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Severe maternal mitral stenosis: regional anaesthesia for caesarean delivery

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Introduction

Severe mitral stenosis (MS) in pregnancy is in the highest level of the modified World Health Organisation classification of maternal cardiovascular risk with an estimated maternal cardiac event rate of 40 -100% [1]. The recommended location for delivery is an expert centre for pregnancy and cardiac disease. Our institutions share a multidisciplinary pregnancy heart team and provide both obstetric and cardiothoracic tertiary facilities co-located on the same site. We present our management of a parturient with severe MS.

Case report

- A nulliparous 31-year-old with mitral valve area 1.0 cm^2 (Figures 1 and 2), significant aortic regurgitation, dilated left atrium and left ventricular ejection fraction (LVEF) of 48%, without atrial fibrillation, was admitted to our obstetric unit at 18 weeks gestation with progressive dyspnoea and pre-syncope.
- She was medically optimised following cardiology review with bisoprolol and furosemide, uptitrated to effect to reduce heart rate and achieve euvolaemia. The patient was also commenced on therapeutic low molecular weight heparin (LMWH) in divided doses. At 33 weeks gestation her LVEF had increased to 55%.
- Following extensive discussion with the patient, whose preference was to be awake for delivery with her partner also in theatre, an elective caesarean section (CS) was performed at 34 weeks gestation. This was performed in our cardiothoracic centre with cardiopulmonary bypass and a cardiac surgical team on standby. LMWH was withheld for 24 hours prior to insertion of an epidural catheter at L2-3 the day prior to surgery.
- On the day of CS wide bore peripheral and central venous access was established, and an arterial line was sited. Furosemide 40 mg was administered intravenously. Spinal anaesthesia (L3-4) was performed with a 25G Whitacre needle and 1 mL 0.5% hyperbaric bupivacaine and diamorphine 400 µg given. The epidural was incrementally topped-up with 0.5% Levobupivacaine.
- Aortocaval compression was avoided. Systemic vascular resistance was maintained with vasopressor and low-dose uterotonics were used. Judicious fluid management avoided rapid increases in preload. The patient was haemodynamically stable throughout with minimal blood loss. The epidural catheter was removed at the end of surgery and the patient remained in cardiac critical care for 24 hours for observation before transfer back to the obstetric unit. She was discharged 9 days postpartum without complication.

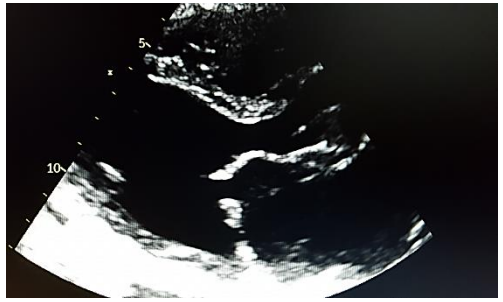


Figure 1 Transthoracic parasternal long axis echocardiogram view of the patient's mitral valve in diastole between the enlarged left atrium (right of image) and the left ventricle (to left of the image)



Figure 2 Transthoracic parasternal short axis echocardiogram view of the patient's mitral valve, showing the classic 'fish mouth' appearance but very limited valve

Discussion

- Severe rheumatic MS is a rare diagnosis in developed countries and management during pregnancy requires expert multidisciplinary care.
- Increasing maternal circulating volume and heart rate during pregnancy result in higher left atrial volume and pressures (with concomitant elevation in pulmonary capillary pressures), as well as reduced left ventricular filling time as diastole is reduced.
- There is no established safe anaesthetic technique for CS for mothers with severe MS.
- Disadvantages to general anaesthesia include increased pulmonary arterial pressure and tachycardia during laryngoscopy, and altered venous return with positive pressure ventilation.
- Epidural anaesthesia can be titrated slowly to assist maternal compensation for sympathetic blockade, maintaining afterload, cardiac perfusion and uteroplacental blood flow .
- Epidural insertion, however, in the context of possible therapeutic anticoagulation required in the event of cardiopulmonary bypass for cardiac surgery, generates increased concern with regards to epidural haematoma and needs very careful consideration.
- Following an informed discussion, our patient chose regional anaesthesia with epidural insertion the day prior to surgery to lower (but not eliminate) risk if a bloody tap were to occur.

References

[1] Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, et al. 2018 European Society of Cardiology (ESC) guidelines for the management of cardiovascular diseases during pregnancy. *Eur Heart J* 2018; 39: 3165-3241.