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Case Report

Pregnancy with Bidirectional Dominant Left-To-Right Shunt due to Ventricular Septal Defect and Large Secundum Atrial Septal Defect with Left-To-Right Shunt: A Case Report

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ABSTRACT

Introduction: Congenital heart disease (CHD) is the most common birth defect in humans, affecting approximately 0.8% of all live births. The spectrum of defects is broad, ranging from complex defects that lead to severe disability and death in infancy, to mild defects that may only be discovered later in asymptomatic adults.

Case Presentation: This case report discusses a 21-year-old female in her second pregnancy was diagnosed with complex congenital heart disease after presenting with shortness of breath. Pulmonary hypertension was established by echocardiography. The woman did not obtain proper therapy since she was not aware of her cardiac problem during her pregnancy. There were no fetal abnormalities found during prenatal exams. At 38 weeks gestation, an IUD-assisted cesarean surgery was scheduled. While a cesarean section is performed on individuals with certain problems, the majority of CHD cases may be successfully delivered vaginally. Another crucial factor to take into account is the choice of postpartum contraception.

Conclusion: A personalized strategy is needed to manage congenital heart disease throughout pregnancy. This includes risk education, careful observation, and modification of interventions to guarantee the best possible results for both mother and child.

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INTRODUCTION

The most prevalent birth defect and the primary cause of infant death is congenital heart disease (CHD) [1]. With the exception of bicuspid aortic valve and patent foramen ovale, recent estimates place the frequency of congenital heart disease at 7–10 per 1000 live births, with 3 per 1000 babies suffering from moderate to severe forms [2–4]. The development of imaging and diagnostic methods in recent years has enhanced the detection and characterization of several minor abnormalities, and advancements in medical and surgical treatment have resulted in significant improvements in the survival and quality of life of patients with more severe disorders [5].

During pregnancy, fluid retention can lead to issues in previously undiagnosed cardiovascular systems, as well as the emergence of new diseases. Globally, approximately 1-4% of pregnancies experience complications related to cardiovascular diseases, with prevalence increasing to 10% if risk factors such as hypertension are present [6,7]. The capacity of a pregnant woman with congenital heart disease's circulatory system to adjust to the physiological changes

of pregnancy determines her risk of experiencing unfavorable cardiovascular events, including pulmonary edema, stroke, overt heart failure, symptomatic arrhythmia, or death. Depending on their anatomical characteristics, prior surgeries, and present hemodynamic state, various congenital disorders carry various risks [8].

Premature birth, cerebral hemorrhage, fetal death, and intrauterine growth restriction are more common in fetuses whose mothers have congenital heart disease. Any other obstetric risk factors increase this risk, which is most in women with cyanosis, poor functional class, and left heart blockage to flow. Additionally, the chance that their fetus may have structural heart abnormalities ranges from around 3% to 12%, whereas the background risk for the general population is 0.8% [9]. This case report aims to explore the challenges in managing a pregnant patient with CHD, highlighting the importance of an individualized approach to clinical management and providing evidence-based recommendations to support medical decision-making in similar cases.

CASE PRESENTATION

A 21-year-old lady with gravida 2 para 0 abortus 1 who was 37–38 weeks pregnant was referred from the local hospital to the obstetric polyclinic after complaining of dyspnea during prenatal care. The patient denies having ever been diagnosed with congenital heart disease or experiencing dyspnea. Congenital cardiac disease also affects her mother. A previous hospital's thorax X-ray revealed cardiomegaly. During the physical examination, no clubbing finger nor cyanosis was seen. After consulting with the cardiac department, the patient underwent echocardiography. Echocardiogram results showed VSD bidirectional, Left-to-right dominant shunt; large ASD secundum left-to-right shunt, and mild to moderate tricuspid regurgitation with a high probability of PH (EF 62-65%). The Result of echocardiography is shown in Fig.1.

Fetomaternal conferences that focus on postpartum care, anesthetic techniques, delivery procedures, and contraception planning are carried out. With a good survival rate and an expected fetal weight of 2400 grams, the Sectio cesarian delivery procedure was selected for this patient. Various anesthetic approaches can be employed with postoperative ICU backup. As postpartum contraception, IUDs are utilized. After giving birth, the cardiology department recommends a right heart catheterization (RHC) and a transesophageal echocardiography (TEE).

Two days following the fetomaternal conference, surgery was conducted under subarachnoid block anesthesia. A newborn girl weighing 2650 grams was born with an Apgar score of 6–8. Intraoperative IUD insertion was performed. The patient proceeded to the intensive care unit after surgery. Seven days after surgery, the patient was discharged. The patient has already been called in for TEE and RHC by the cardiology department. However, due to the patient's family's lack of support, the patient declined the evaluation and any further action. A healthy mother and child were observed during home visits 40 days Postpartum.

DISCUSSION

In this case, the patient has no history of shortness of breath prepartum and never been diagnosed with CHD. The echocardiogram results revealed VSD bidirectional, left-to-right dominant shunt, significant ASD secundum left-to-right shunt, and mild to moderate tricuspid regurgitation. One of the most frequent congenital cardiac abnormalities in expectant mothers is ASD. Although the majority of patients do not exhibit symptoms prior to pregnancy, persistent left-to-right shunts can result in atria enlargement and right ventricular volume overload, which can be made worse by pregnancy-related volume retention. VSD is frequently seen as an isolated illness. Major defects are often addressed in infancy and typically result in considerable left ventricular (LV) volume stress and heart failure early in adulthood. Consequently, small anomalies make up the majority of uncorrected abnormalities found in the adult population [5,10].

In the present case, the patient's congenital heart condition was identified only after she started having dyspnea in the third trimester of her pregnancy. Following a referral to a tertiary hospital for further care, the echocardiography findings confirmed the patient's cardiac condition. Although a cardiovascular evaluation for congenital heart disease (CHD) should ideally be done before to pregnancy, in cases of unintended pregnancies, the test is modified to reduce the danger to the mother and fetus. Transthoracic echocardiography and electrocardiograms are the primary techniques used to evaluate the anatomy and function of the heart. After the first trimester, MRI can be used to assess vascular architecture; however, gadolinium should not be employed. To reduce radiation exposure, cardiac catheterization and CT scans are only carried out when absolutely required [11–13].

The most frequent type of atrial septal defect, ASD Secundum, is usually well tolerated during pregnancy provided pulmonary hypertension is not present. Cardiovascular problems are rare in people with ASD (1.3%). Atrioventricular septal abnormalities, on the other hand, are more likely to cause pregnancy-related morbidity [6]. The most common form of VSD is

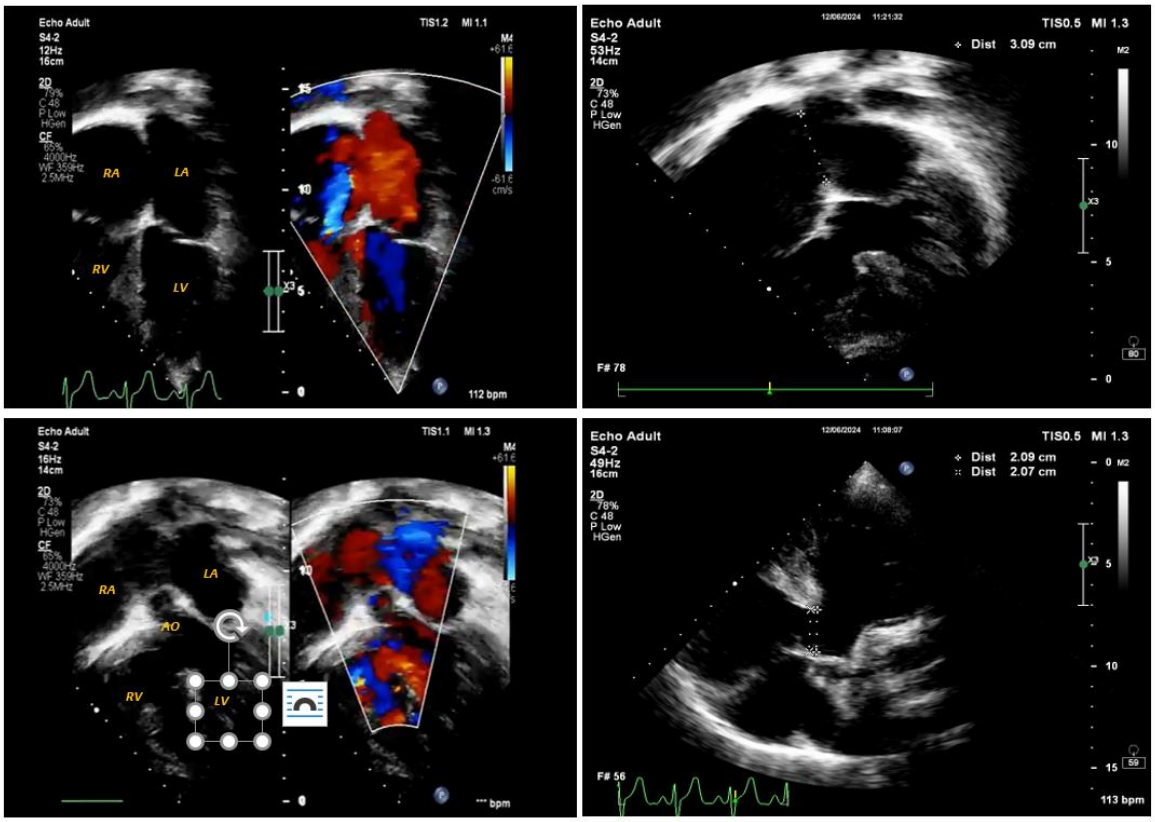


Fig.1. A. Echocardiography showing ASD left to right shunt; B. The size of ASD approximately 3 cm; C. Echocardiography showing VSD bidirectional, Left-to-right dominant shunt; D. The size of VSD approximately 2 cm.

perimembranosa VSD. While big, non-restrictive VSDs can result in pulmonary hypertension and pose a serious risk during pregnancy, small, restrictive VSDs are low risk. Increased cardiac output, pulmonary hypertension, hypercoagulability, or right-to-left blood shunting that exacerbates hypoxia can all lead to right ventricular heart failure. Myocardial ischemia risk can be raised by arrhythmias like tachycardia. During and after labor, changes in blood pressure and volume can increase the load on the right ventricle, which if left untreated, can lead to its failure [6].

Maternal cardiovascular alterations during pregnancy are substantial and include a forty percent increase in blood volume, a thirty percent drop in peripheral vascular resistance, and a ten to twenty percent rise in heart rate. Due to uterine contractions and catacholamin responses, these alterations raise cardiac output (CO) by 25–40% during pregnancy and by 50% during labor. CO quickly drops after birth, but before six months, the hemodynamic alterations fully revert to normal. Furthermore, pregnancy raises the risk of thromboembolic complications (TECs), particularly in women with congenital heart disease (CHD), due to an increase in the thrombotic propensity. Women having a history of heart disease are more likely to experience difficulties as a result of these changes [14].

While sectio caesarean (CS) is used for a number of obstetric reasons or serious cardiac diseases such severe pulmonary hypertension or aortic pathology, vaginal birth is usually safe for people with CHD [15]. A multidisciplinary team (MDT) should arrange the birth between weeks 20 and 32 of pregnancy, and the best option for reducing cardiovascular stress is epidural anesthetic. Blood pressure, heart rate, oxygen saturation, and fluid balance must all be closely monitored throughout childbirth in order to prevent problems like heart failure or pulmonary edema. A transient volume excess may be brought on by the placenta's automatic blood transfusion after birth. To rescue the mother and unborn child in situations of cardiac arrest that occur after 24 weeks of pregnancy, a peri-mortem cardioscopy should be carried out within 4 minutes [10,16].

Active treatment of the third stage of labor is advised to lower the risk of postpartum hemorrhage, as the postpartum period is when venous thromboembolism (VTE) is most likely to develop. Abdominal termination, or sectio caecarea, is performed on this patient because to the moderate likelihood of elevated

pulmonary artery pressure following the acquisition of ASD and VSD. The procedure is performed between weeks 38 and 39 [16,17].

Breastfeeding is recommended for women with CHD although there is a small risk of bacteremia associated with mastitis. However, it is not advised when heart failure is present since it may increase the strain on the heart. The following medications are thought to be safe to take while nursing: metoprolol, nadolol (beta blocker), enalapril, captopril (ACE inhibitor), amlodipine (and most calcium channels), furosemide, and warfarin. Six to twelve weeks following birth, women with complicated congenital heart disease should be monitored concurrently by their obstetrician and cardiologist [16].

The combination oral contraceptive pill (OCP), which includes both estrogen and progesterone, increases the risk of VTE and has been shown to raise blood pressure, thus it is not indicated for people with pre-existing heart disease or hypertension. Patients with congenital heart disease (CHD) can safely use progestin-only tablets, particularly large dosages (Desogestrel 75 mg), which are preferable since they prevent ovulation. IUDs, or intrauterine devices based on levonorgestrel (LNG), are among the safest and most effective long-term contraceptive techniques. However, IUD insertion may need to be done in a hospital, particularly for people with Fontan and Eisenmenger syndromes, as it may provoke a vasovagal response. Despite their unreliability, barrier contraception protects against STDs. An LNG IUD in conjunction with barrier contraception is thought to be the best option. IUDs made of copper, LNG, or ulipristal acetate (UPA) are safe for use as emergency contraception and do not raise the risk of thrombosis.[18,19,20] Our patients decide to utilize postpartum IUDs and breastfeed exclusively based on the information above.

Mostly due to physiological changes and hypercoagulability, pregnant women with congenital heart disease (CHD) are at significant risk for both the mother and the fetus. Pre-conception counseling is crucial and encompasses topics such as lifestyle changes, contraceptive alternatives, and a possible lower chance of congenital heart disease. A multidisciplinary team ought to provide pregnancy care, with high-risk women receiving closer monitoring. It is crucial to examine and change any dangerous pregnant medicines during the initial consultation. Monitoring the mother's heart status and paying attention to potential problems are also part of postpartum care.

Health follow-up was provided, along with instruction for future treatment and activity limitations. The patient was not permitted to work or engage in physically demanding activities. Patient awareness and information regarding current illnesses are lacking. Before discharged, the patient is counseled by a cardiologist regarding the TEE examination plan and the possible closure of the heart valve defect. The patient was given oral therapy Sildenafil to prevent pulmonary hypertension and was scheduled for control at the cardiac polyclinic and postpartum polyclinic seven days after discharge from the hospital. However, the patient did not attend the control schedule, and although two home visits had been made, the patient still refused to continue treatment, even though the health center and community leaders were willing to help take the patient to the hospital.

CONCLUSION

Multidisciplinary management is necessary for pregnant women with complex congenital cardiac disease in order to reduce risks both during and after delivery. To lower the risk of problems, elective deliveries in individuals with unstable cardiac conditions should be planned carefully and closely monitored. Although vaginal delivery is regarded safe in the majority of cases of CHD, cesarean surgery may be necessary in situations of CHD with difficulties.

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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