ABSTRACT

Study Title

A PROSPECTIVE STUDY EVALUATING THE EFFECTIVENESS OF EPIDURAL VOLUME EXTENSION WITH NORMAL SALINE IN COMBINED SPINAL EPIDURAL ANAESTHESIA FOR LOWER LIMB ORTHOPAEDIC SURGERIES USING LOW DOSE INTRATHECAL HYPERBARIC BUPIVACAINE.

Background

Combined spinal epidural (CSE) anesthesia is the preferred and widely used method for lower limb orthopedic surgeries. The epidural volume extension (EVE) technique is a modification of CSE in which the level of sensory analgesia obtained by subarachnoid block is increased by a small volume of saline administered through the epidural catheter. It is an extremely beneficial technique for patients with a compromised cardiac status like global hypokinesia with left ventricular dysfunction, trauma patients with systemic illness, peripartum cardiomyopathy, severe right ventricular dysfunction and severe pulmonary artery hypertension and ischemic or dilated cardiomyopathy.

Aim

To evaluate the effectiveness of epidural volume extension using 10 ml of 0.9 % saline in combined spinal epidural anaesthesia to perform adequate neuroaxial blockade using low dose of intrathecal hyperbaric bupivacaine in lower limb orthopaedic surgeries.

Patients and methods

80 patients divided into two groups of forty each belonging to ASA PS 1 & 2 planned for elective lower limb orthopaedic surgery in supine position from Govt. Kilpauk Medical College and Govt. Royapettah Hospital were enrolled in the study after getting informed consent. Combined spinal epidural anaesthesia was performed with 10 mg of 0.5% hyperbaric bupivacaine with 25 micrograms of fentanyl followed by epidural volume extension with 10 ml of normal saline 5 minutes after performing the subarachnoid block in group A.
Group B patients were anaesthetised with CSE without EVE using the same technique and the same dose of intrathecal hyperbaric bupivacaine.

Results

In this study, all demographic data (age, height, weight, sex) were not statistically significant between the two groups. Regarding the block profile, there was a statistically significant difference between the two groups. The incidence of sensory loss at 10th minute achieved up to T5 level was significantly higher in group CSE - EVE compared to group CSE by a percentage difference of 70.00 scoring points (100% higher). This difference is significant with a p-value of <0.0001 as per Fisher’s exact test. The mean two segment regression time of sensory block was significantly higher in group CSE - EVE compared to group CSE by a mean difference of 14.10 minutes (20% higher). This difference is significant with a p-value of <0.0001 as per unpaired t-test. The mean maximum sensory block time achieved was significantly lower in group CSE - EVE compared to group CSE by a mean difference of 2.85 minutes (21% lower). This difference is significant with a p-value of <0.0001 as per unpaired t-test. The mean maximum motor block time achieved was significantly lower in group CSE - EVE compared to group CSE by a mean difference of 2.43 minutes (38% lower). This difference is significant with a p-value of <0.0001 as per unpaired t-test. The incidence of top up dose of bupivacaine required was significantly lower in group CSE - EVE compared to group CSE by a percentage difference of 62.50 scoring points (96% lower). This difference is significant with a p-value of <0.0001 as per Fisher’s exact test. With respect to the hemodynamic state, the systolic blood pressure and heart rate showed no significant changes between the two groups, which emphasized the safety of epidural volume extension technique.

Conclusion

It can be concluded that low dose of intrathecal hyperbaric bupivacaine (10 mg) with 25 micrograms of fentanyl with epidural volume extension (10ml normal saline) is associated with early onset of sensory and motor blockade, high level of sensory block, shorter time of two segment regression while maintaining the hemodynamic stability.
Keywords

Combined spinal epidural anesthesia, lower limb orthopedic surgery, epidural volume extension, intrathecal hyperbaric bupivacaine, local anesthetics