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PERIOPERATIVE MANAGEMENT OF PERIPARTUM CARDIOMYOPATHY

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Abstract
Background: Peripartum Cardiomyopathy (PPCM) otherwise known as pregnancy associated cardiomyopathy is a rare form of dilated cardiomyopathy which causes heart failure in parturients in the last trimester of pregnancy or early post parturition period. As the available literature on anaesthetic management of peripartum cardiomyopathy under general anaesthesia is scanty, we report the successful management of a lower segment cesarean section in a patient with PPCM.
Case presentation: A lady in her early twenties with obstetric score of G3P2L0 at 36 weeks of gestation, history of Covid-19 in her first trimester presented with worsening of breathlessness, ECHO revealed moderate left ventricular (LV) systolic dysfunction and grade II diastolic dysfunction posted for elective Lower Segmental Caesarean Section (LSCS) under general anaesthesia
Conclusion: PPCM is a life-threatening condition, there's no fixed protocol for the management.
Keyword: Peripartum; Cardiomyopathy; Perioperative; Anesthesia; General; Covid-19; Heart failure; Thiopentone

BACKGROUND

Peripartum Cardiomyopathy (PPCM) is an uncommon cause for heart failure of unknown aetiology with incidence varying between 1 in 3,000 to 1 in 10,000 pregnancies. The most widely accepted definition of PPCM is that of the 2010 European Society of Cardiology (ESC) Working group on Peripartum Cardiology which has been included in 2018 ESC guidelines. To avoid the underdiagnosis of PPCM, its necessitated that all of the following three conditions have to be met to come to a diagnosis of PPCM[1]

- Heart failure in the last month of pregnancy or within the first five months of delivery
- Absence of any other aetiology for the Heart failure
- Left Ventricular (LV) with a reduced ejection fraction of less than 45%, with or without LV dilation.

The inclusion of last criteria has helped to exclude the patients with preserved ejection fraction that may include accelerated hypertension, pulmonary embolism and complications of late pregnancy like pre-eclampsia, however the patients with preserved ejection fraction could be diagnosed with PPCM provided if all other causes are ruled out.[2]
Owing to high morbidity and mortality associated with peripartum cardiomyopathy, the perioperative management can be extremely challenging.

CASE REPORT

A lady in her early twenties with obstetric score of $G_3P_2L_0$ at 36 weeks of gestation, height of 150 cm and weight of 48 kg, had history of hypothyroidism for the last 2 years, and history of Covid-19 in her first trimester presented with worsening of breathlessness to NYHA grade 3, not associated with cough, hemoptysis, orthopnoea, paroxysmal nocturnal dyspnoea. She was scheduled for elective Lower Segmental Caesarean Section (LSCS). Clinically, she recorded a pulse rate of 105 beats per minute and blood pressure of 100/50 mmHg in left arm, SpO_2 of 93%, respiratory rate of 24/min. On auscultation, bilateral equal air entry was appreciated, while airway examination revealed normal mouth opening, Mallampati Class II and sternomental distance of 12 cms. Hemoglobin was found to be 11.8g%, rest of the blood investigations within the normal limits.
ECHO divulged moderate LV systolic dysfunction with grade II diastolic dysfunction. She was started on oral carvedilol 3.125 and trimetazidine 35 mg twice a day, in addition to 100 mcg of thyroxine. She was fasted for 8 hours, 40 mg of pantoprazole and 4 mg of ondansetron were given as part of anti-aspiration prophylaxis. In view of her clinical and ECHO findings, it was decided to proceed with LSCS under general anaesthesia. Patient was wheeled into operation theatre and standard ASA monitors were attached. She was induced with "sleeping dose" of thiopentone; sufficient enough to abolish the eye lash reflex and 50 mg of succinylcholine. She was intubated with 7 size endotracheal tube following gentle laryngoscopy, tube position was confirmed with end tidal carbon dioxide and 5 point auscultation. Anaesthesia was maintained with oxygen and air kept at a ratio of 1:1 and isoflurane. Incremental dose of atracurium was given to ensure adequate relaxation monitoring Train Of Four(TOF). Intravenous fluid was titrated to maintain a stable hemodynamics. Following delivery of foetus, oxytocin infusion was started at 0.3IU/kg. After completion of surgery, bilateral Transverse Abdominis Block(TAP) was given with 30 ml of 0.25% ropivacaine. Gentle suction was given, patient was reversed with neostigmine and glycopyrollate calculated to body weight, monitoring TOF. A total of 600 ml of ringer lactate was transfused intraoperatively. Patient was shifted to Post Anaesthesia Care Unit.

DISCUSSION

PPCM affects women from all ethnicities across all continents, the exact incidence of PPCM is often underestimated as it's a diagnosis of exclusion. The difference in incidence between regions could be attributed to the genetic predisposition with women of African origin accounting for highest prevalence. The

average age of PPCM presentation is 31 years and mean parity is 3.[3]

The risk factors associated with it include age more than 30 years, African ethnicity, multigravida, history of concurrent eclampsia, pre-eclampsia or postpartum hypertension, cocaine abuse[4]

It's prudent to do ECG and ECHO in all those patients suspected to have PPCM. Even though ECG findings are often vague that include sinus tachycardia to non-specific ST segment and T wave abnormalities and to even Atrial fibrillation, ECHO can be more specific which may reveal a global reduction in LV systolic function with ejection fraction less than 45%, and the LV may not be always dilated[5.] Differential diagnosis should include amniotic fluid embolism, anaemia, pulmonary embolism, myocardial infarction

Choosing the optimal method of anaesthesia in these cases have been a matter of debate. Irrespective of the technique, the goals of the anaesthetic management are largely the same like any other management of cardiomyopathy that should broadly ensure hemodynamic stability and adequate oxygenation, further to that, myocardial perfusion should be maintained by avoiding arrhythmias, tachycardia, hypotension. And cardiac output should be maintained by having an adequate preload, reducing afterload and improving the myocardial contractility.[1]

This case was done under general anaesthesia in view of low cardiac output (CO) and poor ECHO findings, any further reduction in cardiac output due to neuraxial blockade can lead to a catastrophe.[6]

In general anaesthesia, induction should be smooth and care should be given to attenuate the laryngoscopic response to avoid any hemodynamic instability, for this purpose, thiopentone was used. Restrictive fluid strategy should be adopted as overzealous resuscitation leads to third spacing and pulmonary edema.[7] Arrhythmias should be promptly managed. Calcium channel blockers are avoided in view of their tocolytic effect and its potential to cause atomic haemorrhage[7]. Complications include arrhythmias, thromboembolism, pulmonary edema, hypoxia leading to foetal distress[8]

CONCLUSION

PPCM is a rare life threatening condition. There's no fixed protocol for the management of PPCM, hence each case should be carefully individualised.

LIST OF ABBREVIATIONS

PPCM: Peripartum Cardiomyopathy
LSCS: Lower Segmental Caesarean Section
TAP: Transverse Abdominis Block

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