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Fetomaternal Outcome in Patients with Pregnancy with Cardiac Disease

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Abstract: ***The study aimed to determine the fetomaternal outcome in pregnant patients with cardiac disease to better understand the prevalence and severity of the disease and to enable timely and appropriate management. This hospital - based observational study was carried outon 117 pregnant women with any kind of heart disease acquired congenital valvular, ischemic, irrespective of gestational age, patients with known cases of heart disease before pregnancy. The total number of deliveries at the hospital was 11273 out of which 117 deliveries (1.07%) were with heart disease. The mean age of the patients was 27.63±14.2 years ranging from 18 to 41 years.82.90% of patients had term gestation whereas, preterm labour was seen in 5.98% of the cases and first - trimester abortion occurred in 10.25% of the patients. Among 117 patients 85 patients (72.65%) were diagnosed with heart disease before pregnancy whereas 32 patients (27.35%) were diagnosed during pregnancy. After delivery 1 woman had congestive cardiac failure, 2 had postpartum cardiomyopathy, and 4 had infective endocarditis. Whereas, 2 mothers died due to pulmonary embolism and congestive cardiac failure. Out of 117 patients, 108 (92.30%) were discharged from the hospital without any complications. Among 117 patients, 12 patients were admitted for first - trimester miscarriage. In the remaining 105 cases, 7 patients (6.66%) were stillborn of which 4 (57.14%) were fresh stillborn and 3 (42.85%) were macerated stillborn, and 98 (93.33%) were alive. Most of the babies were born with birth weights between 2.5 to 3 kg (71.42%) followed by 21.42% of the babies with birth weights more than 3 kg and low birth weight was observed in 7.14% of the cases. A total of 39 (39.79%) were admitted in NICU. The most common reason for NICU admission was meconium aspiration (43.58%) followed by prematurity (17.94%) and IUGR (17.94%). Management of the pregnant women with cardiac abnormalities shouldbe multidisciplinary to enhance care for these patients.***

Keywords: Cardiac disease, Fetomaternal outcomes, pregnancy, fetomaternal outcomes

1. Introduction

Cardiac disease during pregnancy is still a serious issue, especially in developing nations. Even though the reported incidence ranges from 0.1% to 4%. [1 - 3]For decades, there has been no change in the prevalence of clinically significant cardiac disease during pregnancy. Although the prevalence of cardiac abnormalities during pregnancy has largely remained unchanged, the relative contribution of the various causes of heart disease that develop before or are discovered during pregnancy varies depending on the study population and study period. [4]

Heart disease continues to be a major global cause of maternal death. [5] Children with congenital heart disease are now more likely to survive into adulthood because of recent advancements in paediatric cardiology and cardiac surgery. Due to maternal aging, the development of assisted reproductive technologies, and rising cardiovascular risk factors in women, it is anticipated that there would be a rise in the number of pregnant women with coronary disease. [6] Pregnant women with underlying heart disease may experience an increase in morbidity and death due to increased cardiac demands during pregnancy. Maternal outcomes may be affected by pregnancy - related cardiocirculatory alterations, which include an increase in heart rate, stroke volume, and cardiac output as well as a decrease in systemic vascular resistance. Other conditions, such as valve insufficiencies, generally follow a benign course during gestation if the myocardial function is not compromised, whereas pregnancy is associated with high maternal morbidity under some circumstances. [7]

Women with new (whether or not pregnancy - related) diseases are likely to present primarily to obstetricians or primary caregivers and not to a cardiologist, as do those with pre - existing heart disease that has not yet been detected. To reduce morbidity and death, early diagnosis, appropriate follow - up, and counselling are essential, and this strategy necessitates cooperation between obstetricians and cardiologists. Therefore, obstetricians, cardiologists, and anaesthetists must identify the high - risk factors, foresee the complications, and manage the issues faced during pregnancy, labor, and puerperium when managing heart disease in pregnancy. [8] Hence the current study aimed to determine the fetomaternal outcome in pregnant patients with cardiac disease to better understand the prevalence and severity of the disease and to enable timely and appropriate management.

2. Material and Methods

This hospital - based observational study was carried out in the Department of Obstetrics & Gynecology, at a Tertiary care hospital in central India during a period from Jan 21 to June 22. A total of 117 pregnant women with any kind of heart disease acquired congenital valvular, ischemic, irrespective of gestational age, patients with known cases of

heart disease before pregnancy and willing to participate in the study were included in the study. Whereas, all pregnant women without any heart disease, all heart disease patients with pregnancy who have got admitted to the hospital with other medical disorders of pregnancy like diabetes complicating, anemia complicating pregnancy, liver disorders complicating pregnancy, abortions, vesicular mole, blighted ovum and not willing to participate in the study were excluded from the study.

Data were collected using personal interviews and study investigations and procedures done during the course of the stay. Written consent of patients included in the study was taken after explaining the 57 purposes of the procedure of the study. A proper proforma was devised for containing all essential details for each individual. A complete obstetric history was taken. A general examination was done as per the case record form. Investigations included physician consultation, pulse, BP, HB, CBC, platelet count, bleeding and clotting time, coagulation profile, detailed liver function test, PT INR, renal function test, obstetric USG, ECG, and 2D Echo were done for all mothers. Pregnant mothers were classified according to NYHA classification and managed accordingly.

Obstetric outcome - If the patient is in labour or not, vaginal birth or caesarean section, induction and delivery method, post - delivery complications like heart failure, PPH, infection, gestational age, NYHA grade, conservative termination in labour, protocol during labour, ICU admission were noted.

Fetal outcome - status at birth - live/stillborn, if still born (Fresh or macerated), live following points were noted - Birth weight, Apgar at birth and after 5 min, need for NICU admission, preterm, IUGR. Congenital anomalies need blood transfusions and fresh frozen plasma noted.

3. Results

The total number of deliveries at the hospital was 11273 out of which 117 deliveries (1.07%) were with heart disease. The mean age of the patients was 27.63±14.2 years ranging from 18 to 41 years. Whereas, most of the patients were in the age group of 25 to 29 years (41.56%) followed by 30 to 34 years (2137%) and 20 to 24 years (20.51). However, most of the patients were from rural areas (70.09%) as compared to urban areas (29.91%) (table 1).

Table 1: Distribution of patients according to age

Age groups in years	Number of patients (n)	Percentage (%)
≤19	11	9.40
20 - 24	24	20.51
25 - 29	48	41.03
30 - 34	25	21.37
≥35	9	7.69
Total	117	100.00

Gestational age at the time of admission

Assessment of gestational age at the time of admission showed that 82.90% of patients belonged to term gestation. Whereas preterm labour was seen in 5.98% of the cases and first - trimester abortion occurred in 10.25% of the patients.1 woman with heart disease was referred to the hospital as post - dated (table 2).

Table 2: Gestational age at the time of admission

Gestational age	Number of patients (n)	Percentage (%)
1st trimester	12	10.25
Preterm	07	5.98
Term	97	82.9
Post - dated	01	1.0
Total	117	100.0

Among 117 patients 85 patients (72.65%) were diagnosed with heart disease before pregnancy whereas 32 patients (27.35%) were diagnosed during pregnancy. Out of these 40% diagnosed were evaluated for cardiac symptoms and 60% were diagnosed during the routine echocardiogram done in the antenatal patients.

Echocardiography helps in diagnosing heart disease in pregnant women. About 52.99% of the women had rheumatic heart disease and 24.79% had congenital heart disease. Mitral valve prolapse was seen in 11.11% of the cases and was mostly an incidental finding during the ECHO study. Primary pulmonary hypertension was seen in 3.42% of patients. Cardiomyopathy was observed in 4.27% of patients. Other types of heart disease include sick sinus syndrome (1 case), heart block (1 case), viral myocarditis (1 case), and constrictive pericarditis (1 case) (table 3).

Table 3: Type of heart disease

Type of heart disease	Number of patients (n)	Percentage (%)
Rheumatic heart disease (RHD)	62	52.99
Congenital heart disease (CHD)	29	24.79
Mitral valves prolapse syndrome (MVP)	13	11.11
Primary pulmonary hypertension (PPH)	4	3.42
Cardiomyopathy	5	4.27
Others	4	3.42
Total	117	100

Post - delivery maternal outcome

After delivery 1 woman was observed with congestive cardiac failure, postpartum cardiomyopathy in 2 patients, and infective endocarditis in 4 cases. Whereas, 2 mothers died due to pulmonary embolism (n=1) and congestive cardiac failure (n=1). Out of 117 patients, 108 (92.30%) were discharged from the hospital without any complications (table 4).

Table 4: Post - delivery maternal outcomes

Maternal outcome	Number of patients (n)	Percentage (%)
Congestive cardiac failure	1	1.0
Post - partum cardiomyopathy	2	1.20
Infective endocarditis	4	3.41
Death	2	1.70
Discharged without complications	108	92.30
Total	117	100

Neonatal outcome

Among 117 patients, 12 patients were admitted for first - trimester miscarriage. In the remaining 105 cases, 7 patients (6.66%) were stillborn of which 4 (57.14%) were fresh

stillborn and 3 (42.85%) were macerated stillborn, and 98 (93.33%) were alive (table 5).

Table 5: Status at birth

Status at birth	Number of patients	Percentage
Live	98	93.33
Stillborn	7	6.66
Fresh stillborn	4	57.14
Macerated stillborn	3	42.85
Total	117	100

Birth weight

Most of the babies were born with birth weights between 2.5 to 3 kg (71.42%) followed by 21.42% of the babies with birth weights more than 3 kg and low birth weight was observed in 7.14% of the cases.

Apgar at birth and after 5 minutes

No significant difference was observed in the Apgar score at birth and after 5 min. At birth, 6.12% of babies showed Apgar score <7, and 93.87% of babies showed >7. Whereas, after 5 min 4.08% of neonates showed an Apgar score <7 and 95.91% showed >7.

Reasons for NICU admission

Among 98 babies born 39 (39.79%) required NICU admission. These babies were screened for heart disease and found negative for heart disease. However, the most common reason for NICU admission was meconium aspiration (43.58%) followed by prematurity (17.94%) and IUGR (17.94%).

4. Discussion

Pregnancy is associated with hemodynamic and cardiovascular changes that can lead to clinical deterioration in patients with cardiac disease. Various studies estimated that 0.3% to 3.5% of all pregnancies are complicated by heart disease. In the present study, the prevalence of cardiac disease among all pregnancies was 1.03% which is comparable to the study conducted by Bafna KK et al [9], Mahesh K et al [10], Nagamani G et al [11], and Williams A et al. [12] The incidence varies in developed and developing countries due to different geographical locations, seasons, and incidences of rheumatic fever varying between 0.2 - 3.6% in India, 1 - 3% in the USA, 0.5 - 1.8% in London, and 0.8% in South Africa. [13]

The mean age of the patient was 27.63±14.2 years, ranging from 18 to 41 years. Most of the patients were in the age group of 25 to 29 years (41.03%) followed by 30 to 34 years (21.37%) and 20 to 24 years (20.51%). Thus, 82.91% of cardiac patients were below 35 years of age. These findings were similar to the results of studies conducted by Sen M et al, [14] Chaudhary K et al, [15] Salam S et al, [16] and Bafna et al. [9]

In the present study, 82.90% of the patients belonged to term gestation, and 5.98% of patients experienced preterm labour. Whereas, first - trimester abortion occurred in 10.25%.1 woman with heart disease was referred to our hospital as post - dated. These findings were comparable with the study conducted by Khan DA et al which reported that the maximum number of patients (65.45%) had term delivery. [17]

Among 117 pregnant women, 27.35% of heart diseases were diagnosed during pregnancy and 72.65% of the patients were already diagnosed with heart disease before pregnancy. Out of 27.35% of the patients diagnosed in this pregnancy, 40% were diagnosed only they were evaluated for cardiac symptoms and 60% were diagnosed during the routine echocardiogram done in the antenatal patients. In the study conducted by Thamizhselvi N, 22.78% of the heart disease patients in the study group were diagnosed to have heart disease only during this pregnancy and 77.22% were diagnosed before this pregnancy. Regular antenatal check - up patients typically had favourable maternal and perinatal outcomes. [18]

After delivery, 1 woman observed congestive cardiac failure, post - partum cardiomyopathy in 2 cases, and infectious endocarditis in 4 cases. Two mothers died due to pulmonary embolism (1 case) and congestive cardiac failure (1 case). Out of 117 women, 108 (92.30%) were discharged from the hospital without complications. In the Chaudhary K et al study, [15] out of 65 pregnancies, cardiac complications were present in 40% of patients. Out of which 15 required ICU care. Maternal cardiac complications include 7.69% cases of PAH, 6.15% cases of CHF, 12.30% cases of pulmonary edema, 2 cases of peripartum cardiomyopathy (3.07%), arrhythmia in 7.69% (5 cases), 4.62% cases of maternal mortality also noted.4 cases of CHF had anemia and pulmonary edema also. All maternal mortalities are due to CHF. This is consistent with Pandey et al. [19]

Maternal cardiac disease was associated with an increased risk of neonatal complications. In cardiac mothers, there is an increased incidence of Low - birth weight babies [20 - 22]. Placental insufficiency usage of drugs like beta blockers is associated with increased incidence of IUGR/low birth weight babies. In the current study, 39 (39.79%) babies were admitted to NICU. Meconium aspiration (43.58%) and prematurity (17.94%) was the most common reason for NICU admission. Other neonatal complications were IUGR (17.94%), congenital anomalies (12.82%), and birth asphyxia (7.69%). In Chaudhary K et al study of 65 pregnant cases of heart disease, the live birth rate was 98%, and abnormal neonatal events were reported in 35.38% (23) pregnancies. A total of 27.69% of babies required NICU care, 10.76% of babies were IUGR, 18.46% of babies are premature, 4.62% of babies underwent birth asphyxia and 1.53% were stillborn. Low birth weight was noted in 29.23% of babies. [15] Prasanna et al showed in their study that 37% of babies are of low birth weight. The live birth rate was 97%, the perinatal mortality rate was 4%, IUGR was seen in 20% of cases and prematurity is seen in 12% of cases. [23] In Salam S et al study, 21 (27.8%) babies were born who weighed less than 2 kg 56 babies. Seventy - seven live births were observed in these women and 13 stillbirths. [16] Perinatal mortality in the present study was 5.98% (7/117). There was a decline in perinatal mortality and morbidity with good antenatal check - ups, correct diagnosis and treatment of associated conditions, institutional delivery, and good neonatal care. With improved antenatal care, adequate management of comorbidities, and increased institutional

deliveries there is a declining trend in perinatal morbidity and mortality. Early diagnosis, preconception counselling, health education, routine, and regular antenatal check - up, identifying and correcting the factors aggravating heart failure, regular cardiac follow - up, strict adherence to cardiac drugs, and institutional delivery may help in improving the outcome for both mother and the babies.

5. Conclusion

Management of the pregnant women with cardiac abnormalities should be multidisciplinary to enhance care for these patients. There is need for pre - pregnancy counselling, early diagnosis, and correction of cardiac lesions where indicated, close surveillance during pregnancy and a team approach comprising of obstetricians, cardiologists, anaesthetist, neonatologists and nursing personnel combined with patient education provides the best opportunity to continue pregnancy with a good maternal and perinatal outcome. It is mandatory to provide better health care facilities to rural and periphery areas for diagnosis and management and early referral in such pregnant to prevent morbidity and mortality.

References

[1] Klein LL, Galan HL. Cardiac disease in pregnancy. Obstetrics and Gynecology Clinics.2004 Jun 1; 31 (2): 429 - 59.
[2] Van Mook WN, Peeters L. Severe cardiac disease in pregnancy, part II: impact of congenital and acquired cardiac diseases during pregnancy. Current Opinion in Critical Care.2005 Oct 1; 11 (5): 435 - 48.
[3] Yasmeen NA, Aleem MA, Iqbal NA. The fetomaternaloutcome in patients with cardiac disease in pregnancy. Pak J Med Health Sci.2011 Oct; 5 (4): 748 - 51.
[4] Gei AF, Hankins GD. Cardiac disease and pregnancy. Obstetrics and gynecology clinics of North America.2001 Sep 1; 28 (3): 465 - 512.
[5] Mothers S. A report of the National Committee on Confidential Enquiries into maternal deaths in South Africa (1999− 2001) DOH.
[6] James AH, Jamison MG, Biswas MS, Brancazio LR, Swamy GK, Myers ER. Acute myocardial infarction in pregnancy: a United States population - based study. Circulation.2006 Mar 28; 113 (12): 1564 - 71.
[7] Stangl V, Baumann G, Stangl K. Pregnancy risks in cases of acquired heart disease. Zeitschrift für Kardiologie.2001 May; 90: IV16 - 29.
[8] Adam K. Pregnancy in women with cardiovascular diseases. Methodist DeBakey cardiovascular journal.2017 Oct; 13 (4): 209.
[9] Bafna KK, Nakum K, Vithal A. Fetomaternal outcome in pregnancy with cardiac disease. Congenital heart disease.; 10: 33 -
[10] Koregol M, Mahale N, Nayak R, Bhandary A. Maternal and perinatal outcomes of pregnancies complicated by cardiac disease. J Turkish - German Gynecol Assoc.2009 Mar 1; 10: 30 - 4.
[11] Nagamani G, Bhavani K, Isukapalli V, Lagudu S. Heart disease in pregnancy prospective study from southern India. Int J Current Med Appl Sci.2015 Mar; 6 (1): 8 - 12.
[12] Williams A, Child A, Rowntree J, Johnson P, Donnai P. Marfan's syndrome: successful pregnancy after aortic root and arch replacement. BJOG: an international journal of obstetrics and gynaecology.2002 Oct 1; 109 (10): 1187 - 8.
[13] Mohan A, Mohan U, Singla R, Mittal P, Pandey D, Bharti R. Feto–maternal outcome in pregnancy with Heart Disease: a tertiary care centre experience. MOJ Womens Health.2020; 9 (2): 59 - 62.
[14] Sen M, Bhattacharyya P, Chowdhury N. Pregnancy with heart disease - - fetomaternal outcome. Journal of Evolution of Medical and Dental Sciences.2014 Feb 3; 3 (5): 1178 - 84.
[15] Chaudhary K, Sen S. Fetomaternal outcomes in pregnancy with different cardiac disease at a tertiary care center in Udaipur. International Journal of Reproduction, Contraception, Obstetrics and Gynecology.2020 Oct 1; 9 (10): 3983 - 9.
[16] Salam S, Mushtaq S, Mohi - ud - Din K, Gul I, Ali A. Maternal and fetal outcome in pregnancy with heart disease in tertiary care hospital in India. International Journal of Reproduction, Contraception, Obstetrics and Gynecology.2017 Sep 1; 6 (9): 3947 - 52.
[17] Khan DA, Sharma N, Kapoor M, Duwarah SG, Ahanthem SS. The Spectrum of Heart Disease in Pregnancy and its Outcome in Patients Visiting a Tertiary Care Centre of Northeastern: A Prospective Study. Journal of Clinical & Diagnostic Research.2018 Jul 1; 12 (7).
[18] Thamizhselvi N. Study of maternal and perinatal Outcome in heart disease complicating Pregnancy in a Tertiary Institution (Doctoral dissertation, Madras Medical College, Chennai).2013.
[19] Pandey K, Verma K, Gupta S, Jahan U, Kirti N, Gupta P. Study of pregnancy outcome in women with cardiac disease: a retrospective analysis. International Journal of Reproduction, Contraception, Obstetrics and Gynecology.2016 Oct 1; 5 (10): 3537 - 42.
[20] Siu SC, Colman JM, Sorensen S, Smallhorn JF, Farine D, Amankwah KS, Spears JC, Sermer M. Adverse neonatal and cardiac outcomes are more common in pregnant women with cardiac disease. Circulation.2002 May 7; 105 (18): 2179 - 84.
[21] Siu SC, Sermer M, Colman JM, Alvarez AN, Mercier LA, Morton BC, Kells CM, Bergin ML, Kiess MC, Marcotte F, Taylor DA. Prospective multicenter study of pregnancy outcomes in women with heart disease. Circulation.2001 Jul 31; 104 (5): 515 - 21.
[22] Suri V, Sawhney H, Vasishta K, Renuka T, Grover A. Pregnancy following cardiac valve replacement surgery. International Journal of Gynecology & Obstetrics.1999 Mar 1; 64 (3): 239 - 46.
[23] Prasanna Kosuru ML, Aruna Kumari K. Clinical study of maternal and perinatal outcome in heart disease complicating pregnancy at tertiary referral center of Telangana State. Int J Gynaecol.2018; 8 (2): 46 - 54.