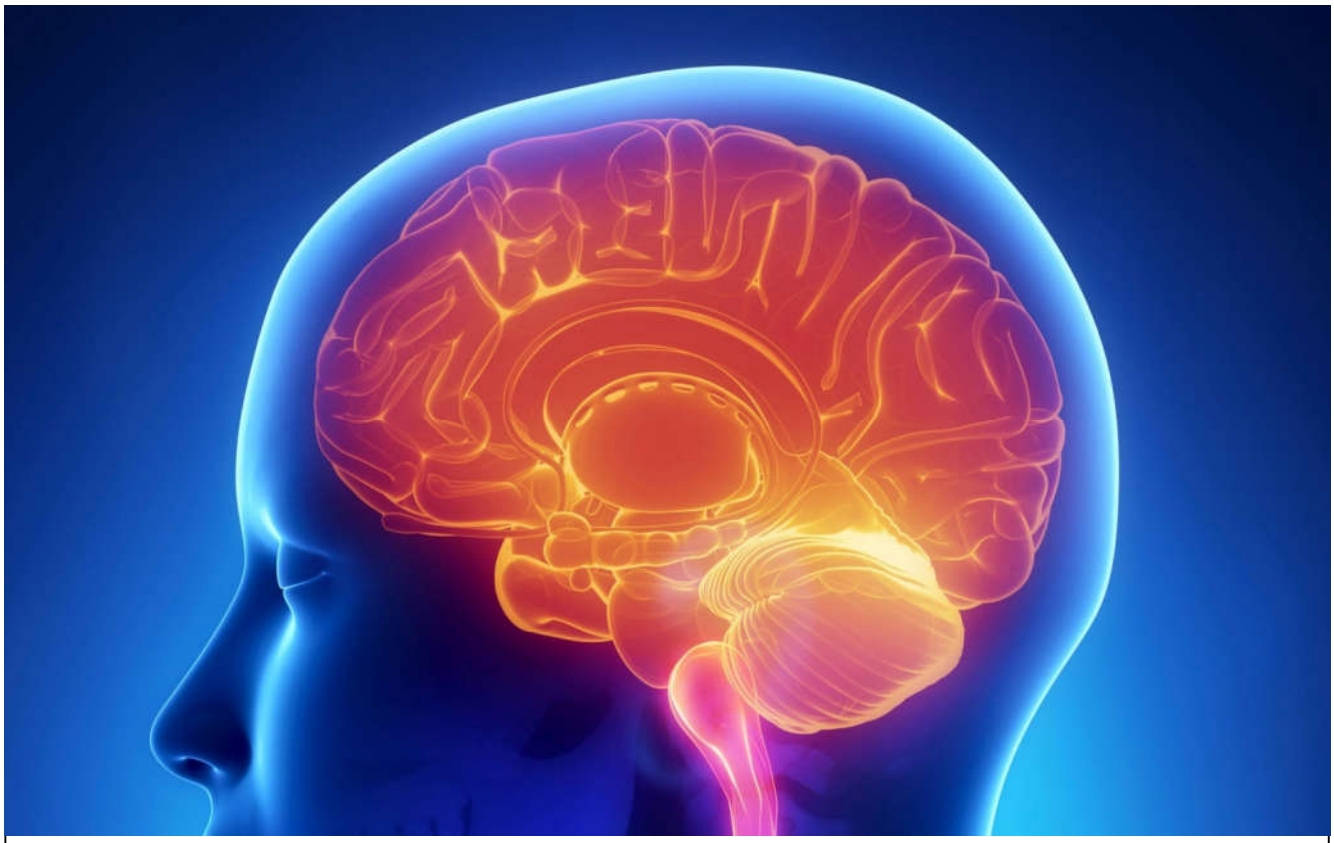

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LOW DOSE SPINAL ANESTHESIA FOR EMERGENCY CESAREAN SECTION IN A PARTURIENT WITH PERIPARTUMCARDIOMYOPATHY: A CASE REPORT

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ABSTRACT

Peripartum cardiomyopathy (PPCM) is a rare, dilated form ofcardiomyopathyof unknown cause that arises duringperipartumperiod, i.e., from 3rd trimester of pregnancy until 5 months after delivery. It occurs in women with no history of heart disease and can result in severe ventricular dysfunction. Anesthetic management for caesarean section (CS) in such patients remains a challenge. We report a case of A 35 year old second gravida parturient suffering from PPCM (ejection fraction 40%) who came to emergency with labor pain. She was taken for emergency CS for fetal distress andwas successfully managed with low dose spinal anesthesia using 7.5 mg hyperbaric bupivacaine with 25 mcg fentanyl intrathecally. Her perioperative course was uneventful. We conclude that low dose spinal anesthesia is a quick, safe and reliable anestheticoption for emergency CS in a parturient having PPCM.

INTRODUCTION

Peripartum cardiomyopathy (PPCM) is a rare, dilated form of cardiomyopathy of unknown cause that arises during peripartum period, i.e, from 3rd trimester of pregnancy until 5 months after delivery. It occurs in women with no history of heart disease. Risk factors are obesity, multiparity, advanced maternal age (>30yrs), multifetal pregnancy & preeclampsia. Possible etiology may be viral myocarditis or maladaptive responses to the hemodynamic stresses of pregnancy. An echocardiography prior to delivery gives idea about severity status parturient and mode of delivery and anesthetic technique feasible. We present a patient with PPCM posted for emergency cesarean section managed with low dose spinal anesthesia due to time constraint in order to avoid fetal and maternal morbidity although combined spinal epidural (CSE) anesthesia is preferred regional technique which is relatively time consuming in this scenario. Moreover, very few cases have been reported under spinal anesthesia alone although CSE and general anesthesia (GA) performed in majority as per the patient's status.

Case Report

A 35 yearold,50kg, second gravida female with 36 weeks of gestation came to obstetric emergency of our institute with labor pain (April 2015). She had an uneventful history of previous CS in spinal anesthesia 3 years back. She was diagnosed as a case of PPCM in present pregnancy during her last trimester (February 2015) by echocardiography (echo) which was done at some private hospital where she consulted for complaints of breathlessness on severe exertion (NYHA class II). Echo report showed left ventricle(LV) size in upper limit (LVID ED 5.48cm, LVID ES 4.35cm), global hypokinesia of LV, grade 1/4 MR, grade 1/4 TR, mild pulmonary arterial hypertension PASP=33.5 mm Hg and left ventricle ejection fraction (EF)-40%. Atrial and ventricular septae were intact, no LV thrombus and no pericardial pathology seen. As there was no previous history of heart disease hence diagnosis of PPCM was made. As this patient was from a village, uneducated, she could not give much detail about anytreatment received, except this echo report. At present she was not on any medication. She was in labor pain and obstetrician decided emergency CS for fetal distress. Anesthetic evaluation was done in operating room. Only available investigations were hemoglobin: 10.5gm/dl, random blood sugar: 130 mg%, coagulation profile – BT: 1.40 minutes and CT:3.20 minutes. She was not fasting (tea and biscuits were taken 4 hours back). Baseline blood pressure (BP)-134/86 mm Hg, heart rate (HR)- 110/min, regular, SpO_2-98%, chest was clear, pedal edema present. She was able to lie supine without respiratory distress; however, intermittent labor pains were causing discomfort. Weighing risks and benefits low dose spinal anesthesia was planned for emergency CS under supervision of cardiac and obstetric anesthesiologist. Two peripheral intravenous lines with 20-gauge cannula were established, and gradual co-loading of crystalloid Ringer's

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lactate (RL) was started. The standard monitoring including non-invasive blood pressure, electrocardiogram and pulse oximetry were attached. Provisions of invasive arterial BP and central venous pressure monitoring were kept as standby. Infusion pumps of dopamine, dobutamine and all emergency drugs were prepared.

Taking all aseptic precautions lumbar puncture was performed in left lateral position at L3-L4 interspace via midline approach using 25 G Quincke's spinal needle. After getting a free flow of CSF 7.5mg (1.5ml, 0.5%) hyperbaric bupivacaine with 25mcg (0.5ml) fentanyl was injected intrathecally. Patient was turned supine; a 15cm wedge was placed under right hip to maintain left lateral tilt. Oxygen with ventimask was given at 5 l/min. A T6 sensory block was obtained in 5 min and surgery was allowed to commence. Patient had received 500ml RL till now. Five minutes into the surgery BP dropped slightly to 98/55 mm Hg which was treated with 6 mg mephentermine, otherwise patient remained hemodynamically stable throughout the surgery with BP ranging from 100-140/55-85 mm Hg, HR 90-120/min, SpO_2 remained 100% on oxygen. A healthy male baby of 2.4 kg with APGAR score of 9/10 at 1 min was delivered. Intra-operatively patient received 700 ml RL and oxytocin 10 units, and urine output was 200 ml. At the end of surgery 10mg frusemideIV was given to decrease preload and shifted to obstetric ICU.

Post-operative analgesia was maintained with diclofenac 75 mg IM TDS and tramadol 100mg IV SOS, as per protocol. Cardiologist opinion was taken who prescribed tab amlodipine 5mg OD to decrease afterload. Her further course was uneventful and discharged on 7th day, with advice of monthly follow up in cardiology department.

DISCUSSION

A possible relationship with pregnancy was recognized as early as the1870sand was classified as a distinct entity in the 1930s [1].

Current Diagnostic Criteria for PPCM [2] are:

1. development of cardiac failure in the last month of pregnancy or five months of delivery
2. absence of preexisting heart disease
3. in determinant cause
4. Echocardiographic findings (a, together with b or c; or all of these)

   A. Left ventricular end-diastolic dimension >2.7 cm/m^2
   B. M-mode fractional shortening <30%
   C. Left ventricular ejection fraction <0.45

The actual incidence of PPCM is not known. It contributes less than 1% of all cardiovascular events related to pregnancy. . The estimated incidence in US is 0.03% to 0.06% [3].

Risk factors associated with PPCM are obesity, multiparity, advanced maternal age (>30yrs)**,** multiple pregnancy, African descent, familial, cocaine abuse, selenium deficiency etc [4].The exact etiology of PPCM is still not known. Various hypotheses have beenproposed like genetic, myocarditis that could be viral or autoimmune, maladaptive responses to the hemodynamic stresses of pregnancy and abnormal immune response to fetal cells etc [3].Patients of PPCM usually present with dyspnea, cough, orthopnea, paroxysmal nocturnal dyspnea, chest pain, palpitation, pedal edema etc. A clinical diagnosis may be confounded initially due to similar physiological changes of pregnancy. The complications like arrhythmias, thromboembolic events and systemic embolism involving brain, spleen and kidney, and finally multiorgan failure can occur [4].

A preterm delivery rate of 25% and maternal mortality rate of 15-50% has been reported [6]. Various factors such as black women, multiparity, LVEF<30% are indicators of worst outcome. Generally full recovery of LV function usually occurs in 6 months after delivery as documented by attainment of NYHA class I and LVEF>50% but may take 1-2 years. Predictors of persistent LV dysfunction are LVEF≤30%, fractional shortening ≤20%, LV end diastolic dimension ≥6 cm. Treatment goal is to reduce preload, afterload and increase the contractile force. Safety of drugs in pregnancy and lactation should be kept in mind, fluid and salt restriction, and diuretics should be given cautiously to decrease preload as it can cause placental hypoperfusion. Digoxin is safe during pregnancy and lactation thus remains a preferred inotrope in PPCM. During antepartum period hydralazine with or without nitrates is the vasodilator of choice aiming to reduce afterload. ACE I inhibitors or Angiotensin II Receptor blockers which are the mainstay for other forms of dilated cardiomyopathy management but they are contraindicated in pregnancy because of teratogenic effects. Inodilators like amrinone, milrinone, dobutamine are also beneficial. Calcium channel blockers and betablockers once contraindicated due to negative inotropic effects, but current studies have shown that amlodipine improves survival and reduce interleukin-6 level in heart failure; carvedilol is being used for antiarrhythmic and vasodilator property and found to improve outcome [3,4].

Incidence of thrombosis is high in PPCM patients if LVEF<35% and LVFS<15%, with atrial fibrillation, such patients need prophylactic heparin during the antepartum and heparin/warfarin during the postpartum period. Role of immunosuppression therapy azathioprine and prednisolone is controversial. Recently pentoxyfylline an immunomodulantand immunoglobulins have been shown to improve physical status and LVEF if added to conventional management [5].

No specific anesthetic approach is standardized in literature while dealing with PPCM patients, CS have been performed in general anesthesia (GA) [6,7] as well as regional anesthesia techniques [8,9]. GA is mostly used in emergency surgery or when regional anesthesia is contraindicated. GA offers the advantage to control airway and ventilation, but rapid sequence induction and intubation can cause sympathetic stimulation thus increase the afterload. Inhalation or intravenous induction agents are cardiac depressants, and when high dose opioid anesthesia is used to avoid myocardial depression, it can cause neonatal respiratory depression [6]. GA adds to already existing risk of thromboembolism, and may lead to cardiac failure and even cardiac arrest [10]. Vasodilators need to be administered to accommodate extra volume released from uterine auto transfusion after delivery of fetus otherwise acute cardiac failure and pulmonary edema can occur. Regional anesthesia (RA) is advantageous in PPCM because sympatholys is produces decrease in preload and afterload

which is beneficial in isolated left ventricle dysfunction. Prevention of thromboembolic events and reduced epinephrine and nor-epinephrine levels are additional benefits of neuraxial blockade. However caution must be taken to prevent abrupt fall in blood pressure [9]. Carefully titrated epidural anesthesia [11] or sequential CSE [8,12] have been used to avoid acute hypotension. We did not choose these techniques because time constraint was a limiting factor owing to emergency nature of surgery.

Conventional spinal anesthesia with usual local anesthetic doses for CS in PPCM patient is not recommended due to uncontrolled sympathetic blockade and acute hemodynamic instability which may precipitate an adverse cardiac event including arrest [13].

We opted for low dose spinal anesthesia (7.5mg bupivacaine + 25mcg fentanyl). Addition of fentanyl allowed reduction in local anesthetic doses that prevented acute fall in blood pressure, also shortened the onset time in view of emergency nature of surgery. Gupta *et al* [9] used low dose spinal anesthesia (5mg bupivacaine + 25mcg fentanyl) in PPCM patient (EF-25%) for medical termination of pregnancy and sterilization.

In the present case, gradual and restricted co-loading before delivery and use of frusemidefollowing delivery prevented acute rise in preload that may lead to acute heart failure. Sympatholysis induced vasodilatation allowed accommodation of extra volume released from uterine contraction. Early use of inotropes to provide hemodynamic stability is warranted in PPCM patients. We also observed a slight fall in BP after 5min of spinal anesthesia which was promptly treated with modest amount of mephentermine which had both beta-1 and alpha agonist effects. Dopamine (inotrope) and dobutamine (inodilator) were to be used if hypotension has not responded to mephentermine.

Invasive monitoring [14] has been used in more symptomatic cases while othershave used non-invasive monitoring [12,15] for asymptomatic and haemodynamically stable patient. We monitored with non-invasive technique as the patient was asymptomatic, haemodynamically stable, also surgery of short duration and both procedures for invasive arterial BP and central venous pressure monitoring would have taken time. However provisions of both were kept as standby, and supposed to be used if needed.

We conclude that low dose spinal anesthesia using an opioid is an acceptable option for emergency CS in a patient with PPCM. Proper understanding of pathophysiology and selection of appropriate anesthetic technique, cautious fluid administration, judicious use of diuretics and early use of inotropes to provide haemodynamic stability remains the cornerstone of successful anesthetic management.

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