ANAESTHETIC MANAGEMENT OF A CASE OF PERIPARTUM CARDIOMYOPATHY (PPCM): A CASE REPORT

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ABSTRACT
Peripartum cardiomyopathy (PPCM) is a rare cause of dilated cardiomyopathy in parturients. It usually occurs in approximately one in 1000 deliveries, manifesting during the last few months or the first 5 months of the postpartum period. The hallmark of the disease is onset of decreased cardiac ejection fraction either in the late pregnancy or early puerperium. The major concern while managing these patients is to optimize fluid administration and avoid myocardial depression, while maintaining stable intraoperative haemodynamics. For favourable maternal and foetal outcome the basic hemodynamic goals should always be kept in mind to choose appropriate anaesthetic techniques and drugs. Transoesophageal echocardiography and CVP monitoring is an useful adjunct in the intraoperative monitoring.

KEYWORDS
Peripartum Cardiomyopathy, Hemodynamic Goals, Anaesthetic Management, Combined Spinal Epidural.


INTRODUCTION
PPCM is an unusual form of dilated cardiomyopathy1 (approximately one in 1000 deliveries). It is usually manifested as acute heart failure in the last trimester of pregnancy or early postpartum2. It was first recognised by Ritchie in 19th century. The hallmark of the disease is onset of decreased cardiac ejection fraction either in the late pregnancy or early puerperium. Anaesthetic management of caesarean section of a patient with PPCM can be a challenge to the Anaesthesiologist. The Goals of the Anaesthetic management lies in the maintenance of optimal ventricular preload and afterload, avoiding any anaesthesia induced myocardial depression. A vigilant monitoring in the perioperative period is essential to avoid complications like arrhythmias (Atrial fibrillation), hypotension, hypoxemia, pulmonary oedema, electrolyte disturbances, myocardial ischaemia, thromboembolism and even sudden death.

CASE REPORT
An 18 years old full-term primi-gravida, weighing fifty kilograms was admitted in our hospital, with complaints of increasing breathlessness and bilateral pedal swelling for two weeks without any prior existing medical illnesses. She was diagnosed with peripartum cardiomyopathy. She was started with Tab Alphadopa 250 mg TDS, Tab Labetalol 100 mg BD, Tab Digoxin 0.25 mg OD, Tab Furosemide 40 mg OD, Tab Enoxaparin 40 mg BD. Treatment was started in the intensive care unit by a multidisciplinary team of physicians with a plan to control her heart failure medically. Elective caesarean section was planned to terminate the pregnancy. Pre-anesthetic examination revealed bilateral pedal oedema, pulse rate (PR)-94 beats/min, blood pressure (BP)- 170/94 mmHg, peripheral oxygen saturation (SpO2)- 97% on room air and respiratory rate of 15 breaths/min. On systemic examination: No abnormality found. The preoperative echocardiogram showed dilated cardiac chambers, with a left ventricular ejection fraction (LVEF) of 38%. Combined spinal epidural (CSE) anaesthesia was planned after optimization of cardiovascular status. Informed consent was taken. IV fluid was started with inj RL, inj Ondanestrone 4 mg iv., inj. Ranitidine 50 mg iv. were given 30 minutes before transferring her to the operating room (OR). Standard ASA monitors along with central venous pressure (CVP) catheter and urine output were used for intraoperative monitoring. Oxygen was administered via facemask at the rate of 4 L/min. Her preoperative heart rate (HR), mean arterial pressure (MAP), CVP, and SpO2 were 108 beats/min, 97 mmHg, 15 mmHg and 98%. The CSE performed in the sitting position and midline approach at L3-L4 interspace. The epidural space was identified by loss of resistance to saline on the first attempt with an 18G Tuohy needle. A subarachnoid block (SAB) was done by 27G Quinke needle and 2 mL of 0.5% heavy bupivacaine (10 mg) was injected after free flow of cerebrospinal fluid (CSF). An 18 gauge epidural catheter (EC) was threaded up to the length of four cm into epidural space. A fifteen cm wedge was placed under the right hip to maintain a left lateral tilt. Level of block was checked at 3, 5 and 10 minutes and was found to be up to thoracic 10th, 8th, 6th segment level respectively.

Intraoperative period was uneventful. Apgar scores of the baby at 1 and 5 minutes were 7 and 9 respectively. Intravenous oxytoca, 15 units/500 mL of saline at 40 drops/min was started slowly after delivery. Intravenous furosemide 10 mg and midazolam 2 mg were given incrementally at this time. Intravenous fluid replacement was targeted to maintain the CVP of 12 to 14 mmHg, and 750 mL of Ringer’s Lactate (RL) was given intraoperatively. Urine output was 75 mL without any episode of adverse hemodynamic events. Intraoperative parameters like heart rate (HR), mean arterial pressure (MAP), CVP and SpO2 remained within 20% of the preoperative value. The patient was transferred back to the ICU after the procedure. Postoperative analgesia was managed with epidural...
administration of 0.2% of ropivacaine in 75 mg of Inj. Tramadol. Furosemide and digoxin were restarted. The remainder of her postoperative stay was uneventful. Echo after 1 week, EF: 47%.

DISCUSSION
Peripartum Cardiomyopathy is defined clinically as the onset of cardiac failure with no identifiable cause in the last month of pregnancy or within five months after delivery3,4, in the absence of heart disease. The finding of left ventricular systolic dysfunction by echocardiography is an important criterion for making the diagnosis. The definition of PPCM was modified which now includes following four criteria, three clinical and one echocardiographic5.
1. Development of heart failure during last trimester of pregnancy or first six months post-partum.
2. Absence of any identifiable cause for cardiac failure.
3. Absence of any recognizable heart disease prior to last trimester of pregnancy.
4. Echocardiographic criteria- Demonstrable echocardiographic6 proof of left ventricular systolic dysfunction. Ejection fraction less than 45%, left ventricular fractional shortening less than 30% or left ventricular end-diastolic dimension>2.7 cm/m² of body surface area.

Some of the risk factors for development of post-partum dilated cardiomyopathy include multigravida, multiple gestation, prolonged use of tocolytic7, pregnancy induced hypertension or preeclampsia, older women with a history of several previous pregnancies. Long standing post-partum cardiomyopathy may damage other systems such as liver and the kidney. Different opinions exist as to the optimal method of anaesthesia for caesarean section. Be it elective or emergency, any technique employed should avoid increases in afterload and use of negative inotropic agents. The use of vasodilator infusion and availability of inotropic support with invasive monitoring would be helpful. General anaesthetic techniques, involve the use of either intravenous cardiodepressant drugs such as thiopentone and/or the inhalational anaesthetic agents such as isoflurane, sevoflurane or desflurane or high dose narcotics, for maintaining haemodynamic stability. The latter technique may necessitate postoperative ventilation for both mother and infant. The management of a failed intubation may become difficult by the longer acting nature of these drugs with mask ventilation, compounded further with obesity. Subarachnoid block may better be avoided in these patients because of sudden onset of haemodynamic instability. Epidural anaesthesia may be a better choice particularly when incremental doses of local anaesthetic are administered along with opioids. The gradual and controlled induction of anaesthesia, may improve myocardial performance and the cardiac output by decreasing the systemic vascular resistance, thus reducing the afterload on the left ventricle without impairing contractility. The presence of a pulmonary artery catheter can guide fluid and inotropic requirements, with minimal change in haemodynamic parameters. These women do not need additional volume before induction of central neuraxial block. Intra operative monitoring depends on the preoperative signs and symptoms. If the cardiomyopathy is asymptomatic, a central venous catheter is adequate with non-invasive blood pressure monitoring, with a provision for using a per cutaneous catheter introducer to allow rapid insertion of a pulmonary artery triple lumen catheter in the right internal jugular vein and direct arterial pressure. The oxytocin (Syntocinon) after delivery was used as an infusion, to prevent sudden vasodilatation, resulting in hypotension and tachycardia requiring rapid fluid infusion. This also helped in reducing the after load maintaining the haemodynamic stability. Post-operative monitoring was done in the intensive care unit, because, the post-operative management also requires intensive monitoring measures similar to the intraoperative period until the patient is stabilized. The retention of water due to the anti diuretic effect of Syntocinon, and the reabsorption of the third space fluid after 48 hrs of the caesarean section, may increase the preload, worsening the patient’s condition. These women may develop a reduction in left ventricular systolic function during subsequent pregnancies. This reduction would be greater in those with persistent left ventricular dysfunction at the start of the pregnancies. Symptoms of heart failure develop in about 20 percent of women whose systolic function is normal at the start of the subsequent pregnancy and in almost half of the women who have persistent left ventricular dysfunction. The medical management of these patients is similar to patients with heart failure. Salt restriction, diuretics are advocated to decrease pulmonary congestion, and volume overload.

These patients are at increased risk for thromboembolic events since there is association between impaired cardiac function, pregnancy and prothrombotic state. The outcome of these patients with peripartum cardiomyopathy is highly variable. In some the clinical and echocardiographic status improves rapidly and returns to normal. The initial severity of the left ventricular systolic dysfunction or dilatation is not necessarily predictive of the long term functional outcome. Women with peripartum cardiomyopathy appear to have a better survival rate (94% at 5 years) than patients with cardiomyopathy due to other causes.

CONCLUSION
Anaesthetic management of a patient with PPM should be comprised of adequate preoperative optimization using a multidisciplinary approach, careful monitoring, proper use of anaesthetic technique and vigilant postoperative care10. Regional anaesthesia using CSE may be a good choice for this subgroup of patients.

REFERENCES


