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CARDIAC DISEASE AND PREGNANCY, MANAGEMENT IN TERTIARY CARE HOSPITAL : A CASE SERIES OF 5 PATIENTS

Obstetrics & Gynaecology

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ABSTRACT

Pregnancy-related cardiac disorders cover a wide range of diseases. Numerous cardiac conditions that occur during pregnancy are being studied, and many others that are yet unclear need for additional research. Our study consists of a case series of five individuals who were hospitalised to the obstetrics and gynaecology department because they became pregnant while having heart pathology. Along with a discussion and literature analysis, we present our outcomes. A multidisciplinary strategy can successfully treat the majority of cases of cardiac illness in pregnancy, which is a substantial cause of morbidity and mortality.

KEYWORDS

Cardiac disease, Pregnancy outcome, Multidisciplinary approach

INTRODUCTION:

1% to 3% of pregnancies are complicated by cardiovascular disease, which also causes 10%–15% of maternal deaths[1]. Cardiac illness negatively impacts pregnancy, and due to physiological changes during pregnancy, heart function is significantly reduced.[2] In South Asia, a systemic review and meta analysis of the frequency of heart disease during pregnancy indicated that 70.25% of cases were due to rheumatic heart disease (RHD) and 18.10% were due to congenital HD[3]. Heart disease increases the risk for both the mother and the fetus because pregnancy is a protracted state of physiological stress. Due to its high occurrence, efforts must be made to identify and closely monitor the condition before conception, and decisions should be based on the patient's clinical circumstances.

Case Series:

In this work we report a series of 5 cases of pregnant women who had history of cardiopathies, or in whom a diagnosis of heart diseases has been made during pregnancy. Patients data collected from the Gynaecology and Obstetrics department in period of 1 year May 2022-June 2023 in R G Kar Medical College and Hospital Kolkata, India. All cases of our series had different type of cardiac problem and they were managed in multidisciplinary approach alone with cardiology, anaesthesiology and neonatology in our hospital. All the five patient had successful pregnancy outcome and here is brief discussion about each cases.

Case 1:

Mrs. A was a 21 year old patient in her first pregnancy at 33 weeks was admitted with severe respiratory distress and b/l pedal edema, she was a known case of RHD diagnosed in childhood and on irregular medication during pregnancy. An echocardiogram showed mitral valve area of 0.7 cm^2 with PHT 310 msec, mild MR, mild AR, moderate PAH, LA thrombus with ejection fraction (EF) 62%. Her Hb was 11.5gm% and pro BNP a 7586 pg/ml. A multidisciplinary team (MDT) was formed comprising a physician, cardiothoracic surgeon, obstetrician, neonatologist and anaesthetist. She was kept on tab metoprolol 50 mg for persistent tachycardia and prophylactic UFH 5000 IU 8 hourly, tab Pentid (penicillin) 400 bdpc. Patient symptomatically improved and her functional status was NYHA class II. The estimated fetal weight (EFW) was 2100 gm with normal middle cerebral artery (MCA) and umbilical artery (UA) flow. She developed PPROM on 7th day of admission, she was given prophylactic antibiotic and UFH stopped, steroid course was completed. Patient went in active labour after 36 hrs and delivered vaginally a male baby of 2.2 kg. Post placental IUD was given. Immediate post delivery period was normal. She was discharged on day 7 on warfarin and was stable when reviewed by both physician and obstetrician on 3 weeks postpartum.

Case 2:

Mrs. B a 23 year old presented at 38 weeks, a primigravida for safe confinement. She was known to have double chamber right ventricle with severe RVOT obstruction, underwent repair with annular preservation on 30/03/2016. On post operative day one(31/03/16) she had complete heart block and underwent permanent pacemaker (VVIR). Cardiological opinion taken, echo data showed post ICR-DCRV, post permanent pacemaker(PPM), LVEF-60%, mild MR. Her Hb was 12.3 and INR-0.92, during pregnancy she was on tab furosemide 20 mg od. USG fetoplacental profile was normal. After initial stabilisation she underwent elective cesarean section with epidural anasthesia. She delivered a healthy baby girl of 2.6kg and her immediate postoperative period was uneventful. IUD was inserted during cesarean section. She was discharged on 10th day and was stable when reviewed after 4 weeks.

Case 3:

Mrs. C a 30 year old primigravida presented at 37 weeks 5 days gestation for safe confinement. She was known to have RHD with severe MS with atrial flutter underwent BMV on 2010. At beginning of pregnancy she was asymptomatic (NYHA class I) and INR was within therapeutic range. At her 20 weeks, she developed respiratory distress and echo data showed mitral vale leaflet thickened with diastolic doming, grade II MR, AR, TR, LVEF-60%, grade I diastolic dysfunction. She underwent balloon mitral valvuplasty again on 2/8/22. She was kept on tab metoprolol 100 mg od, tab digoxin 0.25 half tab od, tab warfarin 2.5 1 tab od, tab pentid 200 bd and torsemide 5mg od. She was switched from warfarin to LMWH at 36 weeks gestation. At 37 weeks echocardiogram showed- post BMV status, mitral restenosis, MVA of 1.2 cm^2 , grade II MR, moderate PAH, reduced diastolic compliance. She underwent an elective labour induction in order to time the necessary lapse period between the final dose of LMWH and the epidural operation. After only a few hours of induction, she experienced fetal bradycardia and required an emergency cesarean delivery under general anesthesia because the epidural catheter that had been timed for established labor had not yet been placed. A live baby boy of 2130 gm was delivered. Immediate post operative period was uneventful. She was discharged from our institution on 7th post operative day in stable condition on warfarin and was asked to use barrier contraceptives. She was in good health when reviewed by physician after 3 weeks.

Case 4:

Mrs. D a 23 year old 2nd gravida with previous one cesarean section 7 years back, at 40 weeks gestation was referred to our institution with shortness of breadth(SOB) with echo data of global hypokinesia, mildly reduced left ventricular systolic function, LVEF-45-50%.She was not a known case of cardiac disease, she was diagnosed with that condition when she developed SOB at 36 weeks gestation with NYHA class II functional status. She was on tab metoprolol 12.5 mg od and tab

furosemide 20mg od for last 1 month. After initial stabilisation and consultation with cardiologist she underwent elective cesarean section due to scar tenderness and delivered a healthy girl baby of 2215gm. Scar dehiscence was significant finding during CS, tubal ligation done during CS. Post operative recovery was uneventful with close monitoring in HDU. Day 2 of post operative day she was shifted to general ward and discharged on 10th day in stable condition. She got admitted with SOB in cardiology department after 3 weeks postpartum and was diagnosed with cardiomyopathy. She was kept in cardiology ICU for 2 weeks and then discharged in stable condition. She was in good health when reviewed by physician and obstetrician after 4 weeks.

Case 5:

Last but not the least case of our series is pregnancy with Eisenmenger syndrome with successful outcome. 27 years old primigravida women came to antenatal OPD R. G. Kar Medical College at 10 weeks of gestation. She had h/o exertional dyspnoea since childhood. She was diagnosed with congenital heart disease (ventricular septal defect) at 12 years of age. No corrective surgery was performed at that time. Despite the life-threatening risk to the mother, she opted to continue the pregnancy. She was known case of T2DM kept on metformin and insulin lispro. A cardiology opinion was sought. Baseline echocardiography and ECG were done and she was kept on medical treatment with sildenafil (20 mg) and bosentan (62.5 mg). Due to polycythaemia, phlebotomy was performed at the 25th week of gestation. She was now admitted at 34 weeks gestation with mild dyspnoea. On investigation, haemoglobin was 14.1 g/dl and haematocrit were 42%. Complete blood count and urine examinations were found to be normal. ECG showed features of right axis deviation and echocardiography reported large perimembranous VSD (17 mm) with severe pulmonary artery hypertension (34 mmHg), tricuspid regurgitation and bidirectional shunt with ejection fraction 62% . She was managed conservatively; a cardiology consultation was obtained after which she was put on complete bed rest, restricted physical activity, oxygen therapy and anxiolytics. General examination revealed oedema, clubbing and peripheral cyanosis. She underwent elective cesarean section with IUD insertion after steroid completion and delivered a girl baby of 1600gm. Immediate post operative period she was kept in ICU for intensive monitoring. Her baby was admitted to the neonatal ICU for 11 days given low birth weight. The baby was discharged on day 12, with a weight of 1985 g. Both the mother and the baby were healthy on discharge. She was advised to barrier contraceptives and to follow up in the cardiology outpatient department.

DISCUSSION:

Pregnancy-related alterations in normal physiology might exacerbate underlying heart conditions, increasing morbidity and mortality. The stress on the heart is increased by these physiologic changes, which can become severe if function is already damaged. These changes include an increase in heart rate, plasma volume, and stroke volume.

Gradually, the intravascular volume rises during pregnancy, which could be dangerous for women who have valvular diseases like mitral or aortic stenosis. There can be a failure to maintain a sufficient cardiac output in these circumstances. Even in previously asymptomatic patients, the increased intravascular volume can cause arrhythmias, pulmonary edema, and a further increase in blood pressure.[4] Due to this, only minimal amounts of intravenous fluid administration should be used. An elevated maternal heart rate and a shorter left ventricular filling time, which reduce cardiac output, exacerbate the risk of cardiac compromise. The most accurate indicator of cardiac impairment is the level of stenosis.[5,6]

Depending on the kind of heart disease, the normal decrease in systemic vascular resistance (SVR) during pregnancy may result in a variety of illnesses.In the event of a cardiac shunt or in a lesion with constant pressure to maintain cardiac output, it may cause decompensation.[7] Eisenmenger syndrome may develop in a patient with a left to right shunt as a result of a decline in SVR.[7]

Patients with artificial heart valves are more susceptible to venous thromboembolism due to the hyper coagulable state of pregnancy. Therefore, during pregnancy, low molecular weight heparin or warfarin must be used as a therapeutic anticoagulant. Anticoagulation reduces this risk by 75%.[8]

Cardiomyopathy during pregnancy is associated with significant morbidity and mortality. Patient with severe left ventricular dysfunction during index pregnancy or persistent dysfunction are at increased risk of recurrent or progressive heart failure and death in

Table 1: Case Summary Table

SL. No	Age (Years)	Parity & POG	Known H/O cardiac disease	Cardiac disease	Indication for admission	Labour at admission	Echo data	NYHA class & WHO class	Spontaneous labour	Mode of delivery
1	21	P 0+1 33 weeks	YES (RHD)	Valvulopathy, severe MS	Respiratory distress	No	Severe MS, PAH, LA thrombus, MV-.7cm2,EF-62%	Class-II, WHO-1	Yes	Vaginal
2	23	P 0+0 38 weeks	Yes (RVOT obstruction)	Double chamber Rt. Ventricle with severe RVOT obstruction, Permanent Pacemaker in 2016	Safe confinement	No	Post ICR-DCRV, Post PPM, Mild MR, EF-60%	NYHA-II, WHO-2	No	Elective CS
3	30	P 0+0 37w5d	Yes (RHD)	Severe MS with atrial flutter, BMV in 2010	Safe confinement	No	Post BMV status, MVA-1.2 cm2	NYHA-II, WHO-2	No	Emergency CS
4	28	P 1+0(cs) 40 weeks	No (Global hypokinesia)	Left ventricular defect	SOB	No	Global Hypokinesia, mildly reduced LV systolic function, LVEF-45-50%	NYHA-II, WHO-2 or 3	No	Elective CS
5	27	P 0+0 34 weeks	Yes(VSD)	VSD with severe PAH	SOB	No	VSD with severe PAH (34 mm Hg), TR and bidirectional shunt	NYHA-III, WHO-4	Yes	Elective CS

subsequent pregnancy.[9,10,11] Persistent cardiac dysfunction seen in 50-80% of patients.[12,13,14] although those with normal cardiac function 6-12 month postpartum fare better, they are still risk for heart failure and a recurrent decrease in ejection fraction that may not recover after another pregnancy.[10,15]

The 7-8% of case of pregnancy with congenital cardiac disease develop complications.[16] Ostium secundum atrial septal defect is one of the most common congenital heart defects seen in pregnancy and pregnancy is well tolerated and uncomplicated, especially in patient with normal systolic function shown by echocardiography and NYHA functional class I and II.[17,18] VSD is other common congenital heart disease seen in pregnancy.[18] Small defects usually either close spontaneously or are corrected in childhood. Maternal morbidity is related to the size of the VSD and the presence of pulmonary hypertension.

It's vital to pay attention to symptoms and indicators that are noticed in subsequent instances since physiological changes during pregnancy may generate symptoms that are similar to those seen in heart disease.

Prematurity, small for gestational age, and death are all considered to be neonatal problems. It is anticipated that 2% of pregnant women with heart disease may experience the latter.[19]

The NYHA classification is one of the most crucial tools for assessing risk when evaluating the likelihood of problems in pregnant women. Increased risk is related to higher NYHA categorization.[20] There are many different score systems that have been developed to estimate risk, but the modified WHO score is the best predictor of pregnancy risk currently available.[21,22,23]

An understanding of the principles of and indications for bacterial endocarditis antibiotic prophylaxis in pregnant patient is important. American Heart Association (AHA) suggests that the risk of adverse events related to antibiotic prophylaxis exceeds the benefit. The AHA therefore does not recommend antibiotic use solely for the purpose of endocarditis prophylaxis.[24]

When there is a high risk pregnancy, birth, and postpartum status, a treatment strategy is crucial. A multidisciplinary team approach should be used, with a cardiologist, anesthesiologist, neonatologist, and gynecologist all involved.

Formulating an effective contraception plan can be challenging but is essential because of potential maternal and fetal risk associated with an unintended pregnancy. The potential side effects and complications of various contraceptives methods must be considered in relation to unique problems associated with specific cardiac conditions. The WHO provides a framework to aid in choosing appropriate and effective contraceptive method based on known risks and contraindications.[25]

CONCLUSION:

Since heart conditions are the most frequent non-obstetric cause of maternal and fetal mortality and morbidity, pregnancy can exacerbate them. As a result, preconception counselling and heart function testing are advised for women who have been diagnosed with cardiovascular disease. A MDT should take care of those who wanted to become pregnant or who arrived after conception, with a focus on diagnosing and preventing the causes of decompensation and fetal anomaly/loss throughout pregnancy and the puerperium. What we've learned is that maternal mortality can be prevented by adhering to guidelines and protocols as well as giving mothers the right care and attention through a multidisciplinary team approach.

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