

Original research article**Impact of maternal heart disease: Maternal and fetal outcome in tertiary care hospital****¹Dr. K Saritha, ²Dr. Bushra Shereen, ³Dr. Ritika Malviya**¹Professor, Department of Obstetrics and Gynaecology, Mallareddy medical college for women, Hyderabad, Telangana, India^{2,3}Assistant Professor, Department of Obstetrics and Gynaecology, Mallareddy medical college for women, Hyderabad, Telangana, India**Corresponding Author:**

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Abstract

BACKGROUND: Cardiovascular abnormalities are considered to be the most important non obstetric cause of morbidity. Cardiac disease is an important cause of maternal mortality both in antepartum and postpartum period. The overall incidence of heart disease in pregnancy is <1%.

METHODS: The present study was Prospective and Observational study, conducted at the Department of Obstetrics and Gynecology in Mallareddy Narayana Hospital, Suraram, Hyderabad, Telangana from 2018-2022. All women with cardiac disease diagnosed during antenatal visits, or diagnosed previously, or emergency admissions in the labor room, or referred with cardiac diseases, or who developed cardiac complications during peripartum period beyond 32 weeks period of gestation were included in the present study. Maternal outcome in terms of mode of delivery and fetal outcome in terms of preterm, intra uterine growth restriction was evaluated.

RESULTS: In the current study, majority of the patients were less than 25 years of age group 25 (64.1%) and most of them were primigravidae 17 (43.58 %). Co-morbid conditions identified in 19(48.71%) women among them anemia followed by pregnancy induced hypertension was most common. Valvular heart disease with Rheumatic involvement was the most common presentation. The pregnancy outcome in terms of fetus preterm deliveries in 15 cases (38.46%), intrauterine growth restriction in 6 cases (15.38%) noted. In this study there was no maternal mortality.

CONCLUSION: This current study conclude that the rheumatic heart disease is still a predominant heart disease in pregnancy. Prognosis is good with surgically corrected cases, NYHA class I and II. In this study, maternal complications occurred during labor and puerperium. Early diagnosis, preconceptional counselling, early initiation of treatment by cardiologist, maternal and fetal monitoring by skilled obstetrician with strict constant supervision can expect better outcome.

KEY WORDS: Pregnancy, Rheumatic heart disease, maternal outcome, Fetal outcome, NYHA class.

Introduction

Cardiovascular abnormalities are considered to be the most important non obstetric cause of morbidity. Cardiac disease is an important cause of maternal mortality both in antepartum and postpartum period. The overall incidence of heart disease in pregnancy is <1%^[1]. The circulatory changes that occur during pregnancy are reduced peripheral vascular resistance (TPVR) and increased blood volume and cardiac output around 50%. During labour and delivery, cardiac output is further increased as a result of uterine contractions and maternal effort, in the presence of maternal heart disease may result in adverse consequences even death of the mother or fetus^[2]. Rheumatic heart disease (RHD) is the most common cause of valvular disease in the developing world. In total, 90% of all cardiac disorders in women of childbearing age in non-industrialized regions are of rheumatic origin^[3, 4]. Mitral stenosis, one of the most common valvular lesions in pregnancy. Severe maternal and fetal complications associated with maternal cardiac disease include congestive cardiac failure, arrhythmia, endocarditis, fetal death, neonatal death, preterm birth, and small for gestational age^[5]. After 2010, the rate of maternal mortality mainly in developing countries began to decline, despite increasing numbers of high-risk patients^[6]. This decline may be related to improvement in medical services. Early diagnosis and management of cardiac lesions with multidisciplinary team approach in collaboration of skilled obstetrician, cardiologist, anesthetist, neonatologist and trained nurses, results in a successful outcome for mother and child in majority of cases. Objective of present study was to determine type of cardiac lesion, maternal outcome in pregnant women with heart diseases in terms of fetal complication, maternal complication and mode of delivery.

Methods

The present study was Prospective and Observational study, conducted at the Department of Obstetrics and Gynecology in Mallareddy Narayana Hospital, Suraram, Hyderabad, Telangana from 2018-2022. Institutional ethical committee permission was obtained. Written informed consent was taken from all study participants. All women with cardiac disease diagnosed during antenatal visits, or diagnosed previously, or emergency admissions in the labor room, or referred with cardiac diseases, or who developed cardiac complications during peripartum period were included in the present study. In present study women with cardiac disease beyond 32 weeks period of gestation were included. Maternal baseline characteristics including age, gravida status, gestational age, New York Heart Association (NYHA) functional class, type of cardiac lesions was noted. Thorough physical and general examination was done. Necessary baseline blood investigations and ECG and echocardiography were done. For booked Antenatal cases monitoring was done in subsequent visits on the basis of period of gestation, the severity of the cardiac lesion and functional class. Medication for each cardiac case suggested by cardiologist according to type of cardiac lesion and at each visit evaluation of functional status, hemoglobin estimation, urine microscopy and fetal growth monitoring was done, along with cardiologist consultation. All women were educated about the signs of decompensation like progressive oedema, palpitations, increasing dyspnoea on exertion, orthopnea, paroxysmal nocturnal dyspnea, and hemoptysis. In patients with Rheumatic heart disease, Injection Benzathine penicillin 1.2 million IU intramuscularly was given. All patients were given infective endocarditis prophylaxis at the time of delivery. Maternal outcome in terms of mode of delivery and fetal outcome in terms of preterm, intra uterine growth restriction and stillbirth was evaluated. Neonatal complications managed by Pediatrician necessary NICU admission was done. After delivery all women were encouraged to breast feed immediately, and early ambulation was advised. Patients were followed up for 6months following delivery for signs of complications like infective endocarditis and congestive heart failure and deep vein thrombosis, At the time of discharge, counselled for contraception and cardiologist opinion was taken. Maternal cardiac complications managed in conjunction with cardiologist and ICCU team.

Results

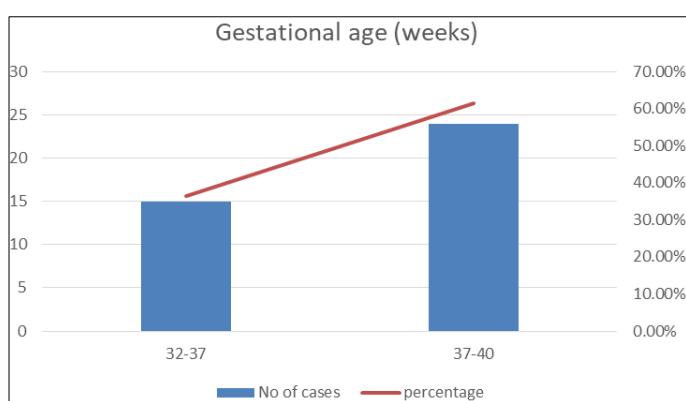
In the current study, majority of the patients were less than 25 years of age group 25 (64.1%) and most of them were primigravidae 17 (43.58%). Co-morbid conditions identified in 19(48.71%) women among them anemia followed by pregnancy induced hypertension was most common. Majority of the diagnoses were made in the Antenatal period in 21(53.84%) cases while the remaining 18 (46.15%) were pre-pregnancy diagnoses. Valvular heart disease with Rheumatic involvement was the most common presentation. In 5 cases cardiac surgeries done among them ASD closure was done in 1 patient, VSD closure was done in 2 patient, Balloon valvuloplasty was done in 1 patient, Mitral valve replacement was done in 1 patient. SVT in 2 cases, cardiomyopathy in 2 cases noted under miscellaneous category. Table-1 showing Clinico-demographic characteristics of pregnant women with cardiovascular disease. All women were symptomatic, commonly complaining of breathlessness and palpitations. Graph -1 showing Gestational age in weeks. In our study majority of women were in term gestation (61.53%). Table-2 showing Cardiac lesions in study participants with ejection fraction (2D-ECHO). Rheumatic valvular heart disease was more common, constitutes about 58.97%. Table-3 showing maternal outcome of pregnancy in term of mode of delivery. Cesarean deliveries in 19 (48.71%) cases were done for obstetric indications. While 15 (38.46%) were delivered vaginally spontaneously.

The pregnancy outcome in terms of fetus preterm deliveries in 15 cases (38.46%), intrauterine growth restriction in 6 cases (15.38%) and still birth in 1 case (2.56%) noted. Three perinatal mortalities noted due to sepsis and respiratory distress. Graph-2 showing Cardiac complications. Cardiac complications were identified in 8 cases, they were cardiac arrest in one case, congestive cardiac failure in 5 cases, Atrial fibrillations in one case, CCF+AF in one case. Cardiac arrest patient revived by timely intervention of CCU team. Pulmonary arterial hypertension seen in 18 cases; among them 2 cases were severe. In this study there was no maternal mortality due to availability team of critical care team, cardiologist, obstetrician, anesthetist and emergency services.

Table 1: Showing Clinico-demographic characteristics of pregnant women with cardiovascular disease

Characteristics (n=39)	No of cases(n=39)	Percentage (%)
Age(years)		
<25	25	64.10%
>25	14	35.90%
Gravida		
G1	17	43.58%
G2	15	38.46%
G3	5	12.82%
G4	2	5.12%

Associated co-morbid conditions(n=19)		
Chronic hypertension	1	2.56%
Anemia	9	23.07%
PIH with oligohydramnios	3	7.69%
PIH	3	7.69%
GDM	1	2.56%
Bronchial Asthma with PIH	1	2.56%
Epilepsy	1	2.56%
NYHA class		
1	16	41.02%
2	12	30.76%
3	9	23.07%
4	2	5.12%
Birth weight of baby (Kgs)		
1.7-2.5Kgs	21	53.84%
2.5-3.2Kgs	18	46.15%



Graph 1: Showing Gestational age (weeks) of study participants

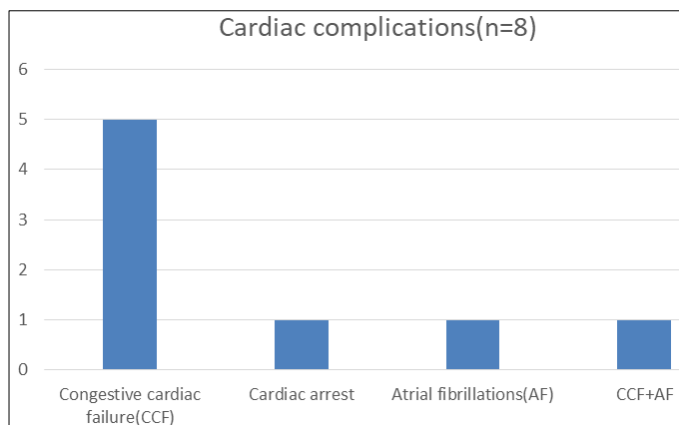
Table 2: Showing Cardiac lesions in study participants with ejection fraction (2D-ECHO)

Type of cardiac lesion	No of cases(n=39)	Percentage (%)
Rheumatic heart disease with Single valve lesions (MS, MR, TR, AR)	8	20.51%
Rheumatic heart disease with Multiple valve lesions	15	38.46%
Congenital cardiac lesions (ASD,VSD,PDA)	7	17.94%
Prior Cardiac surgery for congenital heart disease	5	12.82%
Miscellaneous	4	10.25%
Ejection fraction in % (2D-ECHO)		
30-40	4	10.25%
40-50	5	12.82%
50-60	14	35.89%
60-70	16	41.02%

MS – Mitral stenosis; MR – Mitral regurgitation; TR – Tricuspid regurgitation; AR – Aortic regurgitation; ASD- Atrial septal defect; VSD-Ventricular septal defect; PDA-Patent ductus arteriosus

Table 3: Maternal outcome in terms of mode of delivery

Mode of delivery	No of cases(n=39)	Percentage
LSCS	19	48.71%
Vaginal delivery	15	38.46%
Instrumental vaginal delivery (Outlet forceps)	5	12.82%



Graph 2: Showing Cardiac complications in study participants

Discussion

Cardiovascular disease is strongly associated with maternal mortality and morbidity in pregnancy. The tendency for late diagnosis poses a challenge in the management of pregnant women with cardiac diseases [7]. About 64.1% of the women with heart disease were young (less than 25 years) in our study which is comparable with Salam S *et al.* study (74%) [8]. Majority of the study participants were primigravidae (43.58%) similar to study by Indira I *et al.* (43%) [9]. With increasing gravidity, the rate of complications associated with heart disease increases due to indirect association with increasing age, duration of heart disease, progression of disease process. In the present study Rheumatic heart disease RHD (58.9%) was the principal cardiac lesion and mitral stenosis was the most common valvular cardiac lesion similar to Salam S *et al.* study [8] (56.6%). Joshi G *et al.* [10] study (71.5%) and Lakshmi Prasanna and Aruna Kumari study [11] (64%).

However, the incidence of rheumatic heart disease in developed countries has been greatly reduced by the widespread use of antibiotics effective against the streptococcal bacterium which causes rheumatic fever [12]. In this, present study Rheumatic heart disease was 58.9%, indirectly indicates inadequate treatment of girls suffering from streptococcal infection in their childhood and adolescence.

Counseling after thorough evaluation should be offered to all women of reproductive age with known cardiac disease. This should preferably be done before conception or alternatively in early pregnancy [13]. For better maternal and perinatal outcome timing of delivery and mode of delivery need to be discussed in advance with multidisciplinary team consisting of skilled obstetrician, cardiologist, pediatrician, critical care team and anesthesiologist. The patients and family members were also counselled regarding the delivery plan and potential complications.

Women with heart disease in pregnancy had spontaneous vaginal delivery in 20 cases (51.28%), which was found safe and effective in this study. In our study, 19 cases (48.71%) required Cesarean delivery and was done for obstetric indications.

Perinatal outcome was usually seen in the form of preterm birth, low birth weight babies, stillbirth and live term birth babies. In our study there were no such inherited cardiac lesions in new born babies. In this study perinatal mortality was noted in 3 cases (7.6%), 2 cases were due to sepsis and respiratory distress and one stillbirth. In Joshi G *et al.* study 4 perinatal mortality was about 22.6%. Here perinatal mortality widely varies due to sample size, selection of cases, functional class and severity of the disease. In spite of potential risk of maternal morbidity with cardiac disease better outcome can be expected with proper pre conceptional counselling, regular and frequent monitoring along with multidisciplinary team and initiation of appropriate and relevant treatment during antenatal period, intrapartum and postpartum period may reduce maternal mortality. In this present study no maternal death because of effective management by multidisciplinary team.

If asymptomatic women with heart disease delivered at home or rural health centres not diagnosed during antenatal and even post-natal period not counted for actual prevalence. Because of this reason, teaching institutes in our country, being referral centres, may not reflect the actual prevalence of this medical disorder in pregnancy. It is an important cause of maternal mortality in India.

All women were encouraged to breast feed their children and therapeutic doses of anticoagulants use during puerperium period is not a contraindication for breast feeding. In this study, the patients who suffered from heart disease were treated according to type of cardiac lesion and severity of the cardiac lesion by Cardiologist. The cardiovascular treatment protocol varies for each case, which mainly depending upon when the patient visited hospital, the time of disease detection and the specific clinical condition of each case.

Conclusion

This current study conclude that the rheumatic heart disease is still a predominant heart disease in

pregnancy and is associated with increased maternal and fetal risk. We need to monitor cardiac patient for early detection and management of heart failure throughout the course of pregnancy labor and puerperium. Thus, cardiac disease in pregnancy remains an important cause of maternal mortality and is potentially avoidable with optimal care and also early referral to a good critical care center, which is well equipped with a team of cardiologist and obstetrician who are trained to deal with such kind of complicated cases. Prognosis is good with surgically corrected cases, NYHA class I and II. In this study there is no maternal mortality because of team work by Cardiologist, ICCU team, Obstetrician, anesthetist. In this study, maternal complications occurred during labor and puerperium. Early diagnosis, preconceptional counselling, early initiation of treatment by cardiologist, maternal and fetal monitoring by skilled obstetrician with strict constant supervision can expect better outcome.

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