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Sequential Combined Spinal Epidural Anaesthesia versus Epidural Anaesthesia in Orthopaedic Surgeries - A Comparative Evaluation

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ABSTRACT

Objective- To study comparison of efficacy, surgical anaesthesia and motor blockade of combined spinal epidural anaesthesia with epidural anaesthesia and dose of local anaesthetic required to produce T-10 block is larger with epidural block as compared to combined spinal epidural block.

Method- This study was conducted on 60 patients, ASA I and II aged 20-60 years of both sexes scheduled for elective lower limb orthopaedic surgeries .patients requiring general anesthesia were exclude.

Result- The mean sensory level achieved was T9.5±0.68 and T9.47±0.63 in Group A and B respectively with a p value of 0.844 which is not significant. According to Modified Bromage Grading, Grade III block is seen in 93% of cases in group B, but only in 73% of cases in group A.

Conclusion- Sequential CSE has been found to be better technique as compared to epidural block .Advantages of CSE are faster onset of action, Better quality of analgesia ,better muscle relaxation and less dose of local anesthetic drug needed to reach the same level. Bradycardia and hypotension incidence is found to be similar with both the blocks.

I. INTRODUCTION:

Central neuraxial blocks for major lower extremity surgery include spinal anaesthesia alone, epidural anaesthesia alone or the combination of spinal and epidural anaesthesia. Most of the lower limb surgeries are conducted under subarachnoid or epidural anaesthesia. Both the techniques have their own set of disadvantages; subarachnoid blockade is single shot, gives unpredictable level of blockade with limited time. While on the other hand, missed segments, incomplete motor block, poor sacral spread, local anaesthetic toxicity and slower onset of action are disadvantages of epidural anaesthesia. So this has led to the development of combined spinal epidural (CSE) technique in which the disadvantages of both the techniques can be minimized. The need of the hour is a technique that offers good intraoperative and postoperative analgesia using a minimum concentration of drug with minimal or no side effects. It gained increasing interest as it combines the reliability of a spinal block and flexibility of an epidural block. So, the purpose of this study is to evaluate sequential cse and epidural block in terms of efficacy, surgical analgesia and muscle relaxation in patients undergoing lower limb surgeries.

II. MATERIAL AND METHODS:

A prospective randomized study was conducted in the department of anaesthesiology in association with department of orthopaedics at national institute of medical science jaipur from 1st january 2021 to 30th june 2022. 60 patients, ASA I and II, aged 20-60 years of both sexes scheduled for elective lower limb orthopaedic surgeries were randomized into two groups. Group A, receiving epidural anaesthesia and Group B, receiving sequential combined spinal epidural anaesthesia. patients requiring general anaesthesia, who were on anticoagulant therapy , with bleeding diathesis, with infections on the back, with spinal deformities ,with history of peripheral neuropathy and with CNS disorders were excluded.

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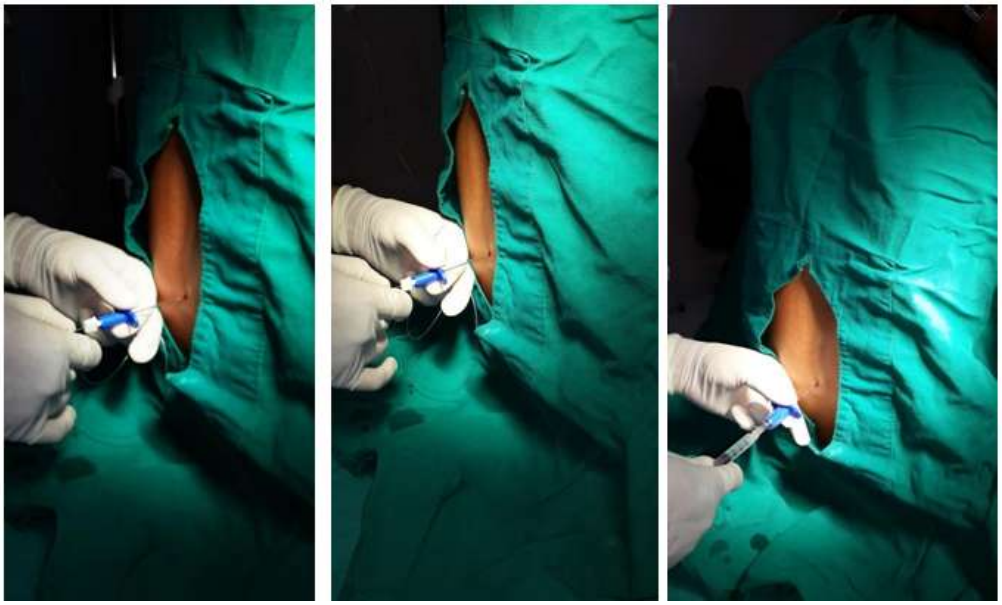
Threading Of Epidural Catheter



In group A- 18g touhy epidural needle, with the bevel facing cephalad, was introduced in the midline in the L3-4 interspace. after entering the interspinous ligament, the stylet was removed and a 5ml plastic syringe with 3ml of air was firmly attached to the hub of the epidural needle. the unit was then carefully advanced with constant pressure on the plunger of glass syringe. as soon as there was loss of resistance to the injection of air, the insertion of needle was stopped and an aspiration test was done to check for blood or CSF to exclude the presence of the needle tip in an epidural vein or in the subarachnoid space. The epidural catheter (18G) was then threaded through the epidural needle. After ensuring that 3cm of catheter was introduced into the epidural space, the needle was removed carefully over the catheter without dislodging the catheter. The catheter was then fixed to the back of the patient with a good sticking plaster. after positioning the patient in supine position 15ml of 0.5% plain bupivacaine was injected epidurally in aliquots of 5ml, each time ensuring that an aspiration was negative for blood or csf. 1.5-2ml/ of 0.5% bupivacaine was injected epidurally for every unblocked segment after the maximum height of block is reached.

in group B – epidural space was identified as described for group a, and then a 27g long whitacre spinal needle was introduced through epidural needle to locate the subarachnoid space and 7.5mg (1.5 ml) of the 0.5% bupivacaine (heavy) was deposited in the subarachnoid space. After withdrawing the spinal needle carefully a 18G epidural catheter was threaded through the epidural needle into the epidural space for about 3cm, the needle was removed carefully over the catheter without dislodging the catheter. The catheter was then fixed to back of the patients with a good sticking plaster. Patient was positioned in supine position 5mins after spinal block was given. 1.5-2ml of 0.5% bupivacaine was injected epidurally for every unblocked segment after 10 minutes. Once the level of analgesia was assessed, 0.5-2mg inj. midazolam intravenous was given for sedation oxygen was administered through a polymask at 5-6 lts/min flow rate, through out the surgery.

Table 1. Comparison Of Pulse Rate

Time	Group A Mean ± Sd	Group B Mean ± Sd	P Value	Significance
0	86 ± 11	86 ± 11	0.9800	NS
5	86 ± 11	86 ± 11	0.8095	NS
10	84 ± 13	84 ± 13	0.5267	NS
15	82 ± 13	82 ± 13	0.6533	NS
30	81 ± 10	81 ± 10	0.8432	NS
60	81 ± 9	81 ± 9	0.9067	NS
90	81 ± 10	81 ± 10	0.7516	NS

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120	82 ± 11	82 ± 11	0.6717	NS
150	81 ± 11	81 ± 11	0.4887	NS
180	81 ± 10	81 ± 10	0.6637	NS
210	80 ± 8.4	80 ± 8.4	0.9482	NS

Table 1 Shows the intraoperative mean pulse rate ± Sd per minute. There is no significant change in the pulse Rate.

Table 2: Sensory Block

Parameters	**Group A**	**Group B**	**P Value**	**Significance**
Height Of Patient	168.1 ±7.30	167.2 ±7.48	0.639	NS
Mean Sensory Level Achieved	T 9.50 ± 0.68	T 9.47±0.63	0.844	NS
Time To Achieve T10 Sensory Block	26 ± 2.75	24.5 ± 3.03	0.046	S

The Mean ± SD of height of the patient was 168.1±7.30 In Group A and 167.2 ±7.48 In Group B, the difference is not statistically significant. The mean sensory level achieved was T9 0.5±0.68 And T9 0.47± 0.63 In Group A And B respectively, with A P Value Of 0.844 which is not significant. The time to achieve T10 sensory block was statistically significant.

Table 3: Motor Blockade

Bromage Grade	Group A	Group B
0	0	0
I	1(3.34%)	0
II	7(23.34%)	2 (6.67%)
III	22(73.34%)	28 (93.34%)

According To Modified Bromage Grading, Grade III Block is seen in 93% of cases in Group B, but only in 73% of cases in Group A.

III. DISCUSSION:

Regional anesthesia techniques has been of great interest for surgery and pain management over the last two decades. The local anesthetic intrathecal dosage is reduced upto 70% in CSE which helps in preserving sensory block quality, hemodynamic stability and provides rapid patient recovery ,This was also noted in the past study which was conducted by Michele Cacciapaglia Et Al[1].

Rapid onset of analgesia with minimal dosage has been noticed when subarachnoid injection is given and also there is a flexibility to extend the block depending upon the surgical incision needed.

It is found to be easy to spread the dermatomal distribution of the drug in sequential CSE. By keeping a epidural catheter in situ , safety of CSE is enhanced and it also avoids the overshooting with regard to duration of spinal anesthesia.

In my study it is found that surgical analgesia and muscle relaxation after giving sequential CSE anesthesia is much better than those noticed in epidural anesthesia.

For major orthopedic surgery , study was conducted in the past comparing the CSE , spinal anesthesia and epidural block ,it was found that spinal anesthesia and CSE were superior to epidural block[2] .

According to modified bromage classification only 80% of cases in epidural Group achieved Grade III Blockade and 23.34% achieved Grade III Block. In CSE Group 93.34% of patients achieved Grade III Block.

IV. CONCLUSION

Sequential CSE has been found to be better technique as compared to epidural block

.Advantages of CSE are faster onset of action, better quality of analgesia ,better muscle relaxation and less dose of local anesthetic drug needed to reach the same level. Bradycardia and hypotension incidence is found to be similar with both the blocks.

However, the disadvantage with sequential CSE is when subarachnoid block is given before epidural catheter placement, hyperbaric solution and positioning delay may result in saddle block or unilateral block and it also delays in giving test dose .Difficulty in interpretation of intravascular catheterization is also experienced.

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