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Case Report

Anaesthetic management of emergency caesarean section in a patient with peripartum cardiomyopathy under general anaesthesia - a case report

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Abstract

Peripartum cardiomyopathy is a unique and rare kind of cardiomyopathy of unknown cause that occurs during pregnancy or the postpartum period. Regional anaesthesia for anaesthetic management of this condition has been extensively described. There are limited reports of anaesthetic management of caesarean section of this case under general anaesthesia. We report a case of 32 years old lady diagnosed to have peripartum cardiomyopathy requiring emergency caesarean section that was successfully managed under general anaesthesia. Anaesthetic management was directed towards optimization of myocardial contractility, preload and after load.

Keywords: caesarean section; general anaesthesia; peripartum cardiomyopathy

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Introduction

Peripartum cardiomyopathy (PPCM) is a rare disease with incidence ranging from 1 in 300 to 1 in 4000 live births.¹ Anaesthetic management of caesarean section in PPCM patients especially under general anaesthesia can be a challenge to the anaesthesiologist and it has scarcely been described. Correct choice of anaesthesia and precise titration is crucial for a favourable outcome.

Case report

A 32 years old female primigravida weighing 65kg presented at 37 weeks of gestation with complaints of increased fatigue, dyspnea on performing less than ordinary activities and palpitation since 7 days. She was a known case of PPCM and had history of intensive care unit admission 2 weeks back and was treated with diuretics and digoxin. She had regular antenatal check-

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ups during first and second trimesters with no history of associated co-morbidities. Echocardiography done on previous admission showed dilated left ventricle, global hypokinesia, left ventricular systolic dysfunction, left ventricular ejection fraction (LVEF) of 30% and end diastolic volume (EDV) of 170ml.

Physical examination revealed pallor, pedal edema, pulse rate of 110 beats/ minutes, regular, non invasive blood pressure (NIBP) of 130/70mmHg and respiratory rate of 34/minute. On auscultation left ventricular S3 gallop and bilateral fine basal crepitations were present. She was maintaining 90% saturation at room air and 97% on face masks with oxygen at 6 litres/min. Laboratory investigation including renal function test and coagulation profile was within normal limits, except for mild anaemia (haemoglobin =10.5gm%). Arterial blood gas showed pH-7.3, pO₂ of 80mmHg, pCO₂ of 36mmHg and bicarbonate of 26 mmol/litre. Electrocardiography (ECG) revealed non-specific ST-T segment wave changes and repeat echocardiography showed dilated left ventricle, global hypokinesia, LVEF= 32%, left ventricular systolic dysfunction and EDV of 165ml. The obstetrician planned an emergency caesarean section in view of non-reassuring fetal heart rate and maternal decompensation.

After taking an informed consent, she was shifted to operation theatre with a wedge under her right hip and standard monitors were connected. Basal pulse rate was 120 beats/min, regular with NIBP of 120/70 mmHg. An 18G peripheral cannula was inserted and left radial artery was cannulated for measuring intra arterial blood pressure (IBP). Following preoxygenation, anaesthesia was induced with titrated dose of fentanyl 100microgram intravenously; thiopentone 250mg till abolition of eyelash reflex and atracurium 30mg was given intravenous slowly to facilitate tracheal intubation. After the trachea was intubated, central venous cannulation was done in right internal jugular vein. Central venous pressure was 20cm of H₂O hence twice 40mg injection furosemide intravenous was given at interval of 15 min. Anaesthesia was maintained on isoflurane (0.2-0.6%) in oxygen and nitrous oxide (50:50). Haemodynamic parameters remained stable with systolic blood pressure of around 95 to 100mmHg. CVP was maintained between 8 to 10 cm of H₂O. The child was healthy, weighing 2.6kg with APGAR score of 7 and 9 at 1 and 5 minutes respectively. Postoperatively patient was shifted to ICU on ventilator support and subsequently extubated after 24 hours uneventfully. She was discharged on fifth postoperative day.

Discussion

PPCM is a rare disorder of unclear etiology. It is primarily a diagnosis of exclusion, and the symptoms may be disguised as physiologic changes of pregnancy. Patients present with PPCM have typical signs and symptoms of systolic heart failure. Echocardiography helps confirm the diagnosis. Diagnostic criteria for PPCM include (1) traditional criteria

(onset of heart failure during last month of pregnancy or within 5 months of delivery, no other identifiable causes of heart failure and no known heart disease before pregnancy) and (2) Echocardiography criteria (LVEF<45% or fractional shortening <30% and left ventricular end diastolic volume $\geq 27\text{mm}^3/\text{m}^2$).²

Obstetric management involves expedient delivery after stabilization of the mother; caesarean section is reserved for obstetric indications. Given the intravascular fluids shifts associated with labour, delivery, and the immediate postpartum period, IBP and CVP monitoring are recommended. Patients for caesarean section can undergo either general anaesthesia (GA) or regional anaesthesia (RA) depending on situation. As our patient was on anticoagulation therapy and needed an emergency caesarean section, we planned to administer general anaesthesia. Haemodynamic goals include preservation of normal to low heart rate to cut oxygen demand, and avoidance of large swings in blood pressure.

While delivering GA, drugs or volatile agents that reduce LV contractility, reduce preload and afterload, and directly or indirectly raise heart rate should be avoided. Any blood loss should be promptly replaced. Hypotension is corrected with volume expansion and pure alpha-adrenergic agonist. Any invasive monitoring (CVP/PAC) may induce dysrhythmias. GA carries increased risk of sympathetic stimulation while laryngoscopy, use of polypharmacy and doubts about extubating.

The advantage of regional anaesthesia (RA) is that it causes reduction in preload and afterload due to sympathetic blockade. Combined spinal epidural anaesthesia or single epidural anaesthesia have been safely administered in patients with severe PPCM.^{3,4} Graded epidural anaesthesia has been mostly used because of its better hemodynamic stability.^{5,6}

Bilenjani et al described caesarean section in a 19-year-old patient at 32 weeks of gestation with PPCM in decompensated heart failure and pulmonary edema. GA was induced with etomidate and remifentanyl, and maintained with remifentanyl infusion safely, without any adverse outcome on mother or newborn.⁷ Zangrillo et al used fentanyl and vecuronium for induction of GA in a patient with twin pregnancy with PPCM along with invasive monitoring patient recovered well but baby needed ventilator support postoperatively for some time. They also stated that potential benefits of cardiovascular response of RA may not be greater than the risks of maternal hypotension and low cardiac output in such patients.⁸ McCarroll et al also reported caesarean section in patient with PPCM under GA with the use of remifentanyl and propofol. They concluded that hemodynamic response during general anaesthesia using appropriate agents is more predictable than seen in RA.⁹

GA is used when RA is contraindicated, like in anticoagulated patients and in emergency situations.^{5,10} We can use both

inhalational and intravenous based GA in PPCM. The major advantages of GA are primarily airway control and ventilation. It also facilitates the use of transesophageal echocardiography.⁶ But GA also has several disadvantages like maternal and fetal cardiorespiratory depression, cardiac arrest due to severe bradycardia, increased risk of left ventricular failure and pulmonary edema. It carries a higher risk of thromboembolism than RA in these patients.^{3,8,9}

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