

Unilateral Spinal Block in a Patient with Hypertrophic Cardiomyopathy with Left Ventricular Outflow Obstruction Undergoing Lower Limb Surgery: A Case Report

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Case Report

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ABSTRACT

Hypertrophic Cardiomyopathy (HOCM) is inherited cardiac disorder characterized by dynamic Left Ventricular Outflow Tract Obstruction (LVOT) at rest, during activity or in response to unpleasant stimuli. The decision to administer spinal anaesthesia in patients with HOCM and LVOTO remains controversial due to concerns regarding the effects on hemodynamics and potential exacerbation of LVOT. Due to technical difficulty to provide peripheral nerve block as well as risk of hemodynamic instability with bilateral sympathetic blockade in spinal anaesthesia, this case was planned in unilateral spinal block.

This case report shows that unilateral spinal block can be safe and effective alternative anaesthetic technique for patients diagnosed with HOCM with LVOTO undergoing lower limb surgery.

Keywords: Hypertrophic cardiomyopathy; Left ventricle outflow tract obstruction; Unilateral spinal anesthesia; Lower limb surgery

INTRODUCTION

Hypertrophic Cardiomyopathy (HOCM) is inherited cardiac disorder characterized by left ventricular hypertrophy, associated with dynamic Left Ventricular Outflow Obstruction (LVOT) at rest, at exertion or during painful stimulus [1]. Patients with HOCM may be asymptomatic or present with typical symptoms of exertional dyspnea, chest pain, palpitations, and syncope. HOCM is the most common cause of sudden death in young people. Management of these patients undergoing surgical procedures poses significant challenges due to the potential risks associated with anesthesia [1].

Spinal anesthesia, also known subarachnoid block, is a widely utilized technique for lower limb surgery. However, the decision to administer spinal anesthesia in patients with HOCM and LVOTO remains controversial due to concerns regarding the effects on hemodynamics, and potential exacerbation of outflow tract obstruction [2].

Unilateral spinal block is considered safe and effective anesthetic technique for patients with HOCM as the block provides adequate anesthesia and analgesia while minimizing the risk of hemodynamic instability. Unilateral spinal block has potential benefits, including reduced sympathetic blockade, limited spread of local anesthetic, and minimized effects on systemic vascular resistance as well. By targeting only one side of the spinal cord, this technique minimizes the risk of exacerbating LVOTO while providing effective anesthesia for the surgical procedure. In this case report, we include the clinical details, anesthetic management, perioperative monitoring, care and outcomes of a patient with hypertrophic cardiomyopathy and LVOTO who underwent limb surgery under unilateral spinal block [3-7].

CASE PRESENTATION

A 59-year-old Female, weighing 80 kg, BMI of 35.5 kg/m² with left bimalleolar fracture was planned for ORIF with plate and screw for lateral malleolus and ORIF with MTBW for medial malleolus.

Patient's history revealed episodes of palpitations, chest pain, shortness of breath and syncope 7 years ago. She was diagnosed then as HOCM and hypertension, and was put on medical management (metoprolol, amlodipine) for the same. Patient, currently had no symptoms of palpitations, SOB, chest pain at rest but symptoms were present on exertion.

On examination, pulse rate was 80 beats/min, regular and Blood Pressure (BP) was 150/90 mmHg. Airway and systemic examination was normal except harsh systolic murmur at the right 3rd ICS and apex.

Laboratory investigations were normal except platelet count of 1,25,000. Electrocardiogram (ECG) showed sinus rhythm, regular rate with left Ventricle hypertrophy pattern (Figure 1). Transthoracic echocardiography (Figure 2) showed asymmetric septal hypertrophy, mild mitral regurgitation, dilated LA, SAM present, normal wall motion, no clots, vegetation or pericardial effusion, left ventricular ejection fraction 65% and left ventricle outflow tract obstruction peak gradient of 80 mmHg.

All the maintenance medications taken by the patient were continued till the day of the surgery. After shifting the patient to the operation theater, standard ASA 2 monitors were attached. Prophylactic antibiotic was given 30 mins before incision. Prior to the anesthesia patient was preloaded with 500 ml of Ringer's Lactate. Patient was positioned for the spinal anesthesia.

Patient was placed in left lateral decubitus position with knee flexion and chin touching the chest. Under complete aseptic technique with back sterilization, dural puncture was performed using midline approach at the level of L4-L5 interspace with 25 gauge quincke's spinal needle. After observation of free flow of cerebrospinal fluid, the spinal needle aperture was turned towards the left side and patient received 6 mg (1.2 ml) of 0.5% hyperbaric

bupivacaine slowly with an injection speed of 0.5 mL/10 seconds without any aspiration. Patient was maintained in left lateral decubitus position for 20 minutes, then patient was tilted to supine position. After 20 minutes the level of block achieved was T12 Sensory and Motor blockade Bromage grade 3 on the left side.

External defibrillator was ready and standby and all resuscitation and antiarrhythmic drugs were kept ready to tackle an inadvertent arrhythmic event.

Patients vitals were vigilantly monitored which remained stable with heart rate from 64 beat/min to 84 beat/min and systolic BP from 100 mmHg to 140 mmHg and diastolic BP 70 mmHg-80 mmHg during the entire procedure. The procedure lasted for 1½ h. Total fluid given was 1.5 liters of RL. Blood loss was minimal.

Figure 1. ECG showing left ventricular hypertrophy, narrow Q-wave in inferior and lateral leads.

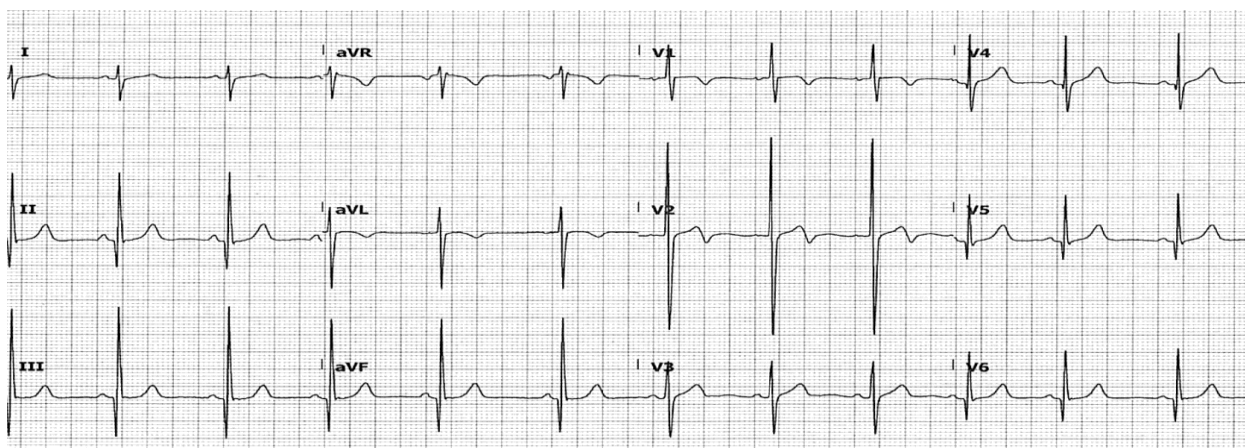


Figure 2: Systolic anterior motion (SAM) of mitral valve in hypertrophic obstructive cardiomyopathy [7].



RESULTS AND DISCUSSION

Factors to be considered when attempting a unilateral spinal block are the use of small doses of local anesthetic solution injected through directional, pencil-point needles, together with a 15-20 min lateral decubitus position and the use of either hypo- or hyperbaric anesthetic solution [4]. Studies have shown that patient undergoing unilateral spinal block have significant reduction in the incidence of clinically relevant hypotension with more stable cardiovascular parameters in comparison to conventional bilateral spinal block. [5] The small amount of local anesthetic solution injected, as well as the reduced extent of spinal block, also provide a favorable profile of the resolution of spinal block, which can be useful in the ambulatory setting. [4] With minimal technical modification we

can effectively provide a preferential distribution of spinal block to the operative side which results in less hemodynamic side effects with higher cardiovascular stability, increased autonomy after surgery with better patient acceptance and minimize risks associated with general anesthesia.

CONCLUSION

The unilateral spinal block successfully provided adequate surgical anesthesia while minimizing the risks associated with general anesthesia and bilateral sympathetic blockade. Careful titration of the local anesthetic dosage with patient positioning was crucial to prevent hypotension and maintain stable hemodynamics throughout the procedure. Continuous monitoring of blood pressure, heart rate, and oxygen saturation, along with vigilant assessment for any signs of cardiac compromise, allowed for prompt intervention if needed.

This case report shows that a unilateral spinal block can be safely and effectively used in patients with HOCM-LVOTO who require surgery and may be a valuable option for patients who are at high risk for complications from general anesthesia, bilateral spinal blockade and those with technical difficulty in performing peripheral nerve block.

DECLARATION OF PATIENT CONSENT

Authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

CONFLICT OF INTEREST

The authors report no conflict of interest in this work.

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