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CASE REPORT

Segmental Anaesthesia for Cesarean Section in a Patient with Severe Dilated Cardiomyopathy and Twin Pregnancy: A Case Report

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ABSTRACT

Dilated cardiomyopathy (DCM) during pregnancy is associated with significant maternal and fetal morbidity due to reduced cardiac reserve and the risk of haemodynamic decompensation. Anaesthetic management becomes particularly challenging in the presence of severe left ventricular dysfunction and twin gestation, as these conditions may further compromise cardiac function and become life-threatening. We report the successful anaesthetic management of a 43-year-old primigravida at 34 weeks of gestation with dichorionic diamniotic (DCDA) twins and severe DCM (left ventricular ejection fraction [LVEF] 28%) undergoing elective caesarean section. Low-dose segmental spinal anaesthesia combined with epidural anaesthesia was employed to achieve controlled sympathetic blockade and maintain haemodynamic stability. With invasive monitoring, inotropic support, and meticulous perioperative care, a favourable outcome was achieved. This case highlights the importance of regional anaesthesia in managing high-risk cardiac parturients.

Keywords: Dilated cardiomyopathy, caesarean section, twin pregnancy, segmental spinal anaesthesia, epidural anaesthesia

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INTRODUCTION

Dilated cardiomyopathy (DCM) in pregnancy is a high-risk condition associated with significant maternal and fetal morbidity and mortality due to impaired myocardial contractility and reduced cardiac reserve. It is characterized by ventricular dilatation and systolic dysfunction, often leading to heart failure, arrhythmias, and thromboembolic complications.[1,2] The physiological cardiovascular adaptations of pregnancy—including increased blood volume, heart rate, and cardiac output—further worsen cardiac function in these patients.[1]

The risk is particularly high in patients with severe left ventricular dysfunction (LVEF < 30%) and advanced functional class (NYHA III–IV), in whom pregnancy may precipitate decompensated heart failure or sudden cardiac death.[2,3] Twin pregnancy imposes an even greater haemodynamic burden owing to the higher circulating volume and elevated cardiac output requirements.

The anaesthetic management of caesarean section in such patients is challenging and requires careful selection of technique to maintain haemodynamic stability. General anaesthesia may cause myocardial depression and adverse sympathetic responses during laryngoscopy, while conventional spinal anaesthesia can result in sudden sympathetic blockade leading to severe hypotension.[4,5]

A low-dose sequential combined spinal–epidural technique may permit gradual establishment of neuraxial anaesthesia, and thoracic segmental spinal anaesthesia has also been described in selected high-risk obstetric patients.[6,7] The available evidence is predominantly case-based and does not establish superiority over a graded epidural or general anaesthesia. We report the anaesthetic management of a parturient with severe dilated cardiomyopathy and twin pregnancy using a combined segmental spinal–epidural technique.[8,9]

CASE REPORT

A 43-year-old primigravida at 34 weeks of gestation with a dichorionic diamniotic twin pregnancy and a known history of dilated cardiomyopathy presented for elective lower segment caesarean section (LSCS). She had been attending antenatal care irregularly at a sub-centre. She had a history of hospitalization five years previously with features consistent with DCM, at which time she was commenced on medication and counseled against future pregnancy. The patient was non-compliant with follow-up and subsequently conceived through in vitro fertilization for infertility.

Pre-anaesthetic evaluation revealed a heart rate of 140 beats per minute, blood pressure of 100/60 mmHg, and oxygen saturation (SpO_2) of 96% on room air. She was classified as NYHA Class III with no pedal edema or clinical features of congestive heart failure. Cardiovascular examination demonstrated normal first and second heart sounds with a systolic murmur.

Investigations revealed haemoglobin 12 g/dL, NT-proBNP 674 pg/mL, prothrombin time 13.86 seconds, and INR 1.01; renal function tests and serum electrolytes were within normal limits. Electrocardiography showed left axis deviation, non-specific ST–T changes, and left bundle branch block (LBBB). Obstetric ultrasonography confirmed a DCDA twin gestation with estimated fetal weights of 1,518 g (Fetus A) and 1,697 g (Fetus B). Echocardiography, performed following cardiology referral, demonstrated dilated left atrium and left ventricle, severe global

hypokinesia, severe mitral regurgitation, Grade III left ventricular diastolic dysfunction on mitral annular tissue Doppler imaging (septal E/e' ratio 46, indicative of raised left ventricular end-diastolic pressure), and severe systolic dysfunction with LVEF 28%. The patient was diagnosed with DCM with severe left ventricular dysfunction and LBBB and was commenced on carvedilol 6.25 mg twice daily and torsemide 5 mg once daily.

The decision for elective LSCS was taken in view of severe left ventricular dysfunction (LVEF 28%), NYHA Class III functional status, DCDA twin pregnancy, and the high risk of haemodynamic decompensation during labour.

Combined segmental spinal–epidural anaesthesia was planned to achieve controlled sympathetic blockade, avoid sudden hypotension, maintain stable preload, and avoid myocardial depression. A contingency plan for conversion to general anaesthesia was established in the event of technique failure or a perioperative cardiac event.

Informed high-risk consent was obtained for the risk of perioperative cardiac events. Overnight fasting was observed. Intravenous furosemide 10 mg was administered preoperatively. The patient was brought to the operating theatre, and standard ASA monitoring (ECG, non-invasive blood pressure, SpO_2) was established. The team secured venous access via an 18-gauge peripheral cannula in the left forearm and obtained central venous access via the right internal jugular vein. The team performed right radial arterial cannulation for continuous invasive blood pressure monitoring. A defibrillator with self-adhesive pads was maintained on immediate standby for prophylactic use.

We began an intravenous dobutamine infusion at 5 mcg/kg/min to enhance cardiac contractility and commenced colloid co-loading. An 18-gauge epidural catheter was placed at the L2–L3 intervertebral level under stringent aseptic conditions, with loss of resistance to saline verified using a continuous drip technique, for intraoperative anaesthesia and postoperative analgesia.

Segmental spinal anaesthesia was subsequently delivered at the T9–T10 intervertebral level utilizing 0.8 mL of isobaric 0.5% levobupivacaine combined with 20 mcg of fentanyl as an adjunct, aiming for a sensory block at the T4 dermatomal level. Supplemental oxygen was delivered at 5 L/minute via a Hudson mask. Ten minutes following intrathecal injection, an epidural top-up with 0.25% plain bupivacaine 10 mL was administered to maintain anaesthetic effect.

Surgery commenced, and two live neonates were delivered, weighing 1.5 kg and 1.7 kg, with Apgar scores of 5 and 7 at one and five minutes (Neonate A) and 6 and 8 at one and five minutes (Neonate B). After delivery of the twins and umbilical cord clamping, oxytocin (5 international units) was administered intramuscularly into the right deltoid muscle because it can cause hypotension and tachycardia when given as a rapid intravenous bolus. Vigilant monitoring was maintained throughout for signs of autotransfusion-related pulmonary edema.

A single episode of hypotension (blood pressure 88/52 mmHg) occurred following spinal anaesthesia and was managed with an intravenous phenylephrine bolus of 100 mcg, restoring blood pressure to 98/65 mmHg. Thereafter, blood pressure was maintained with a mean arterial pressure of 68–72 mmHg,

a heart rate of 110–130 beats per minute, and SpO_2 of 100% on supplemental oxygen.

Total operative duration was 1 hour 10 minutes. Intraoperative fluid input comprised 400 mL of colloid and 200 mL of Ringer's lactate solution. Estimated blood loss was 800 mL, and urinary output was 200 mL. Intravenous furosemide 10 mg was administered at the conclusion of surgery.

The patient reported no chest pain, diaphoresis, tachypnoea, or dyspnoea, and maintained haemodynamic stability throughout. An epidural infusion of 0.125% plain bupivacaine at 5 mL/hour was commenced for postoperative analgesia. The patient was transferred to the intensive care unit for monitoring, with the dobutamine infusion tapered accordingly.

Postoperative care focused on maintaining adequate oxygenation and analgesia and preventing thromboembolic complications. The remainder of the hospital stay was uneventful.

DISCUSSION

Pregnancy in individuals with dilated cardiomyopathy poses a significant risk of adverse cardiac events, especially in cases exhibiting severe systolic dysfunction and NYHA Class III symptoms, as demonstrated in our case. The heightened circulatory demands of twin pregnancy intensify myocardial workload and predispose individuals to heart failure and arrhythmias.[1,3]

The choice of anaesthetic technique is critical in minimizing perioperative risk. General anaesthesia, although sometimes necessary, is associated with potential myocardial depression and exaggerated haemodynamic responses during airway manipulation.[6] Conversely, single-shot spinal anaesthetic may induce rapid sympathetic blockade, potentially resulting in abrupt hypotension and diminished cardiac perfusion, which can be challenging for those with cardiovascular conditions to tolerate.[4,5]

In this case, low-dose isobaric levobupivacaine with fentanyl was administered intrathecally, followed by an epidural top-up. The intended rationale was to limit the initial intrathecal dose and allow supplementation through the epidural catheter. Reports describe low-dose sequential combined spinal–epidural techniques and thoracic segmental spinal anaesthesia in selected cardiac or high-risk obstetric patients; however, these reports are small and do not establish comparative safety or superiority.[6,7,8,9] Thoracic neuraxial anaesthesia also carries concerns including direct spinal cord injury, excessive cephalad spread, and haemodynamic effects from sympathetic blockade, which should be acknowledged when discussing this approach.[8]

Invasive haemodynamic monitoring with an arterial line and central venous pressure measurement was essential for the early detection of instability and guided fluid and vasopressor therapy. Dobutamine infusion supported cardiac output by improving myocardial contractility, as recommended in patients with severe left ventricular dysfunction.[10]

Hypotension following neuraxial anaesthesia was effectively managed with phenylephrine, which is considered an appropriate vasopressor in obstetric anaesthesia owing to its ability to maintain systemic vascular resistance without causing significant tachycardia.[11]

Oxytocin administration requires caution in cardiac patients due to its vasodilatory effects, which may cause hypotension and reflex tachycardia. In our case, intramuscular

administration of a low dose was chosen to avoid abrupt haemodynamic changes, consistent with recommended practice.[11]

Following delivery, autotransfusion from uterine contraction can significantly increase cardiac preload and precipitate pulmonary edema in patients with impaired ventricular function. Vigilant monitoring and furosemide helped prevent fluid overload and cardiac decompensation.[10]

This case describes the use of combined segmental spinal–epidural anaesthesia in one parturient with severe dilated cardiomyopathy. The favourable intraoperative course in this patient does not establish the safety or superiority of this technique; careful selection, planning, monitoring, and multidisciplinary care remain important.

CONCLUSION

The anaesthetic management of parturients with severe dilated cardiomyopathy poses a significant clinical challenge and requires individualized haemodynamic planning. This case illustrates the use of a combined segmental spinal–epidural technique in one parturient with markedly reduced ventricular function. Interpret the outcome as a single-patient experience rather than evidence of comparative safety or efficacy.

Successful management in such high-risk cases depends on adherence to haemodynamic goals: maintenance of optimal preload, avoidance of sudden reductions in systemic vascular resistance, preservation of myocardial contractility, and prevention of tachyarrhythmias. Invasive monitoring, judicious fluid therapy, and goal-directed vasoactive support are pivotal in minimizing perioperative complications.

Cautious administration of uterotonic agents and vigilant monitoring during the immediate postpartum period are essential to prevent acute cardiac decompensation from rapid haemodynamic shifts.

This case highlights the importance of individualized perioperative planning and multidisciplinary collaboration in severe cardiac disease. The role of segmental spinal–epidural anaesthesia in this setting requires cautious interpretation because the supporting literature remains largely case-based.

AUTHORS' CONTRIBUTIONS

Concept and design: RK, RT

Literature review: RK, RT

Compilation of manuscript: RK, RT

Manuscript editing and proofreading: RK, RT

DECLARATION OF CONFLICTS OF INTEREST

The authors declare no competing interests.

DECLARATION OF PATIENT'S CONSENT

Informed written consent was obtained to use data regarding the patient, procedure, and related complications for publication purposes.

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