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The Spectrum of RHD Management in Pregnancy on Assessing the Time of Diagnosis, Severity of Cardiac Lesions, and the Challenges

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Abstract

Rheumatic heart disease (RHD) poses a significant challenge during pregnancy, especially in low- and middle-income countries, where it affects millions of individuals, primarily young women of childbearing age. This autoimmune condition, often triggered by group A streptococcal infections, leads to chronic inflammation and scarring of heart valves, resulting in insufficiency and stenosis. Pregnancies complicated by cardiovascular diseases, including RHD, contribute to maternal mortality rates and present unique management dilemmas due to the physiological changes accompanying gestation. This case series presents three cases illustrating the complexities of managing RHD during pregnancy. Case 1 describes a gravid woman with a history of previous normal delivery and hepatitis B surface antigen positivity, requiring emergency intervention due to fetal distress and elevated blood pressure. Case 2 details the management of RHD in a woman with hypothyroidism presenting with labor pain at term gestation. Case 3 presents the challenges of managing RHD in a primigravida with a history of nephroureterectomy for ectopic ureter insertion. Understanding the pathological mechanisms and tailored management strategies for pregnant women with RHD is crucial for improving care and outcomes.

Keywords: *Cardiovascular Disease, Hepatitis B, Hypothyroidism, Pregnancy, Rheumatic Heart Disease.*

Introduction

Rheumatic heart disease (RHD) is a condition characterized by inflammation and scarring of the heart valves, often triggered by group A streptococcal infections. This autoimmune reaction leads to chronic manifestations such as valve fibrosis, resulting in insufficiency and stenosis. In the context of pregnancy, cardiovascular diseases complicate 1% to 3% of all pregnancies and account for 10% to 15% of maternal mortalities [1]. Notably, RHD constitutes nearly 90% of all cardiovascular diseases among pregnant women in low-income countries, particularly affecting young women of reproductive age. Diagnosis of RHD may occur during the antenatal or postpartum period when the damaged heart valves are unable to withstand the physiological changes of pregnancy, leading to clinical decompensation [1, 2]. Pregnancy poses significant challenges to the cardiovascular system due to marked physiological changes necessary to support fetal growth. These changes can exacerbate pre-existing conditions such as ischemic heart disease and valvular heart diseases potentially leading to complications during and after

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pregnancy [3, 4]. Studies have shown that women with congenital heart disease face considerable rates of maternal cardiac and neonatal complications during pregnancy [5, 6]. Furthermore, research indicates that pregnancy in women with heart disease is associated with significant cardiac and neonatal complications despite advanced obstetric and cardiac care [6]. The prevalence of heart disease complicating pregnancy has been increasing, attributed to factors like late marriage, obesity, hypertension, and diabetes [7]. While acquired cardiac lesions are on the rise, particularly RHD remains predominant among pregnant women, emphasizing the continued significance of this condition [8]. Understanding the underlying pathological mechanisms linking cardiovascular and pregnancy-related conditions could lead to novel therapeutic or preventive strategies for both sets of diseases [9].

RHD Management in Pregnancy

A G3P2L2 woman with 2 previous normal vaginal deliveries (Previous NVD), aged 36 years, booked elsewhere, currently at 39 weeks and 2 days of gestation, and positive for hepatitis B surface antigen (HBsAg), presented for routine antenatal evaluation. Her blood pressure was noted to be 150/90 mmHg. All initial investigations returned within normal limits. The ophthalmological assessment was sought due to suspected retinal changes, revealing no evidence of papilledema or hypertensive retinopathy. Additionally, consultation with the general medicine department was requested to address the elevated blood pressure and positive HBsAg status. Recommendations included liver function tests (LFT), renal function tests (RFT), and an abdominal ultrasound.

The patient underwent an emergency lower segment cesarean section (LSCS) under spinal anesthesia due to grade II meconium-stained liquor (MSL) and fetal distress.

On postoperative day (POD) 1, further evaluation by the general medicine team was undertaken to manage the persistently elevated blood pressure. They advised initiating treatment with oral labetalol and oral nifedipine and recommended an echocardiogram (ECHO). The subsequent ECHO revealed moderate mitral stenosis (MS), mild to moderate mitral regurgitation (MR), mild to moderate tricuspid regurgitation (TR), and severe pulmonary arterial hypertension (PAH). A diagnosis of RHD was made and as per the cardiologist's recommendation, intravenous furosemide once daily and intravenous ceftriaxone 1.5gm twice daily were added to the treatment regimen. By POD 2, the patient developed tachypnea, tachycardia, and basal crepitations, prompting consultations with the pulmonology, general medicine, and cardiology departments. The pulmonologist recommended a chest X-ray, and computed tomography pulmonary angiogram (CTPA), and initiated nebulization with budamate 0.5mg every 12 hours. CTPA showed bilateral pleural effusion - Left (APD 5.2cm) more than right (APD- 5 cm) causing passive lobar collapse- consolidation of bilateral lower lobes and Mild cardiomegaly. Consequently, the patient was transferred to the intensive care unit (ICU) where the diuretics and nebulisation was continued, and oral labetalol was stopped based on pulmonologist orders. A subsequent cardiology review advised Syrup KCL and oral ivabradine 5 mg BD. The patient was eventually transferred out of the ICU (Figure 1 & 2).

Further cardiology review on POD 6 recommended initiating oral Penicillin 400mg twice daily, and oral Metaprolol 12.5mg twice daily while discontinuing oral Ivabradine and intravenous furosemide. By POD #7, the patient exhibited symptomatic improvement, achieving hemodynamic stability, and was subsequently discharged.

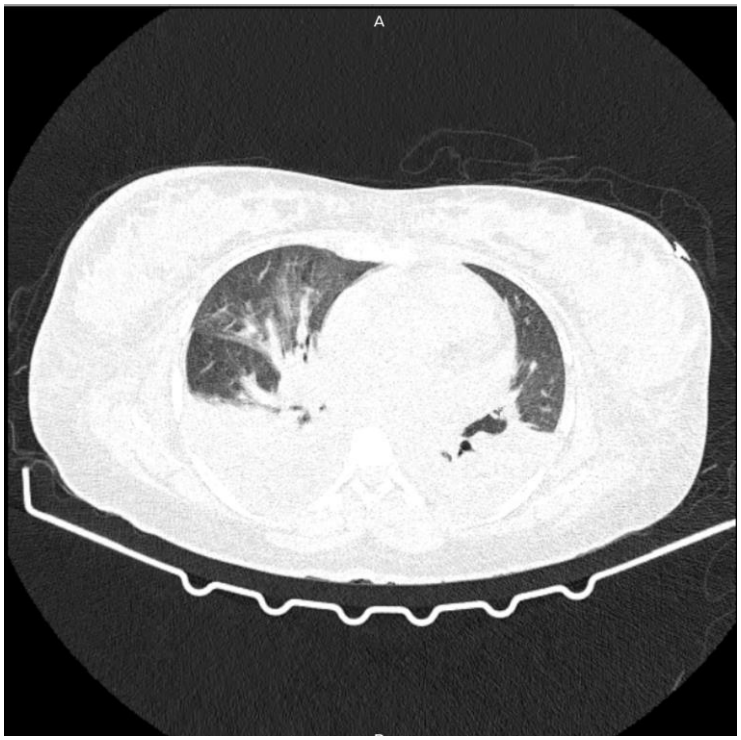

Figure 1. CT Pulmonary Angiogram

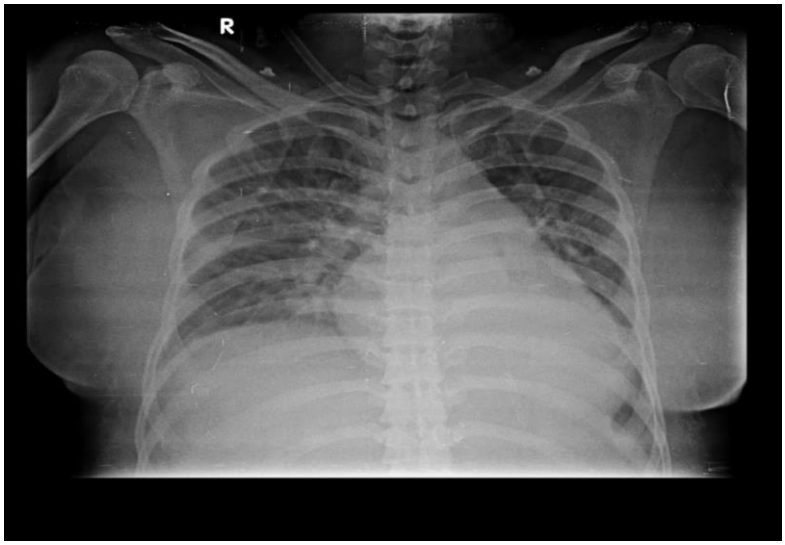

Figure 2. Chest X-Ray showing Cardiomegaly and Pleural Effusion

A G3P1L1A1woman with Previous NVD, aged 29 years currently at 37 weeks and 3 days of gestation, and a history of hypothyroidism, was admitted with complaints of abdominal pain. All baseline investigations were conducted, during which the routine antenatal 2D echocardiography revealed mild to moderate mitral stenosis (MS), trivial mitral regurgitation (MR), mild aortic regurgitation (AR), and tricuspid regurgitation (TR). Cardiology consultation confirmed rheumatic heart disease, and the patient was initiated on oral penicillin 400mg twice daily, oral furosemide 20mg twice daily, and prophylactic antibiotics. Electrolyte levels were closely monitored. Subsequently, the patient progressed into labor spontaneously and delivered a live, full-term male baby. The postnatal period was uneventful. Post-delivery, the patient received subcutaneous enoxaparin for deep vein thrombosis (DVT) prophylaxis. Cardiac review recommended the continuation

of medications. The patient demonstrated symptomatic improvement and was discharged on postnatal Day 6.

A primigravida, aged 28 years, at 33 weeks and 6 days of gestation, who had received antenatal care and immunizations, presented for safe confinement. The patient had a known history of rheumatic heart disease (RHD) which was incidentally diagnosed 3 years ago when the patient was diagnosed with an ectopic kidney with ureter insertion for which she underwent left upper moiety nephroureterectomy with blood transfusions preoperatively and postoperatively. Following postoperative respiratory distress and bilateral crepitations, echocardiography confirmed RHD, leading to the initiation of oral penicillin 400mg once daily and oral furosemide 20mg once daily which she continued through pregnancy. Current Echocardiography revealed mitral valve prolapse (MVP) with severe mitral regurgitation (MR). Cardiology consultation advised continuing these medications and endocarditis prophylaxis during delivery. Steroid coverage was provided for 34 weeks. Elective lower segment cesarean section (LSCS) was performed after obtaining anesthesia and cardiac clearance. Both intraoperative and postoperative periods were uneventful. Cardiac review recommended continuing the same medications and scheduled elective mitral valve replacement three months later. The patient showed improvement and was discharged on postoperative day 8.

Discussion

Rheumatic heart disease (RHD) is a significant concern, particularly in low- and middle-income countries, affecting around 30 million individuals globally. This condition, often resulting from rheumatic fever triggered by streptococcal infections, impacts young women of childbearing age, with the mitral valve being commonly affected [10]. The inflammatory changes and scarring of heart valves in RHD lead to reduced heart function. Risk factors for RHD include poverty, overcrowding, and malnutrition. Symptoms can vary from joint pain and fatigue to more severe manifestations like tachycardia, dyspnea, weakness, and facial rash. Pregnancy can exacerbate heart valve issues in affected women, necessitating careful management to avoid clinical deterioration [11]. While cardiac surgery during pregnancy carries risks for both the mother and baby, early detection, pre-pregnancy care, and good health before conception can lead to better outcomes for both [12].

Pregnancy in women with RHD poses challenges due to potential maternal and fetal complications. Studies have shown that pulmonary edema, arrhythmia, stroke, and cardiac death can complicate pregnancies in women with heart disease, including RHD [6, 13]. The management of valvular diseases during pregnancy is evolving, with a growing number of women with significant cardiac issues reaching childbearing age, necessitating specialized care and interventions [14, 15]. Surgical correction of cardiac lesions before pregnancy has been associated with improved pregnancy outcomes [16]. Additionally, the prevalence of RHD among pregnant women with cardiac diseases is notable, emphasizing the need for tailored management strategies [17, 18].

Thus, understanding the clinical outcomes, complications, and management strategies for pregnant women with RHD is crucial for optimizing care and outcomes [6]. A multidisciplinary approach involving healthcare providers is essential to address the complexities and risks associated with RHD during pregnancy [17]. By leveraging insights from studies on pregnancy outcomes in women with heart disease, including RHD, healthcare professionals can enhance their understanding and provide better guidance for managing such cases, ultimately improving the care and outcomes for pregnant individuals with RHD [18-21].

The three cases presented above highlight how a postpartum diagnosis of RHD carried more morbidity to the mother and how the antenatal diagnosis in the other two cases has resulted in careful precaution undertaking and anticipatory management and has reduced morbidity and mortality. This case series highlights the importance of routine antenatal echocardiography in diagnosing and managing asymptomatic heart disease in pregnant women and helps us to suggest recommendations to include antenatal echocardiography in guidelines for routine screening of antenatal mothers.

Conclusion

In conclusion, the presented case series highlights the intricate challenges and complexities associated with managing rheumatic heart disease (RHD) during pregnancy. Despite advancements in healthcare, pregnancies complicated by RHD continue to pose significant risks to both maternal and fetal well-being. A multidisciplinary approach and further research efforts are imperative to optimize care and outcomes for pregnant individuals with RHD.

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Conflict of Interest

The authors hereby declare that there is no conflict of interest in this study.

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