A Comparitive Evaluation Between Combined Spinal Epidural Block and Epidural Block for Lower Abdominal Surgeries

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ABSTRACT

Introduction: Most of the lower abdominal surgeries are conducted under spinal or epidural anaesthesia. The purpose of this study is to evaluate combined spinal epidural anesthesia and epidural block in terms of efficacy, surgical analgesia and muscle relaxation in patients undergoing lower abdominal surgeries.

Material and methods: This prospective randomised study was conducted after ethical clearance where 60 patients of ASA I and II, aged 20-60 years of both sexes scheduled for elective lower abdominal surgeries were randomized into two groups.

Group A – receiving epidural anaesthesia. 20ml of 0.5% plain bupivacaine was injected epidurally.1.5-2ml of 0.5% Bupivacaine was injected epidurally for every unblocked segment after the maximum height of block is reached so as to get the required T6 level. Group B – receiving combined spinal epidural anaesthesia. (2.5 ml) of 0.5% Bupivacaine (heavy) was deposited in the subarachnoid space.1.5-2ml of 0.5% bupivacaine was injected epidurally for every unblocked segment after 10 minutes to get required T6 height of block.

Results: The changes in hemodynamic parameters observed between the two groups are statistically not significant. The time to achieve T6 sensory block was significantly shorter in CSE group when compared to epidural group. CSEA provided more degree of motor blockade and significantly good quality of analgesia compared to epidural anesthesia alone. The amount of bupivacaine required to produce the desired level of T6 blockade is 2.5 times less in CSEA compared to epidural anesthesia.

Conclusion: Combined spinal epidural technique is effective, safe, with stable hemodynamics and superior to epidural anaesthesia in patients undergoing lower abdominal surgeries.

Keywords: Epidural, Combined Spinal Epidural, 0.5% Bupivacaine, Lower Abdominal Surgeries.

INTRODUCTION

Neuraxial anaesthesia techniques for major lower abdominal surgeries include spinal anaesthesia alone, epidural anaesthesia alone or the combination of spinal and epidural anaesthesia.

Most of the lower abdominal surgeries are conducted under spinal or epidural anaesthesia.[1,2] Single shot nature, unpredictable level of blockade, time limit are disadvantages of spinal anesthesia whereas missed segments, incomplete motor block, poor sacral spread, systemic toxicity[3] and slower onset of action are disadvantages of epidural anaesthesia. These led to the development of combined spinal epidural (CSE) technique. The CSE technique involving intentional subarachnoid blockade and epidural catheter placement during the same procedure, ideally combines the best features of spinal and epidural blockade, avoiding their respective disadvantages. The CSE technique saves 15 to 20 mins in establishing surgical anesthesia when compared to epidural anesthesia alone.

CSE is an effective way to reduce the total drug dosage required for anesthesia[4] or analgesia. The intrathecal[5] injection achieves rapid onset with minimal doses of local anaesthetics and opioids and the block can be prolonged with low dose epidural maintenance administration.

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.CSE gained increasing interest as it combines the reliability of a spinal block and flexibility of an epidural block.[6] Combined spinal epidural anesthesia (CSEA) is characterized by a shorter latent period, a lower dose of local anesthetics and a higher reliability which uses combination of techniques to accomplish the ideal kind of anesthesia for patients of all age groups.

The technique of CSE involves injection of a dose of subarachnoid local anaesthetic and then extension of block by injecting drug through the epidural catheter. The purpose of this study was to evaluate combined spinal epidural anesthesia and epidural block in terms of efficacy, surgical analgesia and muscle relaxation in patients undergoing lower abdominal surgeries.

MATERIAL AND METHODS

After local ethics committee approval and informed consent, a prospective randomized study was conducted in the department of anaesthesiology in association with departments of surgery, urology and gynecology. Elective lower abdominal surgeries were randomized into two groups.

Group **A** – receiving epidural anaesthesia – 20 ml of 0.5% Bupivacaine injected into epidural space.[7,8] 1.5-2 ml of bupivacaine 0.5% per every unblocked segment injected into epidural space after the highest level of sensory block is achieved.

Group B – receiving combined spinal epidural anaesthesia-2.5ml of 0.5% Bupivacaine heavy injected intrathecally and patient placed in supine position. 1.5-2 ml of bupivacaine 0.5% per every unblocked segment injected into epidural space after 10 mins.

In group A (epidural group) an 18G Weiss epidural needle was introduced in the midline in the L3-4 interspace. After entering the interspinous ligament, the stylet was removed and a 5ml

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Parameters	Group A	Group B	P value	Significance
Height of patient	157.66+/-6.06	157.73+/-5.89	0.962	NS
Mean sensory level achieved	T 5.50+/-0.68	T 5.47+/-0.63	0.844	NS
Time to achieve T6 sensory block	17+/-2.6	8.66+/-0.92	<0.05	S

Table-1: Sensory block

Parameter	Group A	Group B
Quality		
Excellent	26	30
Good	4	0
Fair	0	0
Poor	0	0

Table-2: Quality of surgical analgesia

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

Table-3: Motor blockade

plastic syringe attached to the hub of the epidural needle. The unit was then carefully advanced, as soon as there was loss of resistance to the injection of air, 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.3ml of 1.5% xylocaine with adrenaline(1 in 2,00,000)[9] is given to rule out intravascular placement of needle.

The epidural catheter (20G) was then threaded through the epidural needle.After keeping the patient in supine position 20ml of 0.5% plain bupivacaine was injected epidurally in aliquots of 5ml. 1.5-2ml/ of 0.5% Bupivacaine was injected epidurally[10] for every unblocked segment after the maximum height of block is reached so as to get the required T6 level.

In group B (CSE group)[11,12] – By using needle through needle approach, epidural space was identified as described for Group A, and then a 27G long whitacre spinal needle[13] was introduced through the epidural needle to locate the subarachnoid space and 12.5mg (2.5 ml) of 0.5% Bupivacaine (heavy) was deposited in the subarachnoid space. After withdrawing the spinal needle carefully a 20G epidural catheter was threaded through the epidural needle into dislodging the catheter. Patient was placed in supine position after spinal block was given. 1.5-2ml of 0.5% Bupivacaine was injected epidurally[14,15] for every unblocked segment after 10 minutes. For example if after giving spinal (2.5ml intrathecally) the level reached is T10 then to get required T6 height of block,8ml is given epidurally.

STATISTICAL ANALYSIS

Data were collected and analysed using student T-test to find out significant difference between two samples. Data was reported as mean value +/-SD.A P-value of <0.05 was considered statistically significant.

RESULTS

A comparative study was conducted on 60 adult patients of ASA I and II of both sexes in the age group of 20-60 years posted for various lower abdominal surgeries. Time to readiness for surgery was taken as sensory level at T6 or higher.

With regard to age, sex, height and the mean sensory level achieved the difference is considered to be not statistically significant by conventional criteria. The changes in hemodynamic parameters observed between the two groups are statistically not significant. The time to achieve T6 sensory block was significantly shorter in CSE group when compared to epidural group. CSEA[16] provided more degree of motor blockade and significantly good quality of analgesia compared to epidural anesthesia alone. The amount of bupivacaine required to produce the desired level of T6 blockade is 2.5 times less in CSEA compared to epidural anesthesia (table:1-3).

Intraoperative complications like shivering are observed in both the groups and are not statistically significant. No post-operative complications occurred.

DISCUSSION

Over the last two decades there has been considerable revival of interest in the use of regional anaesthesia techniques for surgery and pain management. New drugs, new needle designs, and developments in catheter technology have contributed to improving the quality and safety of regional anaesthesia.

The CSE technique[17,18] has attained widespread popularity for patients undergoing major surgery below the umbilical level who require prolonged and effective postoperative analgesia.

The combined spinal epidural technique involves intentional subarachnoid blockade and epidural catheter placement during the same procedure. CSE allows a rapid onset of neuraxial blockade, which can subsequently be prolonged or modified.

The method used for instituting CSE block is single space needle through needle technique.[19,20]

In the present study we made an attempt to study the CSE block in patients with regard to onset of analgesia, quality of surgical analgesia, degree of motor blockade with hemodynamic changes and complications in comparison to epidural anesthesia.[21]

Patients were randomly divided into two groups of 30 each, group A receiving only epidural anesthesia and group B receiving combined spinal epidural (CSE) anesthesia. Both the groups were comparable in terms of age, height, ASA grading and nature of surgery.

Hemodynamic changes were assessed by using pulse rate, systolic and diastolic blood pressures.In our study, hemodynamically, the incidence of hypotension and bradycardia was almost similar in both the groups. The majority of the patients in both groups had a fall of 10 – 20% in pulse rate and blood pressure. The differences in the hemodynamic parameters throughout the procedure were not significant statistically.

Nikhil Swarnkar et al[22] in their study of CSE in comparison to epidural for total abdominal hysterectomies found out that there is no significant change in the hemodynamic parameters observed in both the groups. The explanation given by them for this finding is, in CSE although spinal block is given initially, significant hemodynamic changes are not observed because of less extensive spinal block (T_{7-8}) due to sequential

CSE technique combined with slower onset of epidural block allowing time for compensatory mechanism to occur.

The absence of hemodynamic changes in CSE group in our study is comparable with the above study and may be explained by the relatively low dose of bupivacaine used in the spinal phase of CSE, and by the gradual administration of local anesthetics in the epidural group and also due to preloading with IV fluids.

Sensory block

The mean time of onset of analgesia is calculated from the completion of anesthesia till the loss of sensation to pin prick. In our study the time to achieve T6 sensory block was 8.66±0.92 min in CSEA group and 17±2.6 min in epidural group and the difference is significant statistically. The time to readiness for surgery is less in the CSE group when compared to epidural group.

The desired level of sensory block in our study is T6 and the achieved levels were T5.5±0.68 in epidural group and T5.47±0.63 in CSE group and the difference in the levels achieved is not statistically significant

Quality of surgical analgesia is graded as excellent to poor basing on the requirement for supplementation with analgesic or sedative.In our study the quality of surgical analgesia was excellent in 100% of cases in CSE group where as it is 86.67% in epidural group. None of the patients required general anaesthesia.

In our study we supplemented 13% cases of epidural group with sedatives to improve the quality of analgesia whereas the quality of analgesia was excellent in 100% cases of CSEA. Combined epidural anesthesia provided better quality of analgesia than epidural anesthesia alone and the difference is statistically significant.

Motor blockade

According to modified Bromage classification, in our study only 73% of cases in epidural group achieved grade III blockade and 23.34% achieved grade II block. In CSE group 93.34% of patients achieved grade III block and only 6% achieved grade II block. In our study we found that the degree of motor blockade is more in cases of CSEA when compared to epidural anesthesia alone which is statistically significant.

Dose of drug

In our study the total dose of Bupivacaine required to produce T6 block was 103.85 mg in epidural group and 42.15mg in CSE group. In our study the dose required in epidural anesthesia was 2.5 times the combined spinal epidural dose which is statistically significant.

Complications

Shivering[23] during intra operative period was complained in 2 patients in both the groups which is statistically not significant. None of the patients

of combined spinal epidural group complained post dural puncture headache. The use of 27G Whitacre spinal needle may have contributed to the absence of headache in our study.

CONCLUSION

Combined spinal epidural anesthesia by needle through needle technique is a useful anaesthetic technique combining the reliability of spinal block and versatility of epidural block. It offers many advantages over other central neuraxial blocks.

Analgesia and surgical conditions provided by combined spinal epidural anesthesia are superior to those provided by epidural anaesthesia alone. Combined spinal epidural anesthesia compared to epidural produces early onset of action, superior muscle relaxation, improved sensory block with stable hemodynamics. The need for supplementary analgesics and sedatives were significantly lower in combined spinal epidural group.

To conclude combined spinal epidural technique is effective, safe, with stable hemodynamics and superior to epidural anaesthesia in patients undergoing lower abdominal surgeries.

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