



Caesarean section under spinal anesthesia for a mother with dilated cardiomyopathy in a resource-limited setting: a case report

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Introduction and importance: Peripartum cardiomyopathy is an uncommon form of cardiomyopathy that develops in the latter stages of pregnancy or in the first few weeks following delivery. Anaesthetic management of caesarean section of a parturient with dilated cardiomyopathy is challenging due to its nature of impaired ventricular contractility coupled with cardiovascular changes during pregnancy. This is significantly worse in a resource-constrained environment with restricted access to medications and equipment.

Case presentation: We report a case of a 31-year-old multigravida parturient presented with a diagnosis of dilated cardiomyopathy and a low ejection fraction undergoing emergency caesarean section. Successful management of a parturient with dilated cardiomyopathy undergoing a caesarean section under spinal anaesthesia is reported in this case report.

Clinical discussion: Spinal anaesthesia is another alternative for the successful management of patients with dilated cardiomyopathy (DCM) using a low dose of bupivacaine with intrathecal adjuvants. Our report indicates that caesarean section also may be managed safely with spinal anaesthesia alone in patients with DCM, by using low-dose bupivacaine and intrathecal morphine. The slight haemodynamic changes were adjusted with fluid infusion. The use of vasopressors was not required to manage the hypotension.

Conclusion: General anaesthesia, epidural alone, and epidural combined with spinal anaesthesia are the widely used anaesthetics techniques for caesarean section in patients with heart disease. Spinal anaesthesia with low-dose bupivacaine with opioids is another suitable choice. The case report is written according to the CARE guideline (<https://www.care-statement.org>).

Keywords: caesarean section, dilated cardiomyopathy, spinal anaesthesia

Introduction

Dilated cardiomyopathy (DCM) is a disease of the heart muscle characterized by enlargement and dilation of one or both ventricles along with impaired contractility. Patients may or may not have overt heart failure symptoms, but they do have systolic dysfunction^[1]. Pregnancy by itself is associated with significant hemodynamic burden and cardiovascular changes, which, when coupled with dilated cardiomyopathy, results in increased morbidity and mortality in both mother and child^[2]. Perioperative management of such a condition presents serious challenges to the anaesthesia teams. The major anaesthetic concern while managing these patients is to maintain stable intraoperative

HIGHLIGHTS

- Spinal anaesthesia with low-dose bupivacaine plus intrathecal opioid has stable vital signs.
- Mothers with dilated cardiomyopathy undergoing caesarean section can be managed by spinal anaesthesia with low-dose bupivacaine plus intrathecal opioids.

hemodynamics in the face of impaired cardiac contractility^[3]. We present a case of a mother with DCM undergoing caesarean section under spinal anaesthesia.

Case report

A 31-year-old gravida III and para II mother with 37 weeks of pregnancy was brought to the operating theatre for an emergency caesarean section. During her previous pregnancy, she gave birth to her first baby through spontaneous vaginal delivery; the second baby was delivered through a caesarean section for twin pregnancies, and meconium grade III is being diagnosed. During her second peripartum period, she was diagnosed with DCM, for which she was taking metoprolol and furosemide, but her symptoms were not controlled during her arrival to the operating room.

In the preoperative period, the patient had easy fatigability, dry cough, orthopnoea and paroxysmal nocturnal dyspnoea. She has a slight limitation of physical activity. Ordinary physical activity results in fatigue, palpitation and dyspnoea [New York Heart

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Association (NYHA) class II]. On physical examination, her heart rate (HR) was 112 bpm, blood pressure (BP) 106/58 mmHg, and oxygen saturation (SpO₂) 90% while breathing room air. On auscultation, an audible systolic ejection murmur was heard. No bilateral pedal oedema was observed.

Laboratory investigation results showed haemoglobin (Hb) 14.2 g/dl, and the results of the renal function test, liver function test, coagulation profile, and serum electrolytes were all normal. According to the 12-lead electrocardiogram (ECG) result, a left bundle branch block with severe left axis deviation was seen. Echocardiographic findings were moderate mitral regurgitation with reduced left ventricular systolic function with an estimated ejection fraction of 40%.

After high-risk informed and written consent was obtained, the patient was transferred to the operating theatre, where an 18-G cannula was inserted bilaterally and routine non-invasive monitoring including SpO₂, NIBP (non-invasive blood pressure) and ECG was attached. The patient was premedicated with metoprolamide [10 mg intravenous (i.v.)] and preloaded with 500 ml of normal saline (NS) before spinal anaesthesia. Baseline vital signs were BP (blood pressure) 106/58 mmHg, PR (pulse rate) 112 bpm, and SpO₂ 90% without oxygen. After a strict aseptic technique, spinal anaesthesia was administered with 1.5 ml (7.5 mg) of heavy bupivacaine and 0.2 mg of morphine at L3–L4 using a 24G spinal needle. Thereafter, the patient was immediately turned to a supine position with slight head elevation using a pillow. The sensory and motor blocks were evaluated by a sense of coldness and the Modified Bromage Scale.

After a successful block of the T6 sensory level, surgery was commenced, and a female baby weighing 3 kg was delivered within 4 min of the incision. Oxygen was administered at 6 ml/min with a Venturi facemask for the mother. Heart rate, systolic and diastolic blood pressure were recorded every 5 min until the end of surgery. A bolus of 5 IU of oxytocin administered slowly, followed by a continuous infusion of 20 IU/500 ml of NS at a rate of 30 drops per minute was administered after clamping the umbilical cord. The Apgar score was 8 and 10 at 1 and 5 min, respectively. Her intraoperative haemodynamic status was satisfactory compared to her baseline vital signs (Fig. 1), and vasopressors were not required. She received a total of 400 ml of NS intraoperatively, and the total estimated blood loss was 300 ml. The duration of the surgery was 30 min.

Outcome and follow-up

She was transferred to the recovery room safely, and her vital signs were stable throughout the postoperative period, and the patient was discharged 5 days later after satisfactory haemodynamic status.

Discussion

For anaesthetists, managing patients with DCM is extremely difficult. These patients have a substantial risk of postoperative death in addition to congestive heart failure, arrhythmias and embolic events. The severity of ventricular dysfunction and the presence of valvular abnormalities should be assessed using echocardiography during the preoperative period, and arrhythmias should be properly managed^[4]. The goals of anaesthesia management are to avoid myocardial depression, maintain appropriate preload, prevent increases in afterload, avoid tachycardia, and prevent abrupt hypotension by careful titration of anaesthetic agents^[5].

Since there have been reports of complications with both techniques, it is uncertain which anaesthetic technique is preferred: general or regional^[6]. Anaesthetic technique will be influenced by the urgency of delivery and the physiological condition of the parturient^[7]. The stress of laryngoscopy and intubation, coupled with the myocardial depressant effects of the drugs, has deleterious effects on both the mother and neonates during general anaesthesia. Vasodilation and myocardial depression are caused by thiopentone, propofol and inhalational drugs. Ketamine, etomidate and narcotics have negligible effects on hemodynamics^[8]. Nitrous oxide and benzodiazepines both have the potential to lower heart rate^[9]. Haemodynamic stability is provided by narcotics, and a balanced anaesthetic strategy should be applied^[10].

It is possible to use regional anaesthesia, incremental top-up of an epidural, or a combined epidural and low-dose spinal anaesthetic method^[11]. Vasodilation associated with regional block may lead to a critical reduction of cardiac output and peripheral vascular resistance. Many clinicians advocate epidural anaesthesia techniques and the use of selective vasopressors (norepinephrine, phenylephrine or ephedrine) for successful management of caesarean section. However, none of those are

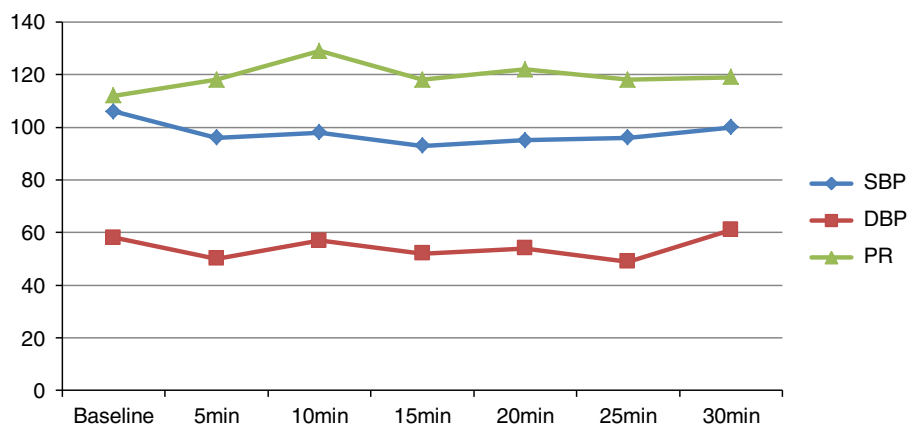


Figure 1. Intraoperative systolic blood pressure (SBP), diastolic blood pressure (DBP) and pulse rate (PR) changes over time.

available in our set-up due to resource limitations. Many case reports are available about epidural anaesthesia alone^[12,13] or combined with spinal anaesthesia^[14–16] have been used safely for caesarean section in patients with DCM.

Spinal anaesthesia is another alternative for successful management of patients with DCM using a low dose of bupivacaine with intrathecal adjuvants^[13,16]. Our report indicates that caesarean section also may be managed safely with spinal anaesthesia alone in patients with DCM, by using low-dose bupivacaine and intrathecal morphine. The slight haemodynamic changes were adjusted with fluid infusion. The use of vasopressors was not required to manage the hypotension.

Conclusion

General anaesthesia, epidural alone and epidural combined with spinal anaesthesia are the widely used anaesthetics techniques for caesarean section in patients with heart disease. Spinal anaesthesia with low-dose bupivacaine with opioids is another suitable choice. Our evidence is very helpful for settings with a limited supply of resources needed for anaesthetic management.

Ethics approval

Not required.

Consent

Written informed consent was obtained from the patient for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

M.D.: study concept or design, data collection, data analysis or interpretation, and preparing the manuscript.

Conflicts of interest disclosure

No conflicts of interest to declare.

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Not required.

Guarantor

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Data availability statement

The data supporting the current study are available from the corresponding author upon reasonable request.

Provenance and peer review

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