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## Brief Reports

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# Combined spinal epidural anaesthesia in a primigravida with valvular heart disease

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**Purpose:** This is the first report describing combined spinal epidural anaesthesia for labour and unexpected Caesarean section in a patient with mitral and aortic stenosis and insufficiency.

**Clinical features:** The patient was a 30-yr-old G<sub>1</sub>P<sub>0</sub> with a history of rheumatic fever. She had moderate stenosis and insufficiency of the mitral and aortic valves. Combined spinal and epidural anaesthesia was used throughout labour and subsequent Caesarean section. The patient remained haemodynamically stable throughout the procedure.

**Conclusion:** Carefully planned regional anaesthesia was safely used for labour and operative delivery in this parturient with mitral and aortic valvular disease.

**Objectif :** Ceci représente le premier cas rapporté d'anesthésie-rachidienne combinée pour le travail et une césarienne non planifiée chez une patiente porteuse de maladie aortique et mitrale.

**Éléments cliniques :** La patiente était une jeune femme de 30 ans, G<sub>1</sub> P<sub>0</sub> avec une histoire de fièvre rhumatismale. Au point de vue cardiaque, elle présentait une sténose et une insuffisance modérées des valves aortique et mitrale. Une anesthésie péridurale-rachidienne combinée a été utilisée durant tout le travail et pour la césarienne subséquente. La patiente est demeurée stable hémodynamiquement durant toute la procédure.

**Conclusion :** Une anesthésie régionale, soigneusement planifiée, a été utilisée de façon sécuritaire pour le travail et l'accouchement par césarienne chez cette parturiente avec maladie aortique et mitrale.

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*Maintenance of haemodynamic stability in mitral and aortic valve disease poses a challenge in providing anaesthesia for the pregnant patient with multivalvular disease.*

### Case report

A 30-yr-old primigravida with a history of rheumatic fever developed symptoms four years before the pregnancy. She was short of breath on exertion, with occasional paroxysmal nocturnal dyspnea and episodes of palpitations at rest; CCS Class 1.

At 34 wk gestation her blood pressure was 110/70 mmHg, heart rate 76. Examination of the precordium showed displaced apical impulse. Loud first ( $S_1$ ) sound, normally split second sound ( $S_2$ ), an opening snap, a grade 2/6 diastolic rumble and a grade 2/6 decrescendo diastolic blowing murmur at the left sternal border and apex, and a grade 4/6 ejection systolic murmur radiating into both carotid arteries were auscultated.

Two-dimensional echo Doppler studies at 24 wk showed moderate mitral stenosis with estimated valve area 1.6 cm<sup>2</sup> and mild regurgitation. The aortic valve area was 0.8 cm<sup>2</sup> with a peak systolic gradient of 35 mmHg, and moderate (2–3+) aortic insufficiency.

The patient was admitted at 38 wk gestation for elective induction of labour. She received vaginal prostaglandin gels (1 mg and 2 mg) six hours apart the night before induction. A radial arterial line was inserted and the blood pressure monitored continuously. Labour was augmented by intravenous infusion of oxytocin, followed by artificial rupture of the membranes.

Combined spinal epidural (CSE) analgesia was started early. A 17 G Tuohy needle was inserted into the epidural space at L<sub>3-4</sub>. A spinal Whitacre needle (25 G 4.5") was passed through the Tuohy needle. Sufentanil (10 µg) and bupivacaine (2.5 mg) were injected intrathecally. The patient had pain relief within one minute. She then received a continuous epidural infusion of bupivacaine 0.0625% at 10 ml·hr<sup>-1</sup>.

She remained comfortable throughout the six hour first stage of labour. The 90 min second stage was marked by a slow descent of the vertex to the level of the spinous processes. No pushing was allowed. Trials of delivery by vacuum extraction followed by forceps were attempted without success. Delivery by Caesarean section followed because cephalo-pelvic disproportion would not permit vaginal delivery. There was no fetal distress.

During labour the patient had received 30 ml bupivacaine 0.0625%. Boluses of 4 ml bupivacaine 0.25% and 10 ml bupivacaine 0.125% were administered for the vacuum and forceps trials. The epidural block was further augmented, using 15 ml lidocaine 2% in 5 ml increments over 15 min, resulting in a block to T<sub>4</sub>.

The patient was breathing 5 L·min<sup>-1</sup> oxygen and remained in left lateral tilt throughout the surgery, which lasted 90 min. The ECG, blood pressure, and oxygen saturation were monitored continuously. She remained stable in normal sinus rhythm with an oxygen saturation of 100%.

She received 2.2 L crystalloid and the estimated blood loss was 1.0 L. She received 80 mg gentamicin, 1 g ampicillin and, after the delivery, 15 mg oxytocin. The neonate weighed 2,600 g. The Apgar scores were 7 at one minute and 8 at five minutes.

We used patient controlled intravenous morphine for post operative pain control. The patient was transferred to the coronary care unit where she recovered uneventfully, and was discharged four days later.

### Discussion

Multivalvular lesions challenge the anaesthetist to maintain haemodynamic variables within a narrow range during the rapid physiological changes of pregnancy and childbirth.<sup>1</sup>

Combined spinal epidural (CSE) analgesia provides excellent pain relief with minimal sympatholytic action. Fast onset reduces catecholamine induced stress responses. Continuous spinal anaesthesia with sufentanil has been used for labour in a patient with pulmonary stenosis, with good haemodynamic stability.<sup>2</sup>

General anaesthesia is recommended for patients with severe AS requiring Caesarean section. High dose alfentanil induction maintains haemodynamic stability but may result in neonatal apnoea, bradycardia and low Apgar scores.<sup>3</sup> Epidural anaesthesia with lidocaine 2% with epinephrine has been used for Caesarean section in a patient with severe aortic stenosis, but the cardiac output decreased by 20% following establishment of the block.<sup>4</sup> Spinal anaesthesia with hyperbaric cinchocaine was used in a patient with severe mitral stenosis and pulmonary oedema for emergency Caesarean section.<sup>5</sup> This patient remained haemodynamically stable. These reports suggest that successful anaesthetic management depends on attention to haemodynamic changes, rather than on a particular anaesthetic method.

We used intrathecal sufentanil and 2.5 mg bupivacaine at the onset of contractions. Intrathecal sufentanil gives analgesia for one to two hours. Continuous infusion of low dose local anaesthetic maintained analgesia beyond that time with minimal haemodynamic changes. Small boluses of bupivacaine were needed for the forceps trial. When Caesarean section became necessary, the epidural was working well and the block was increased with minimal blood pressure and heart rate fluctuations.

Blood pressure is best monitored using an arterial line. A central venous catheter allows reliable venous access, and monitors central venous pressures (CVP). It provides a route to introduce a pulmonary artery catheter (PAC). PAC is not without risks, and the benefit of the information obtained must outweigh these.<sup>6</sup> We were concerned about the risk of precipitating arrhythmias with the passage of a PAC. Our patient did not have any documented left ventricular dysfunction, and due to the presence of mitral stenosis and insufficiency, the wedge pressure would not reliably reflect end diastolic pressure.<sup>7</sup> We did not think cardiac output or CVP measurements would alter our management. The use of a PAC for labouring patients with cardiac disease should be assessed on a case-to-case basis, and used if it can provide reliable information.

### Conclusion

This case illustrates the use of CSE in a primigravida with moderate stenosis, and insufficiency, of the mitral and aortic valves. The key to successful management is early analgesia to prevent tachycardia, maintenance of analgesia with low dose epidural infusion to minimize changes in systemic vascular resistance, and careful titration of local anaesthetic to obtain a block suitable for operative delivery.

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