

## Anaesthetic Management of Patient with Hypertrophy Obstructive Cardiomyopathy Posted for Elective Caesarean

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### Abstract

**Introduction:** Dynamic valvular insufficiency and LVOT blockage are also possible outcomes of hypertrophic obstructive cardiomyopathy (HOCM). Furthermore, attempting to replace an inadequate mitral valve surgically can result in iatrogenic LVOT blockage.

In the general population, it affects one out of every 500 adults, with a male to female ratio of 2:1. Among the general population, the prevalence is around 0.2 percent, and the incidence in pregnant women is around 0.1-0.5 percent.

**Case Report:** 21 year old female patient presented with 9 months of amenorrhea posted for elective lower segment caesarean section. Her previous documents revealed that she was a diagnosed case of hypertrophic obstructive cardiomyopathy during her last pregnancy 1 year ago. History of previous surgery that is induced abortion at two and half months of gestation age a year back operated under spinal anaesthesia. ECG showed ST elevation present in V2, V3, V4, V5 leads and features of left ventricular hypertrophy (LVH), Her echocardiography report revealed features of hypertrophic obstructive cardiomyopathy with severe LVOT obstruction. Left ventricular ejection fraction (LVEF) was 20-25%.

**Conclusion:** HOCM is normally well tolerated during pregnancy, although those who have had previous symptoms or arrhythmias may experience an exacerbation of symptoms. The majority of these people, on the other hand, can be effectively controlled medically. This case report showed that patients with HOCM can be safely managed under general anaesthesia with muscle relaxants and inhalational volatile anaesthetics, as well as an erector spinae block for analgesia.

**Keywords:** Erector spinae block, Esmolol, HOCM, Heart disease, Inhalational anaesthetics, Pregnancy.

**Key Messages:** Pregnant Patients coming for caesarean section having cardiomyopathy may go unnoticed prior to anaesthetizing for surgery. During the operative and post-operative period, they may present with unexplained hypotension and hemodynamic collapse which may require acute management with Vasopressors. We are presenting a case report of HOCM and its successful management.

### How to cite this article:

Pooja Arunkumar Giriyaapur, Ravi Madhusudhana, Sumanth Tarigonda, et al./Anaesthetic Management of Patient with Hypertrophy Obstructive Cardiomyopathy Posted for Elective Caesarean/Indian J Anesth Analg. 2022;9(3):131-134.

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**Received on:** 12.04.2022, **Accepted on:** 03.05.2022

## Introduction

Hypertrophic obstructive cardiomyopathy (HOCM) can be a familial disease transmitted with autosomal dominant inheritance. Mutation in genes that code for cardiac sarcomere proteins can cause hypertrophy of segments of the ventricle. Septal involvement may be common, Incidence is 1 in every 500 adults, and in pregnant females is approximately 0.1-0.5%.<sup>1</sup>

It can include massive hypertrophy primarily involving the ventricular septum. Majority of the patients may be asymptomatic throughout life, some may present with severe limiting symptoms of dyspnoea, angina, syncope and a few may even die suddenly because of ventricular arrhythmias.

## Case Report

A 21 year old female patient, weighing 40 kg presented with 9 months of amenorrhoea posted for elective lower segment caesarean section. Her previous documents revealed that she was having hypertrophic obstructive cardiomyopathy during her last pregnancy 1 year ago. History of previous

surgery that is induced abortion at two and half months of gestation age a year back operated under spinal anaesthesia. Presently asymptomatic, was on tablet Metoprolol 25 mg.

Examination revealed pallor, pulse rate of 92/min and blood pressure of 96/60 mmHg, respiratory rate of 18cpm and was afebrile. Systemic examination of cardiovascular S1 S2 heard, murmur heard over all the chest fields, respiratory, central nervous system was normal with per abdomen examination of gravid uterus. On airway examination include class 3 of Mallampati.

Laboratory investigations were complete blood count Hemoglobin: 11 g%, RBC: 4.54 million/mm<sup>3</sup>, PCV: 34.40% , WBC: 9.99 T/cmm, Platelet count : 323 T/mm<sup>3</sup>, BT- 2 minute oo sec. CT-5 minute 50 sec, INR-1.24, PT: 15.4, APTT-32, ECG showed ST elevation present in V2, V3, V4, V5 leads and features of left ventricular hypertrophy (LVH) (Fig. 1), Her echocardiography report revealed features of hypertrophic obstructive cardiomyopathy with severe LVOT obstruction. Ejection fraction (LVEF) was 20-25%.

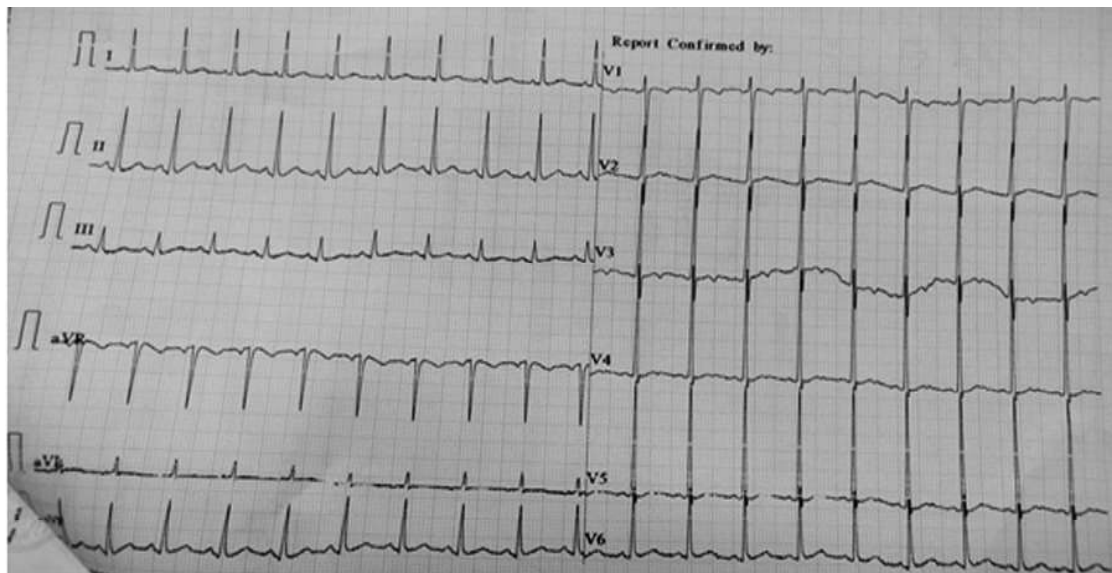


Fig. 1: ECG shows ST elevation present in V2, V3, V4, V5 leads and features of left ventricular hypertrophy (LVH)

## Anesthetic Management

General anaesthesia and Erector spinae block was planned for the surgery. 18G IVC secured in right hand. Monitoring includes pulse oximetry, ECG, invasive blood pressure, end-tidal carbondioxide. Patient was Pre medicated with IV, Inj. Midazolam 2 mg, IV Esmolol 20mg, IV Loxicard 60mg and Inj. Fentanyl 180 mcg IV. Preoxygenation done with 100% oxygen for 3 min. Induced with Inj. Thiopentone

125mg IV. After elimination of reflexes and reaching enough depth of anaesthesia appropriate endotracheal tube of size 6.5mm ID was inserted and fixed at 20cm, cuff inflated with air, bilateral air entry confirmed and good lung ventilation was confirmed by chest rise and ETCO<sub>2</sub>, and tube was fixed in place. Anaesthesia was maintained with 50% nitrous oxide in oxygen, with intermittent positive pressure ventilation. Muscle relaxant-IV Atracurium 15 mg given. Analgesia IV Paracetamol

1g given and erector spinae block given. Procedure lasted for 40 minutes, reversal IV Neostigmine 2.5mg plus IV Glycopyrrolate 0.4mg given. Patient extubated after thorough oral suctioning, vitals stable, shifted to ICU for observation.

## Discussion

The pathophysiology of hypertrophic obstructive cardiomyopathy includes "dynamic" LVOT blockage, which varies depending on the amount of blood in the ventricle just before ventricular systole.<sup>1</sup> Mitral regurgitation, diastolic dysfunction, and dysrhythmias are induced by dynamic blockage caused by systolic anterior motion of the anterior mitral valve leaflet.<sup>1</sup> The increased volume over load of pregnancy induces enlargement of the ventricle, which might theoretically lessen LVOT blockage; nevertheless, the increased cardiac output counteracts this effect, and the LVOT gradient increases as the pregnancy progresses.<sup>1</sup> The risk of atrial fibrillation increases with the same volume loading because the left atrium becomes distended. Volume changes and an elevated heart rate are not well tolerated in the context of diastolic illness, increasing dyspnoea symptoms and reducing the threshold for developing left heart failure. Due to a decrease in systemic vascular resistance and the potential of decreased venous return due to compression, pregnancy worsens the illness even more. Women with HOCM, on the other hand, usually tolerate pregnancy well. Women who are unwell prior to pregnancy and who have substantial LVOT blockage are at a higher risk. Anxiety, stress, and labor pain all raise the heart rate and contractility.<sup>1</sup>

We planned to give general anaesthesia to our patient. She was on tab. Metoprolol. Metoprolol lowers heart rate, improving ventricular filling, and lowering myocardial oxygen demand; however, beta blockers can cause fetal acidosis.<sup>1</sup> It also attenuates the intubation's hemodynamic response. Fentanyl was given because they reduce sympathetic activity, also providing analgesia. It is okay to use intravenous induction drugs such as thiopental to induce anaesthesia, although a fast drop in systemic vascular resistance should be avoided.<sup>1</sup>

Isoflurane, for maintenance, was used in our case as it is cardio stable.<sup>1</sup> We chose atracurium because it is cardio stable. Beta agonistic drugs including dopamine, ephedrine, and dobutamine should be avoided since they enhance myocardial contractility and heart rate, which can lead to LVOT blockage.<sup>1</sup>

Because hypotension and tachycardia are known

side effects of oxytocin, it is safest to administer it slowly and continuously.<sup>1</sup> Pulmonary edema has been found in patients following delivery, necessitating careful fluid management.<sup>1</sup> Severe hypertrophic cardiomyopathy can be followed using transthoracic echocardiography to guide fluid and vasopressor management during an elective caesarean section.<sup>1</sup>

In one case report, parturient was taken for emergency caesarean section, epidural anaesthesia was chosen. Epidural anaesthesia is safe for such patients, provided adequate volume expansion is done. Epidural anaesthesia is tolerated well without any complications even in pregnant females with HOCM having significant LVOT gradient. They chose 0.75% Ropivacaine over 0.5% Bupivacaine due to its superior sensory blockade, better cardiovascular profile as compared to Bupivacaine.<sup>2</sup>

Vaginal delivery is the most common method, with caesarean delivery reserved for obstetric reasons. In low risk, asymptomatic HCM patients, epidural anaesthesia is rarely required. Due to the risk of vasodilation and hypotension, epidural and spinal anaesthesia should be used with caution in women with significant LVOT blockage, and single-shot spinal anaesthetic should be avoided.<sup>3</sup>

Few elements, such as sympathetic stimulation from laryngoscopy and intubation, incision, surgical stress, and blood loss, are unavoidable during anaesthesia and surgery. Inadequate monitoring can exacerbate the blockage of the dynamic outflow tract. As a result, the goal of treatment in these patients is to reduce LVOT blockage. Due to arrhythmia, dynamic LVOT blockage, and diastolic dysfunction, these patients may worsen perioperatively. As a result, preventive measures include aggressive sinus rhythm maintenance with defibrillation or pharmacological therapy, prevention or treatment of LVOT obstruction by maintaining preload and afterload with phenylephrine, and beta blocker or verapamil administration, as well as suppression of sympathetic stimulation.<sup>4</sup>

## Conclusion

HOCM is normally well tolerated during pregnancy, although those who have had previous symptoms or arrhythmias may experience an exacerbation of symptoms. The majority of these people, on the other hand, can be effectively controlled medically. This case report showed that patients with HOCM can be safely managed under general anaesthesia with muscle relaxants and inhalational volatile

anaesthetics, as well as an erector spinae block for analgesia.

*Conflict of Interest:* Nil

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