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Pregnancy with heart disease: Fetomaternal outcome: A retrospective analysis from a tertiary care teaching hospital in Northern India

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ABSTRACT

Background: Heart diseases are the most significant non-obstetrical causes of maternal deaths, accounting for up to 15% of all cases. The present retrospective analysis is an attempt to assess the spectrum and impact of cardiac diseases on pregnancy. **Aims and Objectives:** The aims of this study were to analyze the maternal and perinatal outcomes and spectrum of heart disease in pregnancy. **Materials and Methods:** The study was carried out in the Department of Obstetrics and Gynecology at PGIMS, Rohtak, where retrospective record of inpatient obstetrics registry of pregnant women with cardiac diseases was analyzed. Clinical information obtained from the patient's medical records including clinical presentation, laboratory investigations, 2-D echocardiography, maternal, and neonatal outcomes were noted. All pregnant women as well as postpartum patient with cardiac disease were included in the study. **Results:** A total of 62 pregnant women with heart diseases were hospitalized during the study period. Spectrum of heart disease among these women analyzed and we found that the 22 had rheumatic heart disease (RHD), 14 had congenital heart disease (CHD), and 14 had cardiomyopathies (CMP). LSCS was done for 24 and out of these, nine were elective LSCS while 15 were emergency LSCS. Vaginal deliveries were performed in 31 women. Twenty-eight women got shifted to intensive care units during course of treatment. Three intrauterine deaths were noted in our study. **Conclusion:** We have concluded from the present study and after reviewing the literature about spectrum of heart diseases in pregnancy, that the most common cardiac lesions complicating the pregnancy are RHD followed by CHD and CMP. Successful management of heart disease with pregnancy can be achieved by timely diagnosis and safe transfer of patient to the cardiomaternal tertiary care, where multidisciplinary teams are available.

Key words: Fetomaternal outcome; Cardiac; Pregnancy

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INTRODUCTION

Heart diseases are the most significant non-obstetrical causes of maternal deaths, accounting for up to 15% of all cases. In western countries, maternal cardiac disease complicates 1–3% of pregnancies. Heart disease in pregnancy is a high-risk condition with increased risk of maternal and fetal morbidity and mortality; hence, it mandates a multidisciplinary approach. Cardiac disease can affect the pregnancy adversely and physiological changes during pregnancy can worsen the cardiac illness. Health-care providers must understand how pregnancy affects cardiac disease and principles of obstetric management. The prevalence of cardiac diseases in pregnancy is on increase. This increase can be attributed to the advances in the modern medicine by help of which more and more women are reaching the child bearing age and has overcome the factors which would have previously preluded in these patients.[1] Due to the recent advances, women with heart disease can successfully conceive and maintain pregnancy.

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Hence, it is the need of the hour for medical professionals to act as a multidisciplinary team including gynecologist, anesthetist, physician, cardiologist, and neonatologist for improving the fetomaternal outcome of these patients.[2-6]

The present retrospective analysis is an attempt to assess the impact of cardiac diseases on pregnancy and understanding their indifferent presentations for the better alignment and understanding of cardiac diseases in pregnancy so that right step can be taken at the right time to improve maternal and fetal outcome.

Aims and objectives

The aims of this study were to analyze the maternal and perinatal outcomes and spectrum of heart disease in pregnancy.

MATERIALS AND METHODS

The study was carried out in the Department of Obstetrics and Gynecology at PGIMS, Rohtak, a tertiary care referral center for high-risk cases in northern India, where retrospective record of inpatient obstetrics registry of pregnant women with cardiac diseases, either previously diagnosed or developed during pregnancy from June 2020 to November 2021, was analyzed. Clinical information obtained from the patient's medical records included demographic profile, obstetric and menstrual history, clinical presentation and laboratory investigations, 2-D echocardiography, and maternal and neonatal outcomes was also be noted. All pregnant women as well as postpartum patient with cardiac disease were included in the study. Women with associated medical disorder such as diabetes, pulmonary disease, renal disease, or any other endocrinological disease were excluded from the study. Data collection was done using a structured detailed pro forma. The study was conducted after obtaining ethical approval from the Institutional Ethics Committee (IEC no BREC/21/116, 27.11.2021).

Statistical analysis

Descriptive statistics was used to analyze the continuous and categorical data and was presented in the form of mean, standard deviation, and percentage, while proportions was analyzed using Chi-square test.

RESULTS

During the study period (June 2020–November 2021), 23,756 women got admitted to labor ward of our obstetrics department. A total of 62 women with heart diseases were hospitalized during this period and out of these, seven women were – partum referred from other centers for further management and 55 women were antenatal. Treatment details of all these 62 women were taken from the hospital registry and analyzed. The age of these women were in the range of 19–34 years. Spectrum of heart disease among these women analyzed and we found that the 22 had rheumatic heart disease (RHD), 14 had congenital heart disease (CHD), 14 had cardiomyopathies (CMP), eight had corrected post-cardiac surgery status, one was of coronary artery disease (CAD), two were suffering from takayasu aortoarteritis, and one having left atrial myxoma (Table 1).

Out of 62 women, seven were postpartum referred from other centers for further management. LSCS was done for 24 and out of these, nine were elective LSCS while 15 were emergency LSCS. Vaginal deliveries were performed in 31 women which include two ventouse assisted and six instrument assisted vaginal deliveries (Table 2).

Twenty-eight women got shifted to intensive care units (ICU) during course of treatment. Out of total 62 women, four were deceased during treatment. Out of the four women whom could not be survived, two were suffering from aortoarteritis, one had TGA with large VSD, and one women had TOF. Total 16 neonates were shifted to neonatal ICU (NICU) and one neonate could not be saved during course of treatment. Three intrauterine deaths (IUD) were noted in our study (Table 3).

DISCUSSION

Cardiac disease in pregnancy is a leading contributor to maternal mortality, women with cardiac disease should receive prenatal counseling regarding both maternal and fetal risks before conceiving.[7] Health-care providers who care for pregnant women with cardiac conditions must understand the physiological changes of pregnancy and how these changes affect cardiac function, be able to determine the risk of a cardiac event during pregnancy and demonstrate knowledge of obstetric management principles.

In the present study, all the patients were in the age group of 19–34 years and most of them were primigravidae, this is found to be comparable with the studies by Salam et al., and Bangal et al.,[8,9] we have analyzed the spectrum of heart disease with pregnancy and found that the 35.48% (22 out of 62 patients) had RHD, 22.58% (14 out of 62 patients) had CHD, 22.58% (14 out of 62 patients) had CMP, eight (12.90%) had corrected post-cardiac surgery status, one (1.61%) was of CAD, two (3.22%) were suffering from takayasu aortoarteritis, and one (1.61%) having left atrial myxoma. Our study was found to be comparable with the study done by Salam et al.,[8] conducted on 90 patients having cardiac disease complicating the pregnancy, they had found that main cardiac lesion was RHD (56.6%) followed by CHD (13.3%); however, gap of percentage wise distribution of RHD and CHD was found

Table 1: Spectrum of heart diseases

Type of heart disease	Number of patients (%)	Subtype of heart disease	Number of patients
RHD	22 (35.48%)	Valve involved	
		Multivalvular (more than one valve)	7
		Mitral	13
		Aortic	2
		Tricuspid	0
		Pulmonary	0
CHD	14 (22.58%)	Type of CHD	
		Acyanotic CHD	
		Valvular (Pulmonary stenosis)	2
		ASD	7
		VSD	3
		Cyanotic CHD	
		TOF	1
		Any other (TGA with VSD)	1
CMP	14 (22.58%)	Type of CMP	
		PPCM	12
		HOCM	2
Corrected post cardiac surgery status	8 (12.90%)		08
CAD	1 (1.62%)		1
Miscellaneous	3 (4.83%)	Takayasu aortoarteritis	2
		Left atrial myxoma	1
Total number	62		62

RHD: Rheumatic heart disease, PPCM: Peripartum cardiomyopathy HOCM: Hypertrophic obstructive cardiomyopathy, CMP: Cardiomyopathies, CAD: Coronary artery disease, CHD: Congenital heart disease

Table 2: Mode of delivery

LSCS		Vaginal delivery			Postpartum status
Elective	Emergency	Normal	Ventouse	Instrumental	
09	15	23	02	06	07

Table 3: Perinatal outcomes

Variables	Number of patients
Maternal ICU admissions	28
Neonatal NICU admissions	16
Maternal deaths	4
Neonatal death	01
IUD	03

ICU: Intensive care unit, NICU: Neonatal intensive care unit, IUD: Intrauterine deaths

to be less in our study. In our study, we have found that the main valve involvement in RHD patients was mitral valve in 20.96% patients (13 patients had mitral valve disease) followed by multiple valve involvement 11.29% patients (7 patients had more than one valve pathology) and these finding are not comparable with the results of study done by Salam et al.; in their study, they concluded that among the diagnosed RHD, mitral stenosis was seen in 23.3% patients, and multiple cardiac lesions were seen in 24.4% patients.

We have compared the spectrum of heart disease in our study with retrospective study conducted by Farhan and Yaseen at cardio maternal unit Baghdad heart center, over a period of 4 years on 252 pregnant women presented to cardiomaternal unit, they had observed that the most common heart lesion during pregnancy was valvular heart disease in 34.1%, followed by CHD 30.5%, cardiomyopathy 29.8%, pulmonary hypertension 4%, and ischemic heart disease 1.6% patients. Our results are comparable to the results of study done by Farhan and Yaseen.

In our study, we observed that seven out of 62 patients were postpartum referred from other centers for further management. LSCS was done in 24 patients and out of these, nine were elective LSCS, while 15 were emergency LSCS. Vaginal deliveries were performed in 31 women which include two ventouse assisted and six instrument assisted vaginal deliveries. Observation of our study is found to comparable with the some other studies[10,11] and study done by Salam et al.; in their study, they had found LSCS in 36.7% cases, normal vaginal deliveries in 35.6% patients, and 7% had assisted instrumental vaginal deliveries.

In the present study, we found that 28 women got shifted to ICU during course of treatment and four patients could not be survived during treatment. Out of the four women whom could not be survived, two were suffering from aortoarteritis, one had TGA with large VSD, and one women had TOF. Total 16 neonates were shifted to NICU and one neonate could not be saved during course of treatment. Three IUDs were noted in our study. The

hemodynamic changes during pregnancy in the background of maternal cardiac disease may eventually leads to adverse consequences to maternal and fetal outcome. There is 50% increase in plasma volume and increased risk of thrombosis of thromboembolism during pregnancy.[12,13] It has been has been reported by the European registry of pregnancy and cardiac disease that there are significant adverse perinatal outcomes for both mother and baby in women with cardiac disease with maternal mortality rate of 1% which is more than 100 times the rate for women without heart disease.[14]

Limitations of the study

Limitations of the study in our opinion are that the sample size and duration of study were less.

CONCLUSION

We have concluded from the present study and after reviewing the literature about spectrum of heart diseases in pregnancy, that the most common cardiac lesions complicating the pregnancy are RHD followed by CHD and CMP. Mitral valve is most commonly involved valvular lesion followed by multiple valvular lesions. Successful management of heart disease with pregnancy can be achieved by timely diagnosis and safe transfer of patient to the cardiomaternal tertiary care, where multidisciplinary teams including gynecologist, neonatologist, and cardiologist with back of intensive care team are available.

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Authors' Contributions:
MV- Concept and design of the study; **AK-** Concept and drafting of manuscript; **SN-** Design of study and preparation of manuscript; **MC-** Concept of study and revision of manuscript; **PD-** Supervision of data collection and review of manuscript; **SRS-** Data collection and statistical analysis.

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