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Indian Journal of Clinical Anaesthesia

Journal homepage: www.ijca.in

Case Report

Anaesthetic management of a covid 19 positive parturient with newly diagnosed cardiomyopathy presenting with supraventricular tachycardia

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ARTICLE INFO

Article history:

Received 17-05-2021

Accepted 03-06-2021

Available online 11-11-2021

Keywords:

Caesarean section

Cardiomyopathy

Covid 19

Regional anaesthesia

ABSTRACT

Covid 19 has been a globally concerning pandemic affecting more than 20 million population worldwide including pregnant women. Cardiomyopathy is a rare affliction occurring in the last trimester of pregnancy or early postpartum manifesting as acute heart failure/ development of sudden arrhythmias/ thromboembolic complications. Anaesthetic management of such patients for caesarean section can be quite challenging, the main goals being maintenance of preload and afterload while avoiding myocardial depression at the same time whatever be the choice of anaesthetic technique. Here we report the successful management of a Covid-19 positive parturient under regional anaesthesia who was recently diagnosed with cardiomyopathy presenting with supraventricular tachycardia.

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1. Introduction

Due to physiological and anatomical changes, pregnant women are considered more vulnerable to impact by covid 19 pandemic. As per recent literature, viral myocarditis and cardiomyopathy have been reported in covid positive non pregnant females. But little is known regarding its impact on cardiovascular system of pregnant women.¹ Peripartum Cardiomyopathy manifests as cardiac failure in the absence of demonstrable aetiology in the last month of pregnancy or within 5 months postpartum with ejection fraction reduced to less than or equal to 45%.² Although its clinical symptomatology is mostly dyspnoea on exertion, some patients present with complex arrhythmias or embolic episodes. Tachyarrhythmias may also occur in cardiomyopathies including supraventricular tachycardia, atrial fibrillation and rarely ventricular tachycardia.³ Anaesthetic management of such parturients

can pose a great risk.⁴ Here we report the successful anaesthetic management of a covid 19 positive parturient with newly diagnosed Cardiomyopathy presenting with supraventricular tachycardia posted for Caesarean section.

2. Case History

Twenty nine year old primigravida, booked and immunized presented at 36 weeks+ 5 days gestation with complaints of palpitations on and off for the past 1 week and one episode of giddiness.

2.1. Past history

No previous h/o fever/cough/breathing difficulty/ heart disease/ Bronchial Asthma/ neurological ailment.

2.2. Condition on admission

Patient was admitted in obstetric ICU. patient was conscious, oriented. Not tachypnoeic or dyspnoeic. Vital parameters

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were normal. She was nursed in head up position with back rest and administered oxygen via face mask.

2.3. Investigations

1. Baseline investigations (complete blood count, renal & liver function tests) were within normal limits.
2. RT PCR :COVID-19 Positive.
3. qCRP 5.2 mg/L, LDH 350 IU/L, D- dimer 136.1 ng/ml, Serum Ferritin 310 ng/ml.
4. Electrocardiogram showed Supraventricular tachycardia with heart rate of 160/min.

2.4. Treatment

Inj. Adenosine 6 mg IV stat was given followed by Inj Metoprolol 2.5 mg IV 2 doses which were given slowly. Arrhythmia got reverted. Patient was hemodynamically stable throughout.

Echocardiogram showed:

1. Global hypokinesia of Left Ventricle
2. Moderate Left ventricular dysfunction EF 45%
3. Chambers not dilated
4. No valvular disease

Cardiologist advised the following:

1. Inj Heparin unfractionated 5000 units SC BD
2. Fluid restriction 1 litre / day
3. T. Frusemide 20 mg OD
4. T. Metoprolol 50 mg BD
5. T. Digoxin 0.25 mg OD
6. Inj Methylprednisolone 125 mg IV BD

2.5. Anaesthetic management

Patient was planned for elective Caesarean section after stabilization of rate and rhythm. No further episodes of arrhythmia occurred on observation for next two days. Serial electrocardiogram revealed multifocal atrial tachycardia with controlled heart rate of 104/min.

High risk cardiac consent obtained from the patient and attenders explaining the risk of Covid-19 disease and the simultaneous impact of developing cardiac failure and unstable arrhythmias perioperatively. Heparin was stopped 12 hrs prior to surgery. Patient was assessed under ASA 3 and planned for graded incremental epidural anaesthesia.

All emergency cardiac drugs were kept ready in operating room including Inj Metoprolol, Inj Diltiazem, Inj Adenosine, Inj Amiodarone, Inj Xylocard, Inj Phenylephrine. Patient was shifted inside operating room with 2 large bore IV cannulas. But no preloading was done because of fluid restriction. Monitors including NIBP, 5 lead ECG, pulse oximetry were connected and base line values documented. After explaining the plan of anaesthesia, patient was made to sit and a 16 G tuohy needle inserted

between L2-L3 spines and epidural space identified by loss of resistance technique at 4 cm from skin level. 18 G epidural catheter was inserted and fixed at 6 cm inside. Test dose with 3 ml of 2% xylocaine was given and found to be negative for both intravascular and subarachnoid placements. Patient was made to lie supine with left lateral tilt and 7 ml of 0.5% bupivacaine with 1 ml of NaHCO₃ was injected through the epidural catheter. Level was checked for light touch after 10 minutes and loss of sensation was at T12 level. Another 3 ml 0.5% bupivacaine was given after which sensory loss was at T8 level. Surgery was allowed to commence at this stage. Patient was continuously monitored with oxygen supplementation via a face mask. Patient was stable maintaining a heart rate between 80 -108/min and BP 130/82 -112/76 mm of Hg through the intra operative period. After delivery of baby, 10 units of syntocinon was given intramuscularly and 10 units as a continuous slow infusion which was well tolerated by the patient. Total of 750 ml of Ringer's lactate was infused intraoperatively. Urine output was 150 ml.

2.6. Postoperative follow up & outcome

At the end of surgery patient was shifted to high dependency unit with epidural in situ. After regression of sensory levels to below T10, epidural infusion was started with Inj Bupivacaine 0.0625% with Fentanyl 2 micrograms/ml at the rate of 6 ml/ hr. Patient tolerated the epidural infusion well and remained pain free. IV Metoprolol 2.5 mg BD was given for the first 24 hours followed by oral medications. Electrocardiogram taken post operatively showed normal sinus rhythm with no further episodes of arrhythmia. Epidural catheter was removed on second postoperative day. CT chest taken postoperatively showed normal study. Post operatively treatment with heparin and steroid were continued for seven days. Patient was kept under continuous monitoring for 14 days for recurrence of any arrhythmias. COVID RT- PCR repeated at 14 days was negative. Before discharge, Echocardiogram was done which showed ejection fraction 45% and mild left ventricular dysfunction. Patient was discharged and advised to continue cardiac drugs with routine follow up with cardiologist. After 6 weeks, screening echo showed EF 55% and improvement in left ventricular function.

3. Discussion

The diagnosis in this case has been challenging and that of exclusion which requires high index of suspicion. Therefore the management was tailored considering the two prime differential diagnosis of peripartum cardiomyopathy / viral cardiomyopathy. Patients with prenatal diagnosis of cardiomyopathy must be treated by multi-disciplinary approach.⁵

As the parturient was COVID-19 positive presenting with cardiomyopathy and arrhythmia of sudden onset, it does raise a suspicion regarding the possible impact of COVID-19. Juusela et al⁶ studied that 2 out of 7 pregnant women with Covid-19 developed moderate cardiac dysfunction with ejection fraction of 40 to 45%. Also Mercedes BR⁷ et al had reported 15 cases of myocardial dysfunction with mean ejection fraction of 37.67 $\pm$ 6.4. But more number of case studies are yet to be reported in a larger strata of pregnant population to observe the clinical presentations of COVID-19 cardiomyopathy in pregnancy. Inflammatory markers associated with Covid-19 were on marginal elevation in this case which might be due to the fact that the patient could be in remission phase of mild disease due to covid. However be, the anaesthetic technique was individualized according to the patient's medical condition with hemodynamic goals being

1. Reduction in preload and after load
2. Maintain sinus rhythm
3. Avoid sudden reduction in systemic vascular resistance

In this patient our choice was epidural anaesthesia with a catheter which provides the advantage of graded increase in the block height with sufficient time to stabilize the cardiovascular parameters unlike the conventional single shot subarachnoid block where the drop in blood pressure may be very acute and correction of which with fluids may not be tolerated by this patient because of reduced left ventricular function. Usage of vasopressors to maintain blood pressure poses the risk of precipitating arrhythmias intraoperatively. Having decided for elective caesarean section, we could plan the type of anaesthesia in advance weighing the pros and cons of different available techniques and choose this technique of graded epidural block which helped to overcome the disadvantages associated with single shot sub arachnoid block or general anaesthesia. The preparations and conduct of anaesthesia were also seamless because of the non-emergent nature of the surgery.

4. Conclusion

Choice of anaesthesia for a parturient with cardiomyopathy needs to be guided based on the urgency of surgery and severity of the disease. Although COVID related myocardial dysfunction in pregnancy has been reported in few literature studies, we could not pinpoint the cause of cardiomyopathy

in this parturient. This would prompt for a case series or study to be conducted in COVID positive pregnant women to understand the cardiac manifestations and its involvement in causing morbidity and mortality. Prompt diagnosis, preoperative stabilization with a well-planned anesthetic management could avoid mortalities, at the same time providing a safe maternal and fetal outcome.

5. Source of Funding

None.

6. Conflict of Interest

The authors declare no conflict of interest.

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Cite this article: Venkat MS, Basker N, Karthikeyan A. Anaesthetic management of a covid 19 positive parturient with newly diagnosed cardiomyopathy presenting with supraventricular tachycardia. *Indian J Clin Anaesth* 2021;8(4):594-596.