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Case Report

Fatal postpartum heart failure in a woman with undiagnosed mitral stenosis: A call for enhanced antenatal cardiac screening

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Abstract

Pregnancy with cardiac disease is a high-risk condition with potential for serious maternal and fetal complications. The physiological changes during pregnancy, such as the increase in blood volume, cardiac output, and heart rate, can exacerbate the underlying cardiac condition, increasing the risk of heart failure, pulmonary edema, arrhythmias, and other adverse events. Because of these physiological changes and when patients are asymptomatic clinical diagnosis may be missed. Due to missing and delay in diagnosis in antenatal period we can not provide proper management during labor and postnatally, potentially leading to devastating consequences for both the mother and the fetus. This case report describes a 34-year-old G2P1L1 with undiagnosed heart disease like mitral stenosis who presented to the hospital with preterm labor, intrauterine growth restriction (IUGR), and oligohydramnios. Her pregnancy was not registered in our hospital but she was receiving antenatal care in PHC. She delivered a preterm male neonate via spontaneous vaginal delivery. However, shortly after delivery, she became breathless and was shifted to ICU. On 2D ECHO examination she was diagnosed with severe mitral stenosis, moderate mitral regurgitation, severe pulmonary arterial hypertension, and other valvular abnormalities. Despite resuscitative efforts, the patient could not be revived. In this case in spite of having many severe valvular lesions, the patient was totally asymptomatic till delivery and past medical history was also not significant so diagnosis was missed and patient landed up in severe cardiac complications. So this tragically highlights the critical need for regular antenatal care and routine 2D ECHO examination during first visit or any time during the antenatal period to facilitate the early detection and management of cardiac conditions in pregnancy. A multidisciplinary approach involving cardiologists and obstetricians is vital for improving maternal and fetal outcomes in such high-risk pregnancies.

Keywords: Heart disease, Mitral valve stenosis, Heart failure, Pregnancy complications and maternal mortality.

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1. Introduction

Cardiovascular disease (CVD) during pregnancy remains one of the leading causes of maternal mortality and morbidity worldwide, posing significant challenges for obstetric care providers.¹ Pregnancy induces substantial physiological changes in the cardiovascular system, including increased blood volume, cardiac output, and heart rate, coupled with a decrease in systemic vascular resistance. While these adaptations are essential for maintaining maternal and fetal well-being, they can mask pre-existing heart conditions or exacerbate latent cardiovascular diseases, potentially leading to severe complications such as heart failure (HF).² During pregnancy, many of the normal cardiac sounds are modified.

These include: (1) an exaggerated splitting of the first heart sound and increased loudness of both components, (2) no definite changes in the aortic and pulmonary elements of the second sound, and (3) a loud, easily heard third sound (Cutforth, 1966). In most gravidas, a systolic murmur that was intensified during inspiration in some or expiration. Less often a soft diastolic murmur can be noted transiently, and continuous murmurs arising from the breast vasculature.³

Diagnosing heart disease during pregnancy is often challenging, as common symptoms like fatigue, breathlessness, and lower extremity edema can overlap with

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normal pregnancy-related physiological changes. However, the presence of additional symptoms, such as persistent orthopnea, paroxysmal nocturnal dyspnea, or chest pain, should raise concerns and prompt detailed cardiovascular evaluation. Diagnostic tools, including echocardiography and biomarkers like natriuretic peptides, are indispensable in differentiating pathological conditions from normal physiological adaptations.²

Management of heart disease during pregnancy involves a multidisciplinary approach tailored to the type and severity of the condition. While some standard medications, such as ACE inhibitors and certain anticoagulants, are contraindicated during pregnancy, other options like beta-blockers and diuretics may be used cautiously under expert guidance.⁴ Severe cases may necessitate advanced therapies, including mechanical circulatory support or early delivery to prevent further deterioration.⁵

The case we present aligns with the critical theme of this special issue: the intersection of pregnancy and heart failure. It's a stark reminder of the potential for undiagnosed heart disease to manifest with severe complications during pregnancy and postpartum. The lack of prenatal care in this case likely contributed to the delayed diagnosis of a serious underlying condition, emphasizing the need for increased awareness and improved healthcare access for women of childbearing age.

2. Case Report

A 34-year-old woman, gravida 2, para 1, living 1 (G2P1L1), with a marital history of 13 years, came in emergency to the labor room. She was not registered in our hospital but she was receiving antenatal care in PHC. Her chief complaints were per vaginal (PV) leak and abdominal pain since 12 hours. There was no history of PV bleeding, or breathlessness, palpitations or chest pain and other symptoms such as headache, visual disturbances, epigastric pain, or urinary and bowel irregularities. Her gestational age was 34.2 weeks by LMP and 33.6 weeks by the first-trimester scan. Her obstetric history included a previous full-term normal vaginal delivery of a low-birth-weight (1.5 kg) baby who required no NICU admission. The current pregnancy was spontaneous, with inter pregnancy interval of 9 years and there was no history of cardiac symptoms in antenatal or intra natal period. There was no family history of cardiac diseases. Previous child also didn't have any cardiac condition.

On general examination, she was conscious, cooperative, and oriented, with a BMI of 22.8 kg/m². Her vitals were stable: pulse 88 bpm, blood pressure 110/70 mmHg, respiratory rate 16 breaths/min. There were no signs of pallor, icterus, cyanosis, edema, or lymphadenopathy. Clinically no cardiovascular abnormalities were detected. Abdominal examination revealed a uterus consistent with 28 weeks of size, cephalic presentation, and reduced amniotic fluid levels, suggestive of intrauterine growth restriction (IUGR) with

oligohydramnios. The fetal heart rate was 146 bpm and regular. Per speculum examination confirmed a PV leak with clear liquor, and per vaginal examination showing signs of early labor.

The patient was diagnosed with preterm labor at 34.2 weeks of gestation, complicated by IUGR and oligohydramnios. A reactive CTG was noted. Augmentation of labor was initiated with oxytocin, and she delivered a preterm male neonate weighing 1.8 kg. The placenta was removed completely. No postpartum hemorrhage or tears were noted. However, in sometime, the patient developed sudden breathlessness with oxygen saturation dropping to 80% on room air. Examination revealed tachycardia, tachypnea, and signs of type 1 respiratory failure. She was managed with oxygen supplementation, bicarbonate correction for metabolic acidosis, and transferred to the ICU. Cardiology evaluation revealed severe mitral stenosis, moderate mitral regurgitation, severe pulmonary arterial hypertension, and other valvular abnormalities. Despite intensive management, including intubation, non-invasive ventilation, inotropes, and cardiopulmonary resuscitation, the patient succumbed. The post-mortem findings indicated multiple valvular heart disease with cardiac failure.

3. Discussion

Heart diseases during pregnancy significantly increase the risk of maternal morbidity and mortality. Complications such as arrhythmias, thromboembolism, pulmonary edema, and multi-organ failure may arise, particularly in cases of decompensated HF.⁶ Maternal mortality in women with severe cardiac disease can be as high as 25%, especially in low-resource settings where access to specialized care is limited.⁷ Moreover, cardiac conditions can lead to adverse obstetric outcomes, including fetal growth restriction, low birth weight, and stillbirth, compounding the burden on maternal-fetal health.⁸

This case tragically highlights the severe consequences of undiagnosed and unmanaged valvular heart disease in pregnancy. Due to lack of proper prenatal care, her significant underlying cardiac condition remained undetected until it was too late. Her presentation with preterm labor, IUGR, and oligohydramnios signifies the physiological strain placed on her cardiovascular system, likely contributing to her decompensation and ultimately her death.⁹

The physiological adaptations of pregnancy, including increased blood volume and cardiac output, place significant stress on the cardiovascular system.^{10,11} In the presence of underlying valvular abnormalities, these adaptations can precipitate heart failure and other life-threatening complications.¹² As seen in this case, severe mitral stenosis and pulmonary hypertension create a particularly high-risk scenario, as the stenotic mitral valve hinders left ventricular filling and the elevated pulmonary pressure further strain the right ventricle. The abrupt increase in circulatory volume

following delivery likely exacerbated the existing strain on her compromised heart, leading to acute decompensation.¹¹

The absence of proper prenatal care in this case underscores a critical public health concern. Regular antenatal visits allow for early detection and management of cardiac conditions, potentially altering the trajectory of the disease.¹² As evidenced in the literature, undiagnosed cardiac disease can have devastating consequences, not only for the mother but also for the fetus.¹¹ Preterm delivery and intrauterine growth restriction, both observed in this case, are strongly associated with maternal heart failure and increase the risk of neonatal morbidity and mortality.¹³

The management of heart failure in pregnancy necessitates a multidisciplinary approach, involving cardiologists, obstetricians, and other specialists.¹⁴ While medical therapy can improve symptoms and optimize maternal and fetal outcomes, severe cases may require interventions such as valvuloplasty or even valve replacement.¹² The decision for such interventions must carefully balance the risks and benefits for both the mother and the fetus.¹³

Furthermore, the potential for PPCM to be triggered or exacerbated by infections, such as influenza, should be considered.¹⁵ Although there was no evidence of infection in this case, the possibility highlights the need for heightened awareness and vigilance in pregnant women with cardiac conditions.

This case serves as a poignant reminder of the importance of accessible and comprehensive prenatal care for all women. Early detection and management of cardiac disease in pregnancy can significantly improve maternal and fetal outcomes, preventing tragic losses such as this.

4. Recommendations

This case tragically emphasizes the crucial need for comprehensive and accessible antenatal care and compulsory 2D ECHO examination during antenatal period for all women, irrespective of their perceived risk or socioeconomic background to diagnose even minor cardiac lesions. Early detection and management of cardiac conditions during pregnancy are paramount to improving maternal and fetal outcomes. Healthcare providers should maintain a high index of suspicion for potential cardiac disease in pregnant women, even in seemingly low-risk cases.

The establishment of multidisciplinary cardio-obstetrics teams can facilitate coordinated care and improve outcomes for pregnant women with heart failure. Further research is needed to elucidate the complex interplay of factors contributing to heart failure in pregnancy and to develop targeted interventions to prevent adverse events and improve long-term outcomes for mothers and their infants.

5. Conclusion

This case report presented the tragic outcome of a 34-year-old woman who died due to heart failure secondary to undiagnosed severe mitral stenosis. The lack of proper antenatal care and 2D ECHO masked a severe underlying condition, emphasizing the importance of regular prenatal visits for early detection and management of cardiac diseases.

The physiological strain of pregnancy can exacerbate underlying cardiac conditions, and healthcare providers should maintain vigilance even in seemingly low-risk pregnancies. Establishing multidisciplinary cardio-obstetrics teams can improve the care and outcomes of pregnant women with heart failure.

This case serves as a critical reminder for healthcare providers to remain vigilant and routine 2D ECHO examination in identifying and managing cardiac diseases in pregnancy. Aim of publishing this case is to suggest one 2D ECHO examination should be made part of routine antenatal checkup preferably in second trimester or anytime if the patient comes late. Prenatal screening will be really helpful so that we can plan the pregnancy and required management prenatally. This will definitely help us for early diagnosis even minor heart lesions and proper care at proper place and reduce maternal mortality and morbidity.

6. Source of Funding

None.

7. Conflict of Interest

None.

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