International Medical Case Reports Journal

Dovepress
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CASE REPORT

Severe Mitral Stenosis in Term Pregnancy Presenting During Labor in a Resource-Limited Setting: A Case Report from Borama, Awdal Region of Somalia

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Video abstract

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Background: Mitral stenosis (MS), primarily from rheumatic heart disease (RHD), is a significant cause of maternal morbidity and mortality, especially in low- and middle-income countries (LMICs). Pregnancy places considerable stress on the cardiovascular system, often revealing or worsening existing cardiac issues. Diagnosing severe MS in pregnant women with acute heart failure is particularly difficult in resource-limited settings lacking specialized diagnostic modalities. Here, we report a case of severe undiagnosed MS presenting in active labor.

Case Presentation: We present a 28-year-old multiparous woman (gravida 4, para 3) at 39 weeks of gestation, who arrived at Al-Rahma Specialist Hospital in Borama, Awdal region of Somalia, in active labor with acute dyspnea, orthopnea, hypoxia (SpO2 88%), and tachycardia (110 bpm). Initially suspected of having pre-eclampsia, further investigation using bedside echocardiography revealed severe rheumatic mitral stenosis (mitral valve area 0.9 cm^2, mean gradient 15 mmHg, pulmonary artery systolic pressure ≈45 mmHg), a dilated left atrium, but preserved left ventricular function. Due to a lack of interventional cardiology facilities, management focused on medical stabilization with oxygen, intravenous furosemide, and therapeutic low molecular weight heparin. Despite her severe condition, she had an uncomplicated spontaneous vaginal delivery of a healthy infant, with significant symptom improvement postpartum.

Conclusion: This case highlights the need for a high suspicion of severe mitral stenosis in pregnant women presenting with respiratory distress, even without typical pre-eclampsia signs. It underscores the importance of clinical judgment and echocardiography for timely diagnosis in LMICs. Favorable outcomes can be achieved through effective medical management and multidisciplinary collaboration, pointing to the urgent need for improved cardiac care infrastructure and comprehensive postpartum counseling in LMICs.

Plain Language summary:

- In pregnant women presenting with acute pulmonary edema or respiratory distress, particularly with normal blood pressure, a high index of suspicion for underlying cardiac etiologies—including valvular heart disease like mitral stenosis—is paramount.
- Transthoracic echocardiography, even basic studies, is an invaluable and often indispensable tool for accurate diagnosis and guiding management strategies for cardiac conditions in pregnancy, especially in resource-limited settings.
- In settings where definitive surgical or interventional options are unavailable, meticulous supportive medical management, careful hemodynamic monitoring, and multidisciplinary team planning for delivery can still lead to favorable maternal and fetal outcomes.

Keywords: mitral stenosis, pregnancy, rheumatic heart disease, heart failure, resource-limited setting, Somaliland, case report

https://doi.org/10.2147/IMCRJ.S564292
Received: 31 August 2025
Accepted: 21 February 2026
Published: 26 February 2026

Introduction

Mitral stenosis (MS), primarily a consequence of rheumatic heart disease (RHD), remains a significant public health issue, notably in low- and middle-income countries (LMICs).[1,2] Although local epidemiologic registries are limited, data from sub-Saharan Africa indicate an RHD prevalence of approximately 1–3 cases per 1000 people, accounting for 25–30% of cardiac diseases complicating pregnancy in similar resource-limited settings.[2,3]

The physiological demands on the cardiovascular system markedly increase during pregnancy. This includes a 30–-50% rise in both blood volume and cardiac output.[4] According to European Society of Cardiology (ESC) and American College of Obstetricians and Gynecologists (ACOG) guidelines, these hemodynamic alterations can reveal previously asymptomatic MS or worsen existing conditions, significantly increasing the risk of severe complications. Maternal risks include pulmonary edema (occurring in up to 50% of severe cases) and sustained arrhythmias, while fetal risks include prematurity (20–30%) and intrauterine growth restriction (IUGR) due to uteroplacental hypoperfusion.[4–6]

The diagnosis of severe MS in pregnancy presents considerable complexities. Symptoms of cardiac decompensation —such as fatigue, dyspnea, and lower limb edema—frequently overlap with the physiological alterations of normal pregnancy or obstetric complications like pre-eclampsia and peripartum cardiomyopathy (PPCM).[7–9] However, distinct clinical features can aid in differentiation: unlike physiological dyspnea, cardiac dyspnea is progressive and often accompanied by orthopnea or paroxysmal nocturnal dyspnea. While pre-eclampsia is characterized by hypertension and proteinuria, cardiac pulmonary edema often presents with normotension. Furthermore, PPCM is defined by left ventricular systolic dysfunction, whereas rheumatic MS typically presents with preserved ventricular function but distinctive auscultatory signs, such as a diastolic rumble or opening snap.[4,7] Prompt recognition of these subtle differences is essential to avert acute decompensation.[10]

This case report presents a rare manifestation of severe, undiagnosed mitral stenosis in a term pregnant patient who arrived in labor with acute heart failure in Borama, Awdal region of Somalia—a region recognized for significant limitations in healthcare infrastructure and specialized cardiac services.

Case Presentation

A 28-year-old multiparous woman, gravida 4, para 3 (all living children), at 39 weeks of gestation, presented to the Al-Rahma Specialist Hospital in Borama, Awdal region of Somalia, with active labor pains. Her chief complaints upon arrival were progressively worsening shortness of breath for the past 24 hours, orthopnea, and bilateral lower limb edema.

Regarding her history, the patient had attended two routine antenatal care visits at a local maternal and child health center. No cardiac abnormalities were detected during these visits, primarily due to the lack of cardiac screening capabilities. She reported experiencing mild exertional dyspnea during her third trimester, which she and her providers had attributed to the normal physiological burden of pregnancy. She reported no prior diagnosis of heart disease, nor a history suggestive of rheumatic fever in childhood.

On physical examination, the patient appeared acutely dyspneic and anxious. The temperature was 36.8°C, pulse rate was 110 beats per minute (bpm) and irregularly irregular, blood pressure was 110/70 mmHg, and respiratory rate was 26 breaths per minute. Peripheral oxygen saturation (SpO_2) was critically low at 88% on room air. Jugular venous distension (JVD) was prominent. Cardiac auscultation revealed a loud first heart sound (S1), an opening snap, and a low-pitched, rumbling diastolic murmur heard best at the apex in the left lateral decubitus position. Chest auscultation revealed bilateral fine basal crackles, consistent with pulmonary congestion. Mild pitting edema was noted in both ankles.

Initial Impression and Diagnostic Re-Evaluation

Based on the constellation of acute dyspnea, orthopnea, and lower limb edema in a term pregnancy, the patient was initially diagnosed with pulmonary edema presumed secondary to atypical pre-eclampsia. Although the patient was normotensive (110/70 mmHg), this working diagnosis is common in our setting, where pre-eclampsia is the leading cause of maternal pulmonary edema, and atypical forms (occurring without severe hypertension) must be ruled out. She was immediately commenced on oxygen therapy via a non-rebreather mask and intravenous furosemide (40 mg). However,

the continued normotension and absence of proteinuria, inconsistent with even atypical pre-eclampsia, prompted a critical re-evaluation. Given the specific cardiac auscultation findings (diastolic rumble), a suspicion of a primary cardiac etiology arose, and an urgent cardiology review was requested.

Investigations

Electrocardiogram (ECG)

Performed and interpreted by the attending cardiologist (primary author). This confirmed severe mitral stenosis with a calculated mitral valve area (MVA) of 0.9 cm^2 and a mean mitral valve gradient of 15 mmHg. The study revealed thickened mitral valve leaflets with restricted mobility and fusion of commissures (hockey-stick appearance), a markedly dilated left atrium, and moderate pulmonary hypertension (estimated pulmonary artery systolic pressure ~45 mmHg). Left ventricular systolic function was preserved (ejection fraction ~60%). Echocardiographic images illustrating these findings are presented in Figure 1.

Laboratory Tests

Hemoglobin 11.2 g/dL. Urinalysis was negative for proteinuria, further ruling out pre-eclampsia. Cardiac biomarkers (Troponin, BNP) were not available.

Final Diagnosis

Severe Rheumatic Mitral Stenosis in Term Pregnancy with Acute Decompensated Congestive Heart Failure.

Treatment and Outcome

Due to the critical lack of cardiac surgical facilities or interventional cardiology services (such as percutaneous balloon mitral commissurotomy [PBMC] in Somaliland, definitive valve intervention was not an option.

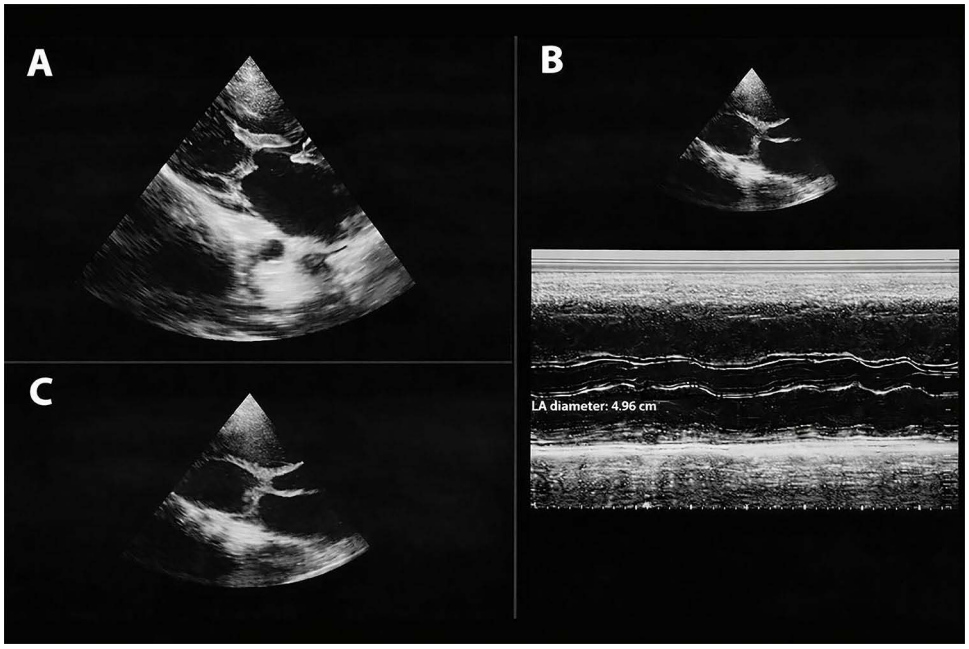

Figure 1 Transthoracic echocardiography findings. (**A**) Parasternal long-axis (PLAX) view demonstrating thickened and restricted mitral valve leaflets with diastolic doming, consistent with mitral stenosis, along with visual enlargement of the left atrium. (**B**) M-mode echocardiogram across the mitral valve showing a reduced E–F slope, consistent with severe mitral stenosis, and an increased left atrial anteroposterior dimension (LA diameter: 4.96 cm). (**C**) M-mode echocardiogram across the left ventricle demonstrating preserved left ventricular systolic function (estimated LVEF ~60%) with normal left ventricular dimensions.

https://doi.org/10.2147/IMCRJ.S564292

Medical Management

She continued to receive high-flow oxygen via a non-rebreather mask. Intravenous furosemide was titrated to effect. Therapeutic anticoagulation was initiated with subcutaneous enoxaparin (1 mg/kg) to manage the high risk of thromboembolism associated with severe MS and left atrial dilation.[4,11]

Delivery Planning

A multidisciplinary team managed the patient. Effective analgesia was provided using intravenous opioids. This was a critical component of the management strategy to minimize the sympathetic surge (tachycardia) associated with labor pain, which can otherwise precipitate further hemodynamic instability and pulmonary edema. She achieved a spontaneous vaginal delivery of a healthy term infant (Apgar scores 8 and 9). The second stage of labor was shortened using vacuum extraction. This intervention was critically employed to bypass the need for maternal expulsive efforts (Valsalva maneuver), thereby preventing the acute increases in venous return and intrathoracic pressure that can precipitate pulmonary edema in severe MS. Active management of the third stage was performed carefully to avoid rapid hemodynamic shifts.

Postpartum Course

Post-delivery vitals were stable: Blood pressure 110/70 mmHg, Heart rate 98 bpm, Respiratory rate 20/min, and SpO_2 95% on nasal cannula. Her symptoms of dyspnea and orthopnea significantly improved within 6 hours. She remained hemodynamically stable and was monitored for 4 days.

Discharge and Follow-Up

The patient was discharged on day 4 on a medical regimen including oral furosemide and warfarin for anticoagulation. The target International Normalized Ratio (INR) was set at 2.0–3.0, with careful monitoring arranged at a local clinic. Crucially, the patient was counseled that warfarin is compatible with breastfeeding, ensuring she could nurse her infant safely while maintaining necessary anticoagulation.

The patient was followed up for a total duration of six weeks postpartum. At the final assessment (6-week visit), she reported significant improvement and was classified as NYHA Functional Class I–II. An echocardiogram showed persistent severe MS but a controlled heart rate. She received extensive counseling regarding the urgent necessity of seeking definitive surgical intervention abroad (eg, Ethiopia or Kenya). Regarding family planning, she was counseled on the high maternal mortality risk associated with future pregnancies. She was offered Long-Acting Reversible Contraception (LARC) to ensure reliable birth control. Specifically, a progestin-only subdermal implant was recommended and accepted, as estrogen-containing contraceptives were avoided to minimize the additional thromboembolic risk in the context of mitral stenosis.

Discussion

This case highlights the challenges of severe, undiagnosed rheumatic mitral stenosis presenting as acute decompensated heart failure during labor in a resource-limited setting. The prevalence of RHD in sub-Saharan Africa remains high, yet diagnostic capacity is often low.[3,12]

The timely suspicion of a cardiac cause was paramount. While pre-eclampsia is a common cause of pulmonary edema in pregnancy, the absence of hypertension and proteinuria in our patient made it less likely.[5] Similarly, Peripartum Cardiomyopathy (PPCM) was considered, but the preserved ejection fraction on echocardiography excluded it.[13,14] Pulmonary Embolism (PE) was also a critical differential diagnosis, given the hypercoagulable state of pregnancy and the acute presentation of hypoxia and tachycardia. However, the echocardiographic confirmation of severe mitral stenosis provided a definitive hemodynamic explanation for the clinical picture (pulmonary venous congestion due to valvular obstruction), effectively ruling out PE as the primary cause without the need for radiation-heavy imaging like CT pulmonary angiography.

According to 2018 ESC and 2020 ACC/AHA guidelines, our patient's MVA of 0.9 cm^2 and mean gradient of 15 mmHg classify her condition as severe MS.[4,15] the physiological increase in cardiac output during labor overwhelmed her stenotic valve, precipitating pulmonary edema.

Our patient's clinical course mirrors recent reports by Mutarelli et al[10] and Malak et al,[11] where undiagnosed valvular disease precipitated life-threatening failure during the third trimester or labor. However, a key distinction lies in the management options available. While Cesaro et al[16] recently described successful percutaneous mitral valvuloplasty (PMV) in a pregnant woman using low-dose radiation, such interventional options require catheterization laboratories that are unavailable in our region. Furthermore, unlike the patient described by Eng-Frost et al,[9] who was asymptomatic and managed electively, our patient presented in extremis, necessitating immediate stabilization rather than preventative planning.

In our setting, the lack of advanced tools like Transesophageal Echocardiography (TEE) or biomarkers limits risk stratification. Furthermore, the unavailability of Percutaneous Balloon Mitral Commissurotomy (PBMC) represents a major healthcare disparity. Recent literature supports PBMC even during pregnancy for refractory cases,[17–19] but in Somaliland, medical management is the only bridge to postpartum referral. Referral pathways to cardiac centers in Addis Ababa (Ethiopia) or Nairobi (Kenya) exist but are often cost-prohibitive for patients.

Conclusion

This case underscores the importance of maintaining a high index of suspicion for severe mitral stenosis in pregnant women presenting with respiratory distress, particularly when typical signs of pre-eclampsia (such as hypertension) are absent. It demonstrates that even in resource-limited settings, favorable maternal and fetal outcomes can be achieved through diagnostic vigilance using basic echocardiography and a tailored multidisciplinary management approach. Ultimately, this case highlights the urgent need to strengthen cardiac–obstetric care systems, expand echocardiography training for frontline providers, and establish accessible referral pathways for definitive surgical intervention in Somaliland.

Data Sharing Statement

Data supporting the conclusions of this report are contained within the report. Additional non-relevant patient data are protected under patient privacy regulations and policies.

Ethics Statement

Verbal informed consent was obtained from the patient for the publication of this case report and any accompanying images, ensuring patient anonymity. Due to the patient's inability to read or write (illiteracy), verbal consent was obtained by the attending physician and witnessed by an independent senior nurse. This process was formally documented in the patient's medical record with a thumbprint mark, in accordance with the internal ethical policy of Al-Rahma Specialist Hospital for patients with literacy barriers. This consent procedure was reviewed and approved by the Institutional Research Ethics Committee (IREC) of Amoud University and adheres to the principles of the Declaration of Helsinki.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

No funding granted for this research.

Disclosure

The authors report no conflicts of interest in this work.

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