ORIGINAL RESEARCH PAPER

Anaesthesiology

SEGMENTAL THORACIC SPINAL ANESTHESIA FOR THOROCOSCOPY

KEY WORDS: Thoracic spinal Anesthesia,segmental spinal Anesthesia,general Anesthesia

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ABSTRACT

Thoracic segmental spinal anesthesia is a technique of regional anesthesia that can potentially be a suitable alternative to general anesthesia for certain cases such as laparoscopic surgeries, particularly in patients who are considered at high risk while under general anesthesia. Although not routinely used, the procedure has been shown as beneficial in maintaining hemodynamic stability for these patients and reducing side effects encountered with general anesthesia. This activity describes the procedure of thoracic segmental spinal anesthesia and explains the role of the interprofessional team in managing patients who have undergone this procedure.Thoracic segmental spinal anesthesia is typically utilized for patients undergoing surgery with major medical problems where they are considered a greater risk for general anesthesia. Single-dose segmental thoracic spinal anesthesia with low-dose local anesthetic and opioid can be a substitute to GA for procedures like thoracoscopy ,breast cancer surgery,lumpectomy as it resulted in faster recovery, higher patient satisfaction, better post-operative pain control, and lower incidence of PONV with consequent early hospital discharge.

INTRODUCTION

Thoracic segmental spinal anesthesia is a technique of regional anesthesia that can potentially be a suitable alternative to general anesthesia for certain cases such as laparoscopic surgeries, particularly in patients who are considered at high risk while under general anesthesia. Although not routinely used, the procedure has been shown as beneficial in maintaining hemodynamic stability for these patients and reducing side effects encountered with general anesthesia. This activity describes the procedure of thoracic segmental spinal anesthesia and explains the role of the interprofessional team in managing patients who have undergone this procedure.Thoracic segmental spinal anesthesia is typically utilized for patients undergoing surgery with major medical problems where they are considered a greater risk for general anesthesia. General anesthesia is the standard for most surgeries; however, some drawbacks can include negative drug side effects, prolong recovery, and inadequate pain control. There is currently renewed attention to thoracic segmental spinal anesthesia for several common surgeries.Giving thoracic spinal anesthesia may provide another option for these common surgeries: improved patient safety, reduced postanesthesia care stay, and better postoperative pain relief. This review aims to describe the technique, indications, contraindications and highlight the role of the interprofessional team in the management of these patients undergoing thoracic segmental spinal anesthesia.

CASE REPORT

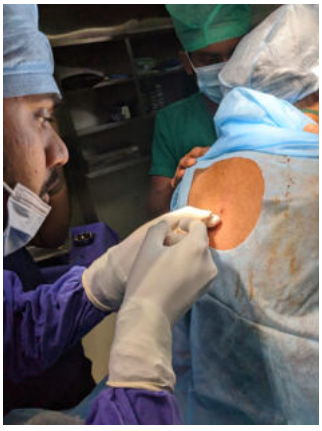
A 72 years female,weighing 55 kg with known case of hypothyroidism taking 50 mcg of t eltroxin was posted for thoracoscopy and intercostal drain insertion.Patient came with complaints of breathlessness 2 days back,chest X-ray showed massive pleural effusion and pleural tapping was performed in Icu and 700 ml of fluid was drained.Patient again developed breathlessness and chest X-ray showed massive pleural effusion,with room air saturation of 90%.So patient was posted for thoracoscopy and ICD insertion.on examination other vitas were stable with GCS 15.Airway assessment showed Mallampatti grade 2,mild restriction of neck flexion and extension.spinal examination was normal.Hemogram,liver function test,renal function test and coagulation profile were within normal limits.Pulmonary function test showed moderate restrictive pattern.The procedure was planned under regional Anesthesia.The patient was kept nil per oral for 2 hours for water and 8 hours for solid food.Written ,informed and explained consent was obtained from the patient and her family.

Intra operative management

On arrival at the operating room, ASA standard monitoring including continuous electrocardiogram, noninvasive blood pressure, and pulse oximetry were attached and baseline vitals [heart rate (HR), mean arterial pressure (MAP), and peripheral oxygen saturation (SpO2)] were recorded. Intravenous (IV) access was secured and Ringer's lactate solution was commenced at 10 mL/kg/h.

Patient was placed in sitting position and under all aseptic precaution the skin of the puncture site (T5–T6) was infiltrated with 2 mL of 1% lignocaine.The puncture was performed via a median approach with a 25-G Quincke spinal needle Once ligamentum flavum was pierced, the needle's stylet was removed and the hub was observed for the free flow of CSF. After confirming the free flow of clear CSF, a mixture of 1mL 0.5% isobaric levobupivacaine and 20□g of fentanyl (total volume 1.4mL) was injected. Patients were then placed in the supine position and the onset of sensory block [response to pinprick from the lower border of the clavicle (T2) to the inferior costal margin (T8)] was assessed at every 2 min. The spinal level achieved was from T2 to T8.

Vitals including MAP, HR, SpO2, and respiratory rate (RR) were recorded at every 5 min after induction till the end of surgery. There was 2 episodes of hypotension (fall in MAP by 30% from baseline) and no bradycardia (HR less than 60 beats/min) was noted and were treated with IV crystalloid bolus and IV ephedrine 6mg .There was no other perioperative complications such as the occurrence of nausea, vomiting, pruritus, and urinary retention.



DISCUSSION

segmental thoracic spinal provides better patient and surgeon satisfaction with significantly better post-operative pain, longer time to first rescue analgesia, lesser postoperative opioid consumption, and lesser nausea vomiting compared to GA Neuraxial anesthesia attenuates the neuro-endocrine, metabolic, and immune response to surgery. It also reduces postoperative opioid requirement, due to prolonged sensory block. Hence, neuraxial anesthesia is a better alternative to GA.

There are two main issues related to spinal at midthoracic level: risk of neuronal injury and chances of high spinal from cephalad spread of local anesthetic. In recent studies, it was found that the space between the duramater and spinal cord in thoracic region measured with MRI was 5.19 mm at T2, 7.75 mm at T5, and 5.88 mm at T10 and also that the spinal cord and the cauda equina are touching the duramater posteriorly in the lumbar region and anteriorly in the thoracic region. The angle of insertion of the spinal needle at T5 and T6 (almost 50°) further elongates the distance from the tip to the posterior surface of the cord.

As compared to lumbar and cervical level, CSF amount at the thoracic level is diminished and nerve roots are thinner, both these factors predict efficient blockade of these segments with lower doses of local anesthetic (5mg isobaric levobupivacaine).

We performed the block at the T5–T6 level as subarachnoid space is widest at this region and the thoracic segment of the cord lies anteriorly; this was shown in studies conducted by Imbelloni et al and Lee et al.

Intraoperatively quality of anesthesia was adequate and there was no conversion to GA. No respiratory complications like affective dyspnea, hypopnea, or hypoxia (SpO2 <94%) were noted . This can be explained by the fact that the main inspiratory muscle is the diaphragm, which is innervated by the phrenic nerve (C3–C6), which is unaffected and expiration occurs passively. Similar results were obtained in a case report, where a patient with COPD with severe emphysema on oxygen therapy underwent cholecystectomy under the thoracic CSE technique, with a minute dose of local anesthetic, without any respiratory complications.

Hemodynamic changes studied were MAP and HR. MAP changes were minor and insignificant; in spite of the neuraxial blockade, this is because the motor power of the lower limbs was preserved, a low dose of local anesthetic was used, and the patient remained conscious throughout the procedure, avoiding central depression of circulation.

The length of stay in the recovery room and the hospital was shorter Patients was highly satisfied with the anesthetic technique, due to motor control of lower limbs, early mobilization, good analgesia, and low incidence of PONV.

CONCLUSION

Single-dose segmental thoracic spinal anesthesia with low-dose local anesthetic and opioid can be a substitute to GA for procedures like thoracoscopy ,breast cancer surgery,lumpectomy as it resulted in faster recovery, higher patient satisfaction, better post-operative pain control, and lower incidence of PONV with consequent early hospital discharge.

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