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STUDY TO SEE THE EFFECTS OF DIFFERENT VOLUMES OF EPIDURAL SALINE INJECTION DURING SPINAL ANESTHESIA

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ABSTRACT

Title:- Study to see the effects of different volumes of epidural saline injection during spinal anesthesia. **Aims and Objectives:-** To observe the effects of different volumes of epidural saline injection after spinal anesthesia using combined spinal – epidural techniques. **Material and Methods:-** Patients of ASA grade I and grade II, admitted to Gandhi Memorial and Associate Hospitals Lucknow scheduled for different surgical procedures of lower abdomen and below were included in study. After taking proper informed consent patients were enrolled for the study. Epidural catheter insertion was performed at L3-L4 or L4-L5 levels. In subarachnoid space 2ml of 5% lidocaine is injected after twenty minutes epidural saline in different quantity 10ml, 15ml, and 20ml were given in different groups of patients. Level of analgesia was evaluated b pinprick method. Data were analyzed by applying student 't' test and $P<0.05$ was considered statistically significant. **Results and conclusions:-** The level of sensory blockade at different time intervals after spinal anesthesia were not statistically significant different in all the groups and the maximum level of sensory blockade after spinal anesthesia can be achieved approximately within 5 minutes.

KEYWORDS: Epidural saline injection, spinal anesthesia, lidocaine.

INTRODUCTION

The spinal anaesthesia has many advantages over general anaesthesia being simple and economical. A small dose of le local anaesthetic agent produces effective block. The chances of respiratory depression and postoperative sedation is minimal with spinal as compared to the general anesthesia. However, certains disadvantages such as risk of extensive block, fixed duration of anaesthesia, hypotension, and risk of postdural puncture headache are reported very often.[1-6] These disadvantages are overcome by using the epidural anaesthesia as alternative. In this an exact block height can be titrated and maintained with supplementary doses and it is possible to use the epidural catheter for postoperative pain relief also. Epidural anesthesia is however time consuming and with high chances of insufficient or superficial blockade especially of motor roots, despite large doses of local anaesthesia. Therefore a combination of the two methods (spinal with epidural) may be an effective alternative. The combined spinal-epidural anesthesia (CSEA) is a relatively new technique but becoming popular especially in anaesthesia for obstetrics and orothopedic surgery.[6-10] It has advantages like early onset of anesthesia combined with flexibility to extend the duration of level of analgesia and postoperative epidural pain relief. Several modifications of CSE techniques have been described but the needle-through – needle single interspace technique as described by number of researchers is probably one of the best methods. The epidural injection of saline soon after the administration of an intrathecal local anaesthesic can increase cephalad extent of the sensory block. The present study was designed to evaluate the effects of different volumes of epidural saline (10, 15 and 20ml) after 20 minutes of spinal anesthesia (2ml of 5% lidocaine).

Aims and Objectives:- Present stud was done to observe the effects of different volumes of epidural saline injection after spinal anesthesia using combined spinal-epidural techniques.

MATERIAL AND METHODS:- The study was designed to clarify the effects of different volumes of epidural saline during combined spinal-epidural anaesthesia. The study was carried out in department of aneshthesiology. The study was approved by institutional ethics committee. Patients of ASA grade I and grade II, admitted to Gandhi Memorial and Associate Hospital Lucknow scheduled for different surgical procedures of lower abdomen and lower limb were considered for the present study. Patients of either sex between 20-50 years of age without any significant comorbid conditions were included for the study. The paients with skin infection at the lumbar puncture site, patients with bacterimia, severe hypovolumia,

coagulopathy, headache and signg and symptoms of increased intracranial pressure were excluded from the study. Before enrolling the patients written informed consent was taken. Baseline monitoring of patients was blood pressure, pulse rate, respiratory rate and oxygen saturation. Level of Preloading was done byy ringer lactate solution. The patients were divided randomly into four groups depending on the volume of epidural saline they received. Group 1- Patients received spinal anesthesia along with 5 ml of saline epidural route. Group 2- Patients received spinal anesthesia plus 10 ml epidural saline. Group 3- Patients received spinal aneshthesia plus 15 ml epidural saline. Group IV- Patients received spinal anaesthesia plus 20 ml epidural saline. In combined spinal –epidural anaesthesia single space technique at the L3-L4 or L4-L5 was used and epidural catheter insertion was performed. Selected lumbar epidural space was located in the usual manner with a 16-gauge Huber-tipped Tuohy needle using loss of resistance to air method. Through the epidural needle was then inserted, a 26 gauge spinal needle which was 1 cm longer than Tuohy needle and therefore immediately penetrated the dura and allowed a subarachoid 2ml of 5% Lidocaine to be injected in the usual manner. Spinal needle was removed and and epidural catheter was inserted and secured in the epidural space while the spinal anesthesia increasing doses of epidural saline (5ml, 10ml, 15ml, and 20ml) were given. The level of analgesia was observed by pin prick method at different time intervals ie. 5, 10, 15, 20, 30, 45, and 60 minutes. The umbilicus was taken as landmark and considered as "ZERO". The level below umbilicus was taken in minus and above umbilicus in plus. The readings of levels were recorded in centimeters. Along with level of analgesia the haemodynamic changes in blood pressure, pulse rate, respiratory rate and oxygen saturation at different time intervals was also recorded.

RESULTS: The anthropometric parameters of patients included age, sex, height, weight, body mass index, were recorded and there were no significant difference in any of the anthropometric parameters among all groups.

Table.1: The level of sensory blockade (in centimeters) in patients of groups I (with 5m of saline) at different intervals after spinal anaesthesia by observing pin prick method.

	After 5 minutes	After 10 minutes	After 15 minutes	After 20 minutes
Number	10	10	10	10
Mean ± SD in Cms	-0.6 ± 2.5	0.4 ± 1.83	0.5 ±1.87	0.5±1.45
't'	-	1.34	1.39	1.52
'p'	-	NS	NS	NS

NS- Non significant

Table.2: The level of sensory blockade (in centimeters) in patients of groups II (with 5m of saline) at different intervals after spinal anaesthesia by observing pin prick method.

	After 5 minutes	After 10 minutes	After 15 minutes	After 20 minutes
Number	10	10	10	10
Mean ± SD in Cms	0.45 ± 1.92	0.95±1.57	0.9±1.66	0.75±1.34
't'	-	1.76	1.98	1.54
'p'	-	NS	NS	NS

NS- Non significant

Table.3: The level of sensory blockade (in centimeters) in patients of groups III (with 10m of saline) at different intervals after spinal anaesthesia by observing pin prick method.

	After 5 minutes	After 10 minutes	After 15 minutes	After 20 minutes
Number	10	10	10	10
Mean ± SD in Cms	-2.1 ± 1.28	-1.7±1.36	-1.9±1.09	-1.8±1.2
't'	-	1.56	1.8	1.4
'p'	-	NS	NS	NS

NS- Non significant

Table 4: The level of sensory blockade (in centimeters) in patients of groups IV(with 15m of saline) at different intervals after spinal anaesthesia by observing pin prick method.

	After 5 minutes	After 10 minutes	After 15 minutes	After 20 minutes
Number	10	10	10	10
Mean ± SD in Cms	-3.1 ± 1.28	-3.7±1.36	-3.9±1.09	-3.8±1.2
't'	-	1.5	1.89	1.46
'p'	-	NS	NS	NS

NS- Non significant

DISCUSSION AND CONCLUSION

The combined spinal epidural anaesthesia (CSEA) offers profound and uniformly distributed analgesia with good muscle relaxation as well as the possibility for peri-and post-operative epidural supplements through the epidural catheter to extend the blockade and to provide post-operative pain relief. Present study was done on total of 40 patients divided in to four groups depending on the volume of epidural saline (ES) they received. We found that level of analgesi after injecting 10,15, and 20 ml of epidural saline in group II, III and IV were resepectivelly higher than those in group I ($P<0.05$). Maximum increase in level of sensory blockade after 10 ml of epidural saline and in group II was 4.3± 0.63 cm. Maximum increseae

in level of sensory blockade after 15 ml of epidural saline in group III was 6.7±1.09 cm. Maximum increase in level of sensory blockade after 20 ml of epidural saline in group IV was 10.4±1.78 cm.

In spinal anaesthesia if the analgesic level does not reach the surgical region, the spinal anaesthesia must be repeated or general anaesthesia must be induced. Both techniques are time consuming and repeated spinal anaesthesia may cause post-anaesthetic complications because of a high concentration of local anaesthetic in the subarachnoid space. With combined spinal and epidural anaesthesia a local anaesthetic or saline can be injected through an epidural catheter to increase the level of sensory blockade. An epidural injection of a large bolus of saline may be dangerous inform of increased CSF and chances of retinal damage. In present study after injecting different volumes of epidural saline the subarachnoid space decreases due to dural compression and it influences the spread of local anaesthetic causes increase in level of sensory blockade. The evidences are there regarding injection of local anesthetics or any fluid into extradural space may be expected to result in shift of level of analgesia. There are evidences that small doses of extradural local anaesthetic injected in lumbar region may extend a fixed subarachnoid block. The short space of time in which the extension occurs suggests a mechanism other than diffusion of anesthetic into the CSF.
In our study we found that level of sensory blockade increases and suggests that even after the fixation of anesthetic aget some drug remains in free form which shift cephalad with CSF due to dural compression.

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