



THORACIC SEGMENTAL SPINAL ANAESTHESIA WITH ISOBARIC LEVOBUPIVACAINE FOR CAESAREAN SECTION IN A PATIENT WITH MODERATE MITRAL STENOSIS

Anaesthesiology

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KEYWORDS

Pregnancy, Mitral stenosis, Isobaric Levobupivacaine, Segmental spinal anaesthesia

INTRODUCTION

Mitral stenosis is characterized by mechanical obstruction of left ventricular diastolic filling secondary to a progressive decrease in the orifice of mitral valve. Most common cause of mitral stenosis is rheumatic heart disease although more than 50% patients do not give history suggestive of rheumatic fever in the past. Rheumatic mitral stenosis forms 88% of the heart diseases complicating pregnancy in the tertiary referral centre in India. Although mitral stenosis is often associated with mitral regurgitation which in general is well tolerated by pregnant patients, morbidity is usually related to mitral stenosis.

Pregnancy in a patient with valvular heart disease needs a multidisciplinary approach with involvement of obstetrician, cardiologist and anaesthetist with detailed counseling of patient and family. There is no ideal technique or drug to anaesthetise these patients, any technique can be used as long as hemodynamic goals are met.

Thoracic segmental spinal is a technique of regional anaesthesia considered as an alternative to general anaesthesia in patients with high risk for general anaesthesia. It helps to improve patient safety, reduce the side effects of general anaesthesia, maintains hemodynamic stability, decreases multiple drug requirements during and after surgery especially in view of analgesia, reduced postanaesthesia care stay and better postoperative pain relief.

Case Report

A 27 year old woman, gravid 3 para 2 living 1 dead 1, 37 weeks pregnant, a known case of mitral stenosis with balloon mitral valvuloplasty done twice, presented with labor pain after being referred to our institution from peripheral government hospital for caesarean section in view of oligohydramnios and IUGR. She was diagnosed with mitral stenosis in 2018 during third month of first pregnancy due to complaint of palpitations during antenatal checkup and further followup. She was operated for balloon mitral valvuloplasty in 2018, and repeat surgery was done in October 2023 during 6th month of third pregnancy due to complaint of dyspnoea on exertion.

Preoperatively on history elicitation she gave history of slight dyspnoea on exertion from 6th month of present pregnancy, reduced after balloon mitral valvuloplasty but still present. She had no complaint of chest pain, palpitations, hoarseness of voice or limitation of regular physical activity and was comfortable on rest. Patient was on Tab Metoprolol 25 mg OD, Tab Pentid 400 mg BD and Tab Aspirin 150 mg OD since 2 months. On general examination, right sided parasternal heave was present, her height was 161 cm, weight 62 kg, pulse rate 78/min, BP – 116/74 mm Hg, room air saturation 98%. On auscultation patient had mid diastolic murmur and loud S1.

Patient was further evaluated in our institution, ECG showed no significant changes and echo showed no regional wall motion abnormality, left ventricular ejection fraction 60%, mitral valve rheumatic, mitral valve pressure gradient 14-17 mm Hg, mitral valve area 1.4cm², grade II mitral regurgitation, tricuspid valve showing mild regurgitation, no pulmonary artery hypertension, no clot/effusion. Cardiologist suggested moderate to high cardiac risk for surgery, fetal

heart rate monitoring, AFI monitoring and close follow up. He also advised Tab Penicillin G 400,000 units BD, Tab Metoprolol succinate 25mg OD, Tab Acetazolamide 250mg BD for 2 months and also Infective Endocarditis prophylaxis before surgery.

Investigations showed Hemoglobin of 10.9 g/dl, coagulation profile was normal, serum electrolytes, renal function test and liver function test within normal limit. Patient and relatives were explained about her condition, the high risks associated with the surgery and anaesthesia, about plan for thoracic segmental spinal anaesthesia and its complications and informed consent was taken.

After shifting the patient on OT table, multipara monitors were attached to the patient, peripheral intravenous line secured and intravenous fluid ringer lactate started. Her preoperative vitals were noted, PR: 82/min, BP: 120/76 mm Hg, room air saturation: 98%. The patient was premedicated with Inj. Pantoprazole 0.8 mg/kg iv and Inj. Cefotaxim 2g iv, half-hour prior to surgery. Patient was positioned in the sitting posture and under aseptic precautions with the help of 25G quinckes spinal needle segmental spinal anaesthesia was given by midline approach at T7-T8 space. After free flow of cerebrospinal fluid 1.8 ml of 0.5% isobaric Levobupivacaine with 30 mcg Buprenorphine were injected intrathecaly with negative aspiration of air or blood. Patient was made to lie down in supine posture. Neuraxial blockade was assessed by pinprick method and achieved from T4-T12. Patient was handed over to surgeon and surgeon was allowed to proceed. Patient's pulse rate, blood pressure, saturation and ECG were monitored and recorded every 5 minutes. She was hemodynamically stable throughout the surgery. On delivery of fetal head injection Oxytocin 20 IU in 300 ml RL was given intravenously. Female baby was delivered with APGAR score at 1 minute and 5 minute being 7/10, 8/10 respectively, weight 1.8 kg and was shifted to Neonatal Intensive Care Unit. During 45 min surgical procedure 500 ml crystalloid was given with total urine output of 120 ml. Post operatively patient's motor block level was assessed to be Modified Bromage Scale 4 and she was able to move herself to the stretcher with minimal help. She was shifted to the recovery room and after 1 hour to the postoperative care unit and closely monitored for the next 24 hours during which no significant adverse effects were detected and was hemodynamically stable throughout.

RESULTS AND DISCUSSION

During pregnancy in women with mitral stenosis there are increased risks related to cardiovascular system. There is increase in the risk of pulmonary congestion and edema due to expanded blood volume, left atrial and pulmonary pressure increases due to shortening of left ventricular filling time as a result of physiological tachycardia of pregnancy. The sudden increase in preload immediately after delivery may flood the central circulation and result in development of severe pulmonary edema. For this reason hemodynamic monitoring should be continued for upto 24 hrs after delivery in any women with mitral stenosis. The goals of anaesthesia management includes maintenance of adequate slow heart rate, adequate venous return and systemic vascular resistance and avoidance of aorticaval compression, pain, hypoxaemia, hypercarbia and acidosis, which may increase pulmonary vascular resistance. In segmental spinal anaesthesia we

used a low volume 0.5% isobaric levobupivacaine with 30 mcg buprenorphine. The advantage of isobaric levobupivacaine over plain bupivacaine is that it is more cardiostable and the spread of isobaric drug is not affected by patient position. The spread of drug was noticed 3-4 level above and below the site of injection, thus sparing the lumbosacral segments and thus the venous pooling in the lower limbs leading to decrease in venous return and hypotension was avoided.

CONCLUSION

Thoracic segmental spinal with isobaric drug is an alternative to general anaesthesia in patients with cardiac risk factors due to its remarkable hemodynamic stability, patient satisfaction and avoids polypharmacy and perioperative complications.

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