

# Pregnancy and mitral stenosis, the anaesthetic management: A case report

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**ABSTRACT**

**Background:** The most prevalent valvular heart condition linked to pregnancy is mitral stenosis. Pregnancy-related increases in cardiac output lead to a worsening of the patient's condition and an increase in New York Heart Association class (NYHA). **Purpose & Methods:** Regional anaesthesia has recently grown in acceptance as a secure alternative for caesarean delivery in all expectant mothers, even those with heart condition. **Results:** General anaesthesia is linked to an increase in pulmonary pressure in regard to laryngoscope and endotracheal intubation in addition to anesthesia-induced cardiac depression. The neuraxial blockade may reduce systemic vascular resistance and cardiac output. **Conclusion:** The outstanding anaesthetic care provided to a pregnant woman with rheumatic heart disease, multivalvular lesions, during epidural anaesthesia is described in this article, along with the positive outcomes for both the mother and the baby.

**Keywords:** Caesarean section, epidural anaesthesia, mitral stenosis, Bmv, NYHA

**1. INTRODUCTION**

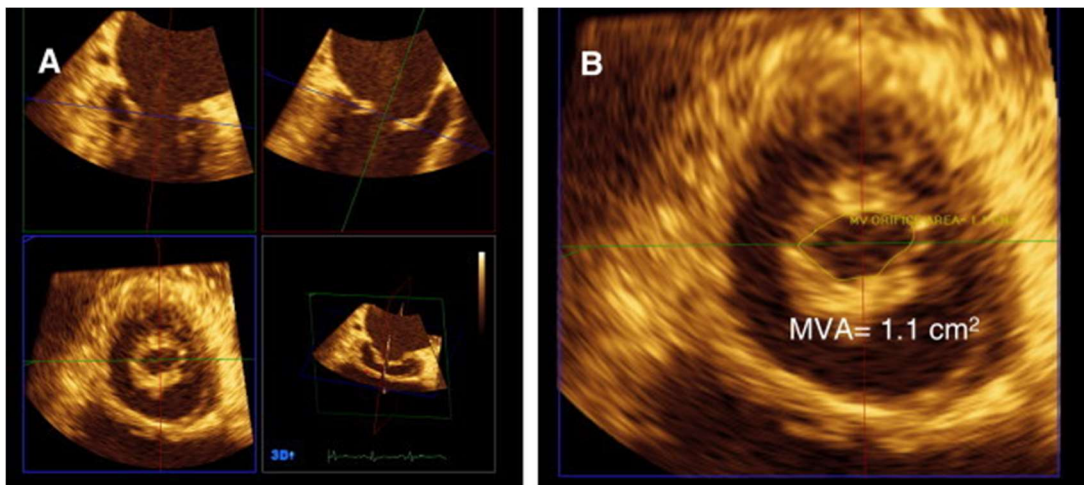
A major contributor to maternal and foetal morbidity and mortality during pregnancy is still cardiac disease. Between 0.2% to 3.0% of pregnant women in affluent nations are thought to have cardiac disease. The valvular heart ailment most frequently linked to pregnancy is mitral stenosis (MS). The size of the bicuspid valve is 4-6 cm<sup>2</sup>. A mitral valve area (MVA) less than 1.0 cm<sup>2</sup> is regarded as serious and the patient develops symptoms when it drops below 2 cm<sup>2</sup>. Pregnancy-related changes in cardiac function lead to a decline in health and an increase in the patient's (NYHA) class. Tachycardia speeds up the filling of the left ventricle, raising the respiratory and left atrium pressures that might cause pulmonary emphysema. A common side effect of MS is atrial fibrillation, which could get worse if systemic emboli develop.

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below 2 cm<sup>2</sup>. An increase in cardiac output during pregnancy results in the patient's health deteriorating and moving into a higher New York Heart Association (NYHA) class. Tachycardia accelerates up the left ventricle's filling process, increasing the left atrial and pulmonary pressures that can lead to pulmonary edema. A common side effect of MS is atrial fibrillation, which could get worse if systemic emboli develop (Mc-Glothlin et al., 2012).

## 2. CASE REPORT

A 24-year-old female primigravida with a gestational age of 37 weeks and RHD along with severe MS, severe MR, severe PAH, severe TR and mild AR. She was scheduled for a voluntary caesarean section (Figure 1, 2). In 2018, the patient was diagnosed with RHD and severe MS.



**Figure 1** Showing 3D echo and mitral value area

VALVES				
	Thickness	Area	Regurgitation	Velocity/Gradient
Mitral	AML 0.8mm PML 1.0mm	10m	M+	30/22
Aortic			2+	
Pulmonary				
Tricuspid			3+	RVJ=25
Mitral Valve Score				
	M	T	S	C
CONCLUSION	RHD severe MS & MR mild AR			
ADVICE	mod TR severe PH Dilated LA & LV two Biventricular no PE / clot -			

**Figure 2** Showing 2D Echo findings in this patient

In 2018, she underwent BMV. Patient was asymptomatic throughout pre-anesthetic examination. She was taking penicillin, metxl and furosemide on a regular basis. In echocardiography, the mitral valve had a 1 cm<sup>2</sup> area and a 50% ejection fraction. 30

mmHg was the mean pulmonary artery pressure. She consistently had a blood pressure of 110/70 mm Hg and a heart rate of 90 beats per minute.

With regular antenatal checks, she had remained asymptomatic throughout her pregnancy. The results of all routine tests were within normal ranges. Due to her cardiac disease, she was scheduled for an elective caesarean section. Since the patient mitral valve area is 1.0cm<sup>2</sup> we planned to administer epidural anesthesia. The patient was wheeled into the operating theatre after giving written informed high-risk consent. NBM was confirmed, two large bore intravenous cannulas were placed and all operating room standard monitor were applied. Acid-aspiration prophylaxis was provided. From the moment of entry into the operating room until surgical site preparation, one of the obstetricians monitored the foetal heart rate.

The lactated Ringer's solution co-loading process began. Epidural block was administered with an 18 G Tuohy's needle in the L2L3 space in the lateral decubitus position under strict aseptic conditions. It was threaded with an 18G epidural catheter and fixed at 9 cm from the skin. The patient was shifted slightly to the side. Urine output monitoring was initiated after a urinary catheter was inserted (Tsiaras and Poppas, 2009). 3 ml of 2% xylocaine and 1:200000 adrenalin were given as a test dosage. The epidural catheter was activated with 7ml of 0.5% bupivacaine once the proper insertion of the catheter had been verified. A sensory block of thoracic 6 was accomplished after 15 minutes of medication administration and the surgeons then continued with the procedure.

Injection pitocin was started at a rate of 10 units per hour after the infant was delivered. After the infant was delivered, the heart rate rose to 160 beats per minute, but the blood pressure stayed the same. After the infant was delivered, the heart rate spiked to 160 beat per minute and needed to be controlled with an intravenous injection of 30 mg of esmolol. During the intraoperative phase, no further problems occurred. An oxygen mask was used to supply oxygen throughout the surgery. Around 900 ml of blood loss overall and 300 ml of urine were excreted, given in total, 1000 ml of crystalloid fluid. Epidural fentanyl and intravenous paracetamol were used round the clock to maintain post-operative analgesia.

### 3. DISCUSSION

Pregnant women typically tolerate mitral regurgitation well because the flow of regurgitant material is reduced due to the lower systemic vascular resistance. On the other hand, mitral stenosis is typically not well tolerated. In a healthy adult, the mitral valve has a surface area of 4-6 cm<sup>2</sup>. The most prevalent clinically significant heart condition is mitral stenosis (MS). If MS is accompanied by symptomatic pulmonary hypertension, the maternal fatality rate might approach 15% when the mitral valve area is 1 cm<sup>2</sup> or less (Tsiaras and Poppas, 2009). When the area of the mitral valve is reduced to less than 2.0 cm<sup>2</sup>, a pressure gradient develops across the valve. The severity of the stenosis and the volume of blood passing through the valve influence the gradient's gradient. As a result, during pregnancy, the gradient across the injured mitral valve grows as cardiac output does. The pulmonary venous circulation reflects this increase in left atrial pressure, putting the patient at risk for pulmonary edema. Pulmonary arterial hypertension can cause elevated right ventricular pressures and, in some cases, right ventricular collapse if left untreated (Biaggi et al., 2013).

The intravascular volume increases by around 50% during pregnancy, resulting in higher left atrial and pulmonary venous filling pressures (Thorne, 2004). Epidural anaesthesia may improve hemodynamic status in pregnant women with MS by lowering preload due to venous pooling and a reduction in heart rate. Cesarean sections in these patients have been described using both general and regional anaesthesia. The severity of the condition determines how these patients are anaesthetized. In severity, general anaesthesia has usually been preferred during caesarean section. Tachycardia must be avoided during laryngoscopy and extubation (Pittard and Vucevic, 1998).

During induction, opioids may result in pulmonary collapse in the new-born. During extubation, opioids may increase the parturient risk of postoperative mechanical ventilation and prolong the emergence from anaesthesia. Increased preload due to auto transfusion during uterine contraction during delivery can produce oedema, which shows up only after extubation because positive pressure ventilation is used intraoperative to prevent it. A suitable depth of anaesthesia is also essential throughout the intraoperative time to avoid tachycardia and hypertension. The advantages of general anaesthesia include definite airway control and the opportunity to monitor the surgery with transesophageal echocardiography. Large doses of inhalation anaesthetics must be avoided in order to avoid uterine atony (Weiner et al., 2011).

### 4. CONCLUSION

Since graded epidural anaesthesia was linked to superior short-term maternal and neonatal outcomes, it is the preferable anaesthetic for elective lower segment caesarean sections in pregnant women who have severe bicuspid stenosis.

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**Author Contributions**

Details of contribution of each authors regards manuscript work & production.

**Informed consent**

Written & Oral informed consent was obtained from participant included in the study.

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**Conflict of interest**

The authors declare that there is no conflict of interests.

**Data and materials availability**

All data sets collected during this study are available upon reasonable request from the corresponding author.

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