CASE REPORT

SEQUENTIAL COMBINED SPINAL EPIDURAL ANAESTHESIA FOR CAESAREAN SECTION IN PERIPARTUM CARDIOMYOPATHY

Dr. Kumari Indira¹ Dr. Kumar Sanjeev² Dr. Gupta Sunanda³

SUMMARY
Peripartum cardiomyopathy (PPCM) is defined as the onset of acute heart failure without demonstrable cause in the last trimester of pregnancy or within the first 6 months after delivery. We report a case of PPCM (LVEF<25%) requiring caesarean section who was successfully managed with sequential combined spinal epidural anaesthesia.

Keyword : Peripartum cardiomyopathy, Sequential combined spinal epidural anaesthesia, Caesarean section.

Introduction
Peripartum cardiomyopathy (PPCM) is a dilated cardiomyopathy which occurs in the last few months of pregnancy or during the first five months of postpartum period in women without previous evidence of heart disease and with no other definable cause for heart failure. PPCM occurs in approximately 1 per 10,000 deliveries with a reported mortality range of 30-60%.¹ The diagnosis of PPCM presents a challenge because many normal parturients in the last month of pregnancy experience dyspnoea, fatigue and pedal oedema; symptoms identical to early congestive cardiac failure. A high index of suspicion of heart failure includes paroxysmal nocturnal dyspnoea, chest pain, nocturnal cough, new regurgitant murmurs, pulmonary crackles, elevated jugular venous pressure and hepatomegaly. Diagnosis rests on echocardiographic (ECHO) identification of new left ventricular systolic dysfunction during a limited period around parturition when other causes of cardiomyopathy have been excluded. The treatment comprises sodium restriction, digoxin, loop diuretics, afterload reduction, anticoagulants and inotropic support. More recently, selenium pentoxyfylline and immunoglobulins have all shown to have a beneficial effect.

We present a patient with PPCM requiring caesarean section (CS) who was managed with sequential combined spinal epidural (CSE) anaesthesia.

Case report
A 22yr old (weight 54 kg) primigravida at 36 weeks gestation with a Mallampati class I airway was taken for emergency CS. Indication for CS was non-progress of labour. One and a half month before she had complained of fatigue, dyspnoea on exertion and palpitation. A cardiology consultation was obtained and an ECHO revealed generalized hypokinesia, moderate left ventricular dysfunction (Ejection Fraction (EF)<25%) with minimal pericardial effusion. Her management strategy included salt restricted diet, digoxin 0.25 mg OD, frusemide 20 mg OD and spironolactone 50 mg OD. Though anticoagulation has been advocated in patients with EF<35% to avoid risks of thromboembolism², the cardiology consult did not include thromboprophylaxis in this case. This rural patient was in labour for 36 hrs at a district hospital (which was 40kms away from our hospital) where they did her coagulation profile and other relevant investigations but omitted a cardiology consult due to non-availability. She was shifted to our hospital and taken up for emergency LSCS, when both the anaesthesiologist and cardiologist were called. At that time, it was the cardiologist’s decision to start anticoagulation post-operatively, also taking into consideration our desire to give a “sequential” CSE.

On arrival in the operative room the patient was asymptomatic. Her pulse-rate was 92 beats/min, blood pressure was 100/70mmHg and SpO2 was 98% with a clear chest on auscultation. The coagulation profile (PT/INR, platelet count, APTT, thrombin time and fibrinogen), haematocrit (PCV) and electrolytes (Na,K) were within normal limits. Intravenous line with 18-gauge cannula was established and an infusion of lactate Ringer’s solution was started. Central venous pressure (CVP), non invasive blood pressure (NIBP), electrocardiogram (ECG) and O2 saturation were monitored perioperatively.

A CSE was performed at L3-4 interspace in left lateral decubitus position. Five mg of hyperbaric bupivacaine
(1 ml of 0.5%) together with 20 microgram of fentanyl was injected intrathecally through a 27-gauge Quincke needle which was introduced through an 18G Tuohy needle. An epidural catheter was inserted and no local anaesthetic was given epidurally at this stage. The patient was placed in supine position and a Cardiff wedge was inserted under the right hip to minimise aorto-caval compression. A T₅ sensory block was targeted. The upper levels of sensory block obtained was T₁₀ at five min and T₅ at seven min. This was further extended with fractionated doses of 2% lignocaine administered through the epidural catheter till the block height reached T₃.

The patient was haemodynamically stable throughout the surgery. APGAR scores of the neonate were 9/10. Postoperatively the patient was transferred to intensive care unit. Postoperative analgesia included rectal diclofenac and epidural fentanyl. The patient was discharged on the 7th day after uneventful recovery.

**Discussion**

Cardiomyopathy is usually a diagnosis of exclusion. Predisposing factors for this disease include advanced maternal age, multiparity, multiple gestation, pre-eclampsia and poor nutritional status. Treatment goal is to reduce the amount of volume returning to the heart (preload reduction), decrease the resistance against which heart must pump (after load reduction) and increase the contractile force of the heart (inotropy). Combination of hydralazine and nitro-glycerine or amlodipine provide needed afterload reduction while diuretics and low dose oral nitrates can be used for preload reduction. Oral inotropic therapy is provided by digoxin. The course of disease relates to the duration and severity of cardiomegaly.

The presence of PPCM requires expert anaesthetic management for labour or for cesarean section. Aggressive pain management for labour is indicated to keep heart rate and systemic vascular resistance under control and to attenuate the volume over loading effect of each uterine contraction. This patient was in labour for 36 hrs and managed on parenteral NASIDS but the anaesthesiologist was called in only for CS. Many authors have used invasive monitoring to manage more symptomatic cases while others have used a non-invasive monitoring technique for asymptomatic and haemodynamically stable patient. We resorted to monitor the CVP along with NIBP, continuous ECG monitoring and SpO₂ measurement as the patient was asymptomatic and haemodynamically stable.

We preferred a sequential CSE technique which provides better haemodynamic stability as compared to a conventional epidural or spinal technique or general anaesthetic. The purported advantages of a regional technique include: vasodilation which is beneficial in isolated left ventricular dysfunction, prevention of thromboembolic events and reduced epinephrine and nor epinephrine levels.

General anaesthesia with high dose opioids to avoid myocardial depression has been recommended in symptomatic patient but there are increased chances of narcotic related neonatal respiratory depression as seen by Carroll et a₁ who used remifentanil in a patient with PPCM and required naloxone to reverse the respiratory depression in the neonate. Similarly Chan & NganKee¹ reported a case of idiopathic dilated cardiomyopathy undergoing CS under general anaesthesia (GA). GA was preferred because of relative urgency, the patient’s wish and concerns about potential risk of spinal hematoma (as the patient was on low molecular weight heparin (LMWH). Her postoperative course was complicated by severe embolic stroke five weeks after delivery and she died five months later. Mc Indoe et al² described a previously asymptomatic patient who presented with a cardiac arrest at induction of GA for emergency CS who subsequently developed acute heart failure. Similarly Wake et al³ reported cardiac arrest immediately after the start of surgical procedure during emergency CS under GA to PPCM.

Though in our case the patient was not on anticoagulation, hence the risk of hematoma is avoided. Epidural anaesthesia with titrated small aliquots of local anaesthesia has been successfully used by Breen and Janzen⁴ and Fukuda et al⁵ in such cases.

We prefered CSE, because intraoperative patient satisfaction, anxiolysis and post operative pain scores have been superior with CSE. If haemodynamic stability is required a deliberately low spinal block can be extended by injecting local anaesthetic or saline into the epidural space in small doses of 5 ml of 2% lignocaine in epidural space. There was no hypotension and a healthy baby was delivered.

Similary Shnaider et al⁶ reported a case of peripartum dilated cardiomyopathy presenting for CS who was successfully managed with CSEA. They injected 6 mg of hyperbaric bupivacaine with 20 microgram fentanyl intrathetically and fractionated doses of 5 ml of 2% lignocaine in epidural space. There was hypotension and a healthy baby was delivered.
However, Pirlet et al.\(^{11}\) reported significant haemodynamic changes with reduction of heart rate and hypotension. They performed a CSE using one ml of 0.5% hyperbaric bupivacaine with 0.3mg diamorphine intrathecally and epidural extension with 10 ml of 0.5% bupivacaine. High doses of local anaesthetic used for epidural extension could be responsible for the haemodynamic instability.

Continuous spinal anaesthesia with bupivacaine in a patient with PPCM and CHF undergoing CS has been successfully managed by Velickovic and Heicht.\(^{12}\) Both the patients remained haemodynamically stable during surgery.

The aim of this case presentation: A PPCM parturient presenting for LSCS requires to be kept haemodynamically stable. We have used a technique of “Sequential” CSE, wherein we have used a low dose of 5mg 5% bupivacaine and 20 microgram fentanyl in the subarachnoid space and introduced an epidural catheter without giving a local anaesthesia. The block was extended subsequently with two doses of 2ml of 2% lignocaine each injected epidurally till the block height reached T\(_5\) dermatome. This technique of sequentially extending the block of dermatomes with small increments of local anaesthetic avoids precipitous hypotension as observed with conventional CSEA techniques, wherein larger bolus doses of drugs are given epidurally to extend the block.

This technique is specifically highlighted, so as to make anaesthesiologists aware of its advantages over conventional CSEA in a high risk cardiac compromised parturient.

**Conclusion**

We conclude that sequential CSEA is an acceptable option for patient with PPCM undergoing CS. Since the patient remained haemodynamically stable throughout procedure with this technique, risk of thromboembolism is also reduced as compared to GA. Thromboembolic complication is common and early consideration should be given to prophylactic anticoagulation, especially in cases where the LVEF is <35\%. Careful monitoring of fluid balance is obligatory and CVP lines are recommended.

Prompt recognition of the condition, initiation of appropriate medical management, collaboration with perinatology for delivery management, thromboprophylaxis (in LVEF <35\%) and haemodynamic stability perioperatively are required for a successful outcome in such patients.

**References**