio economic class III and 52 pregnant women comes under socio economic class IV.

Distribution of women as per socio economic status 52% in class III and 48% in class IV.

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Table 3: Previous mode of delivery

	Frequency	Percentage
Abortion	5	10.41%
FTND	22	45.84%
LSCS	21	43.75%
Total	48	100

In this study, 22 pregnant women had previous full term normal delivery and caesarian section was performed in 21 cases. 5 pregnant women admitted to the hospital with cardiac disease underwent D&C for abortion. Remaining 52 cases are Primi gravida

Table 4: Gestational age

	Frequency	Percentage
I st Trimester	13	13.0%
Preterm	4	4.0%
Term	82	82.0%
Postdated	1	1.0%
Total	100	100

Gestational age in the pregnant women at the time of admission to the hospital was studied: 82% of the patients belong to term gestation. Preterm labour 4% of the cases and first trimester abortion occurred in 13%. 1 women with heart disease was referred to our hospital as postdated.

Table 5: NYHA Grading

	Frequency	Percentage
I	85	85.0%
II	13	13.0%
III	2	2.0%
Total	100	100

The cardiac functional status of the pregnant women with heart disease at the time of admission to the hospital was studied: Most of the patients have stable cardiac status and they fall under class I-85%. 13% of the pregnant women belong to NYHA class II and 2% of the cases belong to NYHA class III at the time of admission.

Table 6: Age range

	Frequency	Percentage
Up to 20 yrs.	11	11.0%
21 - 25 yrs.	43	43.0%
26 - 30 yrs.	39	39.0%
Above 30 yrs.	7	7.0%
Total	100	100

Age wise distribution among the pregnant women with heart disease was studied: About 43% were in the age group of 21 to 25 years, 39% of the cases come under 26 to 30 years. There were 7% of the cases above 30 years. Teenage pregnancy was seen in 11% of the cases.

Table 7: Type of heart disease

	Frequency	Percentage
CHB	1	1.0%
CHD	29	29.0%
MVP	14	14.0%
RHD	56	56.0%
Total	100	100

Echocardiography helps in diagnosing heart disease in pregnant women. About 56% of the women had rheumatic heart disease and 29% had congenital heart disease. Mitral valve prolapse is seen in 14% of the cases and is mostly an incidental finding during ECHO study. Congenital heart block was seen in 1 case and it belongs to type 1 CHB.

About 27 pregnant women were found to have heart disease during the antenatal period, 3 cases diagnosed during the postnatal period. Among this postnatal cases 1 woman found to have VSD with Eisenmenger syndrome and she was started on T.digoxin, T.bosentan. 1 woman was diagnosed as having heart disease during the intraoperative period and ECHO confirmed diagnosis in the postoperative period as RHD-MS.

Table 8: RHD Type

Lesion	Number	Percentage
Isolated MS	19	33.34%
Isolated MR	11	19.29%
MS/MR	10	17.54%
MS/PHT	3	5.27%
MS/Atrial Fibrillation	3	5.27%
Other combined lesions	11	19.29%
Total	57	100

Isolated rheumatic mitral stenosis was seen in 19 cases. MS with MR is seen in 10 cases. MS with pulmonary hypertension is seen in 3 cases and MS with AF seen in 3 cases.

Table 9: CHD Type

Type of CHD	Number	Percentage
ASD	10	34.48%
ASD with PHT	2	6.90%
VSD	7	24.13%
TOF	4	13.81%
PDA	6	20.68%
Total	29	100

In our study, commonest congenital heart disease noted was ASD. Along with ASD pulmonary hypertension developed in 2 cases. 7 patients with congenital heart disease belong to VSD in our study

Table 10: Surgical correction

	Frequency	Percentage
Nonsurgical	76	76.0%
Surgical	24	24.0%
Total	100	100

In 100 cases about 23 pregnant women underwent cardiac surgery and 1 women diagnosed as a case of ASD is planned for ASD closure after delivery. Various types of surgical corrections underwent are as follows:

Table 11: Surgeries

Corrective Procedure	No. of women	Percentage
Mitral valve replacement	3	13.04%
Closed mitral commissurotomy	4	17.40%
Double valve replacement	1	4.35%
ASD Closure	5	21.73%
VSD Closure	1	4.35%
PDA ligation	5	21.73%
TOF corrected	4	17.40%
Total	23	100

Table 12: Mode of delivery

	Frequency	Percentage
Assisted vaginal delivery	15	17.4%
Elective	23	26.8%
Emergency	33	38.4%
Labour natural	15	17.4%
Total	86	100

Among 100 pregnant women 14 cases were admitted during their first trimester with complaints such as bleeding per vaginum, ultrasound finding of missed abortion and manual vacuum aspiration with check curettage is done for such cases. Among the remaining 86 cases, caesarian section was performed in 56 women including both elective and emergency procedures. Pregnant women admitted to the labour ward with adequate cervical dilatation and satisfactory progress of labour with stable cardiac status is allowed a natural course of labour. About 15 women had outlet forceps delivery and it is mainly done to cut short the second stage of labour.

Caesarian section

Caesarian section in pregnant women with cardiac disease was performed mainly due to obstetric indications. Of the 86 deliveries, 23 cases underwent elective LSCS and emergency LSCS was done in 33 cases.

Table 13: LSCS

Type	Number	Percentage
Elective	23	41.07%
Emergency	33	58.93%
Total	56	100

Indications for LSCS

In emergency caesarian section performed the most common indication is fetal distress followed by CPD. Severe oligohydramnios was seen in 2 cases and breech with long period of secondary infertility in 1 case for which LSCS was done.

Table 14: Indication for emergency LSCS

Type	No. of women	Percentage
Fetal distress	13	39.40%
CPD	8	24.24%
Failed induction	3	9.09%
Fetal alarm signal	3	9.09%
Severe oligohydramnios	2	6.06%
Failure to progress	2	6.06%
Breech	1	3.03%
Previous LSCS	1	3.03%
Total	33	100

Indications for elective LSCS

The most common indication for elective LSCS is CPD, Previous LSCS. CPD or cephalo pelvic disproportion was the common cause for elective Caesarean section in this study group.

Table 15: Indications for elective LSCS

Causes	Number of women	Percentage
Previous LSCS with CPD	19	82.60%
Breech	3	13.05%
Previous 2 LSCS	1	4.35%
Total	23	100

Table 16: Type of anesthesia

	Frequency	Percentage
Combined epidural spinal	16	22.85%
GA	8	11.44%
IV sedation	14	20.0%
Spinal	32	45.71%
Total	70	100

Spinal anesthesia was administered to 45.7% of the cases and general anesthesia was given to 11.4% of cases. 22.8% of the pregnant women were administered combined spinal epidural. About 14 cases were admitted in the first trimester with missed abortion, incomplete abortion and IV sedation was administered to them, which also includes 1 case of molar pregnancy. Various types of anesthesia were administered to 70 cases and anesthesia complications

occurred in 6 cases.

Table 17: Anesthesia complications

Type of Complication	Number of Cases
Fall in SPO2	3
Pulmonary edema	3
Total	6

Table 18: Postoperative complications

Complications	Number of Patients
LRI	3
Pulmonary edema	1
Dyspnea	1
Pulmonary embolism	1
Total	6

Pregnant women with heart disease delivered should be monitored vigorously in the immediate postnatal period. Strict vitals monitoring, maintaining intake output chart, administering antibiotics, nasal oxygen were given. Cardiologist review should be obtained postnatally and if the patient was on cardiac drugs, it should be continued.

In the immediate postop period, one women having MS with atrial fibrillation developed pulmonary embolism and expired of sudden cardio respiratory arrest.

Table 19: Duration of stay in ICU

	Frequency	Percentage
< 24 hrs.	11	11.0%
24 - 48 hrs.	68	68.0%
48 - 72 hrs.	6	6.0%
> 72 hrs.	15	15.0%
Total	100	100

Cardiac patients with NYHA grade 3 or 4, Severe MS with atrial fibrillation, AS, uncorrected cyanotic heart disease requires intensive care. Women in the postnatal period also require intensive care since they can develop cardiac failure. About 68% of the cases were observed for 24 to 48 hours.

Patients diagnosed to have MS with pulmonary hypertension, MS with atrial fibrillation requires a longer period of ICU stay.

Table 20: Need for ventilatory support

	Frequency	Percentage
No	82	82.0%
Yes	18	18.0%
Total	100	100

Out of 100 pregnant women studied, 16 cases required ventilator care. Most of the cardiac patients were connected to elective ventilatory support. 5 cases of MS with PHT were put on ventilation. 2 cases diagnosed to have mitral stenosis with atrial fibrillation were connected to ventilator. Cases that were put on elective mechanical ventilation are mostly weaned in 24 hours.

Table 21: Neonatal Outcome

	Frequency	Percentage
Border line	1	1.16%
Post term	1	1.16%
Preterm	3	3.49%
Term	81	94.19%
Total	86	100.0

The Pregnancy outcome in 100 patients was studied. 14 patients were admitted for first trimester miscarriage. Of the remaining 86 cases preterm birth occurred in 3.5%, Term delivery in 94.2% of the cases, 1.2% of the baby was delivered after completion of 40 weeks of gestation.

Table 22: NICU admission

	Frequency	Percentage
No	51	59.3%
Yes	35	40.7%
Total	86	100.0

Neonate born to pregnant mothers complicated by heart disease requiring NICU care was studied in detail. Out of the 86 babies born 35 required admissions to the NICU. These babies were screened for heart disease by performing ECHO. In our study, the screening for the heart disease is negative for these babies.

Table 23: Reason for NICU admission

	Frequency	Percentage
Anamolies	3	3.0%
IV Antibiotics	3	3.0%
Nil	65	65.0%
Observation	29	29.0%
Total	100	100.0

Neonates born by assisted vaginal delivery were observed in NICU, which includes 29 babies. 3 babies required IV antibiotics - Their mothers admitted with complaints of draining per vagina. 2 babies found to have single umbilical artery and further investigations found to be normal. Anomaly scan of the fetus showing mild hydroureteronephrosis investigated postnatally and it is on regular follow up at pediatric OPD.

Table 24: Birth weight

	Frequency	Percentage
< 2.5 kgs	6	7.0%
2.5 - 3 kgs	60	69.7%
> 3 kgs	20	23.3%
Total	86	100

Neonatal outcome in terms of birth weight of the babies were studied. Most of the babies born are with birth weight of 2.5 to 3kgs. 69.8% of the babies come under this group. 23.3% of the babies' have birth weight of more than 3kgs. Low birth weight was seen in 7% of the cases.

Out of this birth, weight of 1 baby was 4kg and admitted in NICU evaluated for large for gestation. Baby was discharged from NICU on 6th postnatal day.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	100	19	38	25.29	3.566
Duration of disease	65	0.03	26.0	9.740	6.5515
Baby weight	86	1.6	4.1	2.910	.3575
Duration of hospital Stay/days	100	5	28	14.03	5.028

Statistical significance of different variables with heart disease are studied as follows

Table 25: Age range * type of heart disease

		Type of heart disease				Total
		CHB	CHD	MVP	RHD	
Age range	Up to 20 yrs	0	2	4	5	11
	21 - 25 yrs	0	14	6	23	43
	26 - 30 yrs	1	11	4	23	39
	Above 30 yrs	0	2	0	5	7
Total		1	29	14	56	100

The distribution of RHD is seen maximum in age range of 21 to 30years.
Teenage pregnancy with RHD is seen in 5 women.

Table 26: Gravida * Type of heart disease

	Type of heart disease				Total
	CHB	CHD	MVP	RHD	
Primi	0	17	6	29	52
Gravida					
Multi	1	12	8	27	48
Total	1	29	14	56	100

RHD was seen in 29 primi and 27 multipara. Among CHD 17 cases are seen in primi and 12 cases among multipara. The P value derived is 0.560, which means there is no statistical significance between gravida and heart disease.

Table 27: Surgery * Type of heart disease

	Type of heart disease				Total
	CHB	CHD	MVP	RHD	
Non-surgical	1	13	14	48	76
Surgery					
Surgical	0	16	0	8	24
Total	1	29	14	56	100

Majority of patients with CHD underwent surgical procedure prior to conception.55.7% of patients had corrective surgery. Among RHD patients, 16.6% underwent surgery prior to pregnancy. The comparison between Surgery and Heart disease types shows that there is statistical significance with P value < 0.001.

Table 28: Type of anesthesia * Type of heart disease

	Type of heart disease				Total
	CHB	CHD	MVP	RHD	

	CES	0	0	0	16	16
	GA	1	1	0	6	8
Type of anaesthesia	IV sedation	0	3	1	6	10
	Normal	0	14	6	14	34
	Spinal	0	11	7	14	32
Total		1	29	14	56	100

The comparison between anesthesia and heart diseases shows that there is statistical significance with P value < 0.001

Table 29: Medical treatment * type of heart disease

	Type of heart disease				Total
	CHB	CHD	MVP	RHD	
No	1	26	10	20	57
Medical treatment					
Yes	0	3	4	36	43
Total	1	29	14	56	100

Major pregnant women with RHD are under cardiac drugs. 64.28% of patients with RHD are getting cardiac medications. In CHD 10.34% of patients are under cardiac drugs. 28.57% of MVP patients are under drugs. The comparison between medical treatment and heart diseases shows that there is statistical significance with P value < 0.000

Table 30: Need for ventilatory support * type of heart disease

		Type of heart disease				Total
		CHB	CHD	MVP	RHD	
Need for ventilatory support	No	1	28	14	39	82
	Yes	0	1	0	17	18
Total		1	29	14	56	100

Ventilatory support is mostly needed for RHD. 30.35% of patients with RHD required ventilation. Most patients were put on elective mechanical ventilation. 3.4% of women with CHD requires ventilator support. The P value is 0.004 hence it denotes there is statistical difference between the type of heart disease and need for ventilator support.

Discussion

Heart disease complicates about 1 to 3% of pregnancies. It causes major impact on maternal and fetal outcome. This study reflects the maternal and fetal outcomes in women with heart disease treated in our hospital. The prevalence of heart disease among the pregnant women attending this center was 1.29%. In various studies prevalence varies from 0.3- 3.5%⁴⁰. This being a referral center the prevalence rate may not reflect that of the general population. The study population was 100 pregnant women. Of these, MVA with check curettage was done in 12 cases and MTP/TAT was done in 3 cases. The prevalence of heart disease among pregnant women was as follows in various studies:

Antenatal care

All pregnant women with heart disease were booked case. All antenatal women were given iron and folic acid tablets during all three trimesters. 33% (n=33) of the women were diagnosed to have heart disease for first time during the current pregnancy. The commonest age group distribution was 21 – 25 (n=43, 43%). Of the 100 women enrolled in the study, 11% (n=11) were below 20 years of age. Major portion of women included in this study are primi gravida, 52%.

Heart Disease

The commonest type of heart disease is RHD (n=56, 56%) which is similar to other Indian studies [5, 6, 7]. Among these, mitral stenosis was the most common type. Isolated MS was noted in 33.34% of the cases (n=19). This study similar to several other Indian studies^{5, 6}. In western studies, congenital heart disease was the commonest type. About 8 women with RHD had underwent surgical treatment, valve replacement was done in 3 cases, combined valve replacement performed in 1 case, CMC was done in 4 cases. Severity of the stenosis was correlated with higher NYHA functional class.

Congenital heart disease was seen in 29 cases (29%), commonest type being atrial septal defect, which includes 10 cases. 2 cases of ASD with pulmonary hypertension, were also included in our study. Ashwini M & Gayatri Devi J conducted a study and found that 40% had undergone surgical correction of which one fourth were done during pregnancy [8]. In our study one women diagnosed to have ASD was planned for surgical closure after delivery. TOF corrected was seen in 4 cases. VSD with Eisenmenger's syndrome was seen in one case which was diagnosed in the immediate postnatal period. Her intrapartum and postpartum period were uneventful. She was started on T.digoxin and T.bosentan.

In pregnancy mitral valve prolapse is mostly an incidental finding. Widespread use of the echo has detected many asymptomatic cases. In our study MVP seen in 14 cases. Pregnant outcome in patients with isolated MVP is usually uneventful. If MVP associated with significant regurgitation, they should be monitored closely for complications like arrhythmia, thrombosis. In our study MVP with mild regurgitation seen in 3 cases. All women with MVP had a good maternal and fetal outcome.

Congenital heart block – Type 1 was seen in 1 women. Repeat LSCS was done in that case and her intra operative and postoperative period were uneventful. Maternal death was seen in 1 case – severe MS with atrial fibrillation. Patient was on anticoagulants, Penicillin. Repeat LSCS was done. Intraoperative period was uneventful. In the immediate postop period patient developed pulmonary embolism and died of sudden cardio respiratory arrest.

NYHA Class

Majority of the women included in our study were admitted with NYHA Class I (n=85, 85%) and Class II (n=13, 13%). About 2% of the women belong to NYHA class III⁷. Cardiac status based on NYHA functional classification was an independent predictor of cardiac event in a Canadian multicenter study by Sameul C, Siu et al. [9].

Out of 86 women delivered, normal labour was seen in 15 women (17.4%). Caesarean section both elective and emergency was performed in 56 cases (65.2%). Most common indications for LSCS are fetal distress and CPD. The second stage was cut short by use of forceps in 15 cases (17.4%). Assisted vaginal delivery to cut short the second stage has been recommended by various other studies [1, 10, 11]. Forceps delivery was performed mainly to relieve maternal exhaustion. Preterm labour was seen in 3 cases, reason being hypoxia in heart disease may cause cervical softening and onset of labour.

Cardiac complications

Six women developed intraoperative cardiac complication. 3 women developed intraoperative pulmonary edema and 3 cases had intraoperative fall in spo2. Postop complications were noted in 6 cases. Pulmonary edema seen in 1 case LRI developed in 3 cases, dyspnea in 1 case and pulmonary embolism in another case. Pulmonary edema was the common complication in many studies [12, 13]. Ventilatory support was required in 18 cases, most of the cardiac patients were put on elective mechanical ventilation and weaned in 24 hours. Patients

who developed LRI, pulmonary edema were also opted for ventilator support. Antibiotic prophylaxis is administered to the cardiac mothers and we had no case of endocarditis.

Neonatal Complications

Most of the babies born have birth weight of 2.5 to 3kg, 60 babies (69.8%) are included in this group. Low birth weight was seen in 6 babies (7%). 29 babies admitted in NICU. Maternal cardiac disease was associated with an increased risk of neonatal complication [9, 14]. In cardiac mothers, there is increased incidence of Low birth weight babies [14, 15, 16]. Placental insufficiency usage of drugs like beta blockers are associated with increased incidence of IUGR/Low birth weight babies.

Mahesh Koregol et al conducted a study and found that the rate of NICU admission was 30.1%¹² Surgne et al proposed that the perinatal outcome in women with RHD was good and comparable to mothers in general population. The inheritance of congenital heart disease in new born was studied by shime et al and found that the incidence was 13%. No heart disease was detected in babies born to cardiac mothers in our study. 29 babies delivered by forceps were observed in NICU. 3 babies were admitted for getting IV antibiotics. 1 baby having birth weight more than 4kg admitted for LGA evaluation. Another baby evaluated for single umbilical artery, another one for renal anomaly and found to be normal.

There is strong association between maternal cyanosis and fetal growth. There is inverse relationship between the maternal oxygen saturation and birth weight of babies. Utero placental insufficiency due to left heart obstruction leads to preterm delivery, IUGR, IUD. Placental insufficiency leads to hypoxic acidosis, which in turn affects the fetal cardiac contractility and cardiac output. This may lead to preterm delivery. With improved antenatal care, adequate management of comorbidities and increased institutional deliveries there is a declining trend in perinatal morbidity and mortality.

Early diagnosis, pre-conceptional counseling, health education, routine and regular antenatal checkup, identifying and correcting the factors aggravating heart failure, regular cardiac follow up, strict adherence to cardiac drugs, institutional delivery may help in improving outcome for both mother and the babies.

Conclusion

Heart disease is the most common non obstetric cause of maternal morbidity and mortality. It also has a major impact on neonatal outcome. Favorable outcome is noted in women with NYHA class I and II, avoidance of factors precipitating heart failure like anemia, infections, arrhythmias, regular cardiac follow up, strict adherence to cardiac medications. Pregnancy should be avoided in women with severe type of heart disease and in such cases; surgical procedures should be performed in the pre pregnancy period itself. Pregnant women with heart disease are advised to have regular and frequent antenatal visits. During pregnancy, corrective procedures if required should be done in the second trimester but it carries significant fetal risk. Cardiac drugs taken prior to pregnancy should be reviewed by the cardiologist. Delivery should preferably conduct in a tertiary care center with multi-disciplinary approach. Fetal ECHO performed around 20 weeks of gestation to find out inherited heart diseases in newborn. Universal access to obstetric and cardiac care and use of standard treatment protocol will definitely improve the outcome in women with cardiac disease.

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Conflict of Interest

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