Anaesthetic management for emergency caesarean section in a pregnant woman with severe mitral stenosis and decompensated heart failure.

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Abstract

This report describes the anaesthetic management of a 30-year-old pregnant woman at 37 weeks of gestation with severe mitral stenosis and decompensated heart failure who presented for an emergency caesarean section. The patient presented with New York Heart Association (NYHA) Class III symptoms and pulmonary oedema. Given the severity of her cardiac condition, a general anaesthesia with tight hemodynamic control was planned and executed with successful maternal and foetal outcomes. The case highlights the importance of meticulous cardiovascular management and multidisciplinary coordination in high-risk obstetric patients.

Key words

Mitral stenosis with pregnancy, Pulmonary oedema in pregnancy, pulmonary artery hypertension in pregnancy.

Introduction

Rheumatic mitral stenosis (MS) in pregnancy remains a significant clinical challenge, particularly when decompensated by volume overload and pulmonary hypertension. It forms 88% of the cardiac diseases complicating pregnancy making it the single most common lesion [(1)]. The physiological changes of pregnancy exacerbate the haemodynamic burden in these patients, increasing the risk of maternal and foetal morbidity. Anaesthetic management must be tailored to avoid tachycardia, fluid overload, and hypotension. Patients with severe mitral stenosis are more likely to decompensate during late stages of pregnancy [(2)] . While regional anaesthesia is often preferred in mild MS, general anaesthesia may be safer in select cases especially with severe cardiac decompensation.

Case Presentation:

A 30-year-old woman, gravida 2 para 2 living 2, at 35 weeks of gestation was admitted with progressive dyspnoea, orthopnoea, and leg swelling. She had a known diagnosis of rheumatic heart disease with severe mitral stenosis (valve area 1.2 cm^2, mean gradient 13/21 mmHg), moderate mitral regurgitation, moderate tricuspid regurgitation, and moderate pulmonary arterial hypertension. She was in NYHA Class III and had clinical and radiological features of pulmonary oedema. Other laboratory parameters were within normal limits.

Due to her unstable cardiac status, the multidisciplinary team decided to proceed with an emergency caesarean section under general anaesthesia. The patient was stabilised in the intensive care unit, where arterial and central venous lines were inserted preoperatively under local anaesthesia. A warming blanket and calf pump (For Deep vein thrombosis prophylaxis) In the operating theatre, she was induced with etomidate (10 milligram) and succinylcholine (75milligram) and intubated with a 7.0 mm cuffed endotracheal tube. Esmolol(10mg) and intravenous lignocaine (60milligram) were administered to blunt the intubation response. Anaesthesia was maintained with sevoflurane in oxygen/nitrous oxide. Fentanyl(100mcg) was given after delivery of the baby. Oxytocin was started as an infusion (2-4IU/hour) post-delivery, and intravenous frusemide (10 milligram slow IV) was administered after placental delivery to manage hypervolemia after auto transfusion. Low-dose norepinephrine infusion was used to maintain blood pressure and systemic vascular resistance. The Arterial blood gas analysis after induction was normal.

A live female neonate weighing 2.6 kg was delivered with good Apgar scores. The mother remained haemodynamically stable throughout the procedure. She was extubated the following day after clinical improvement. Both mother and baby were discharged in stable condition.

Discussion:

Mitral stenosis (MS) remains one of the most common rheumatic valvular lesions encountered in pregnancy, especially in low- and middle-income countries. The physiological changes of pregnancy, including increased blood volume, heart rate, and cardiac output, can

exacerbate mitral inflow obstruction and precipitate pulmonary oedema and heart failure, especially in severe MS [3,4].

In this case, the patient had severe MS (valve area 1.2 cm^2) with a mean gradient of 13 mmHg, NYHA class III symptoms, and pulmonary congestion. She also had moderate pulmonary arterial hypertension and tricuspid regurgitation, compounding the haemodynamic burden. The clinical priority was to prevent further decompensation while ensuring safe delivery for both mother and baby.

Regional anaesthesia, although commonly used in obstetric anaesthesia, carries risks in patients with severe MS and compromised cardiac function. Spinal or epidural anaesthesia can lead to sudden decreases in systemic vascular resistance and preload, precipitating cardiovascular collapse in patients who are critically dependent on their left ventricular filling pressures [5,6] . Therefore, general anaesthesia (GA) was selected to allow greater control over haemodynamics.

Etomidate was chosen for induction due to its minimal cardiovascular effects [7]. The use of esmolol and lignocaine prior to laryngoscopy and intubation aimed to blunt the sympathetic response, which could otherwise trigger tachycardia and increase left atrial pressures. Tachycardia is particularly harmful in mitral stenosis as it reduces diastolic filling time, worsening pulmonary congestion [8].

Anaesthesia was maintained with sevoflurane in oxygen/nitrous oxide. Fentanyl was administered after delivery to avoid neonatal respiratory depression while still providing analgesia and blunting stress responses. Low-dose norepinephrine infusion was titrated to support blood pressure without causing tachycardia. Oxytocin was given as a controlled infusion rather than a bolus to avoid sudden vasodilation and tachycardia, which can be poorly tolerated in severe MS [9] . Frusemide was administered after placental delivery to manage volume shifts and reduce pulmonary congestion.

Invasive monitoring with an arterial line and central venous pressure (CVP) monitoring provided real-time guidance for haemodynamic management. While some centres advocate the use of pulmonary artery catheters or intraoperative transesophageal echocardiography (TOE) in

similar patients [10], the decision to limit monitoring was appropriate given the patient's rapid clinical course and stability postoperatively.

The patient remained haemodynamically stable, was extubated the next day, and had an uneventful recovery. This case exemplifies the importance of an individualized anaesthetic plan based on pathophysiology, with an emphasis on maintaining sinus rhythm, avoiding tachycardia, preventing fluid overload, and ensuring multidisciplinary coordination.

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