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A Comparative Study of Epidural and Combined Spinal-Epidural Block for Lower Abdominal Surgery

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INTRODUCTION*: The aims of this study was to compare Epidural and Combined Spinal-Epidural block with respect of onset and duration of loss of pain, intensity of motor block and haemodynamic changes.*
Materials and Methods*: The study comprised of 100 patients divided into two groups of 50 each, in the department of Anaesthesiology/Surgery, State Referral Hospital of Zoram Medical College, Falkawn, Mizoram, during the period of September 2017 to August 2019. Patients of ASA grade I and II, aged between 20 and 60 years of both sexes scheduled to undergo lower abdominal surgery were included.*
Results*: The result shows that mean onset of analgesia is faster and more intense motor blockage is experienced in combined spinal epidural group than in the epidural group alone but the mean duration of action is longer and haemodynamic stability is better in epidural group.*
Conclusion*: It is concluded that the overall quality is better, onset time of loss of analgesia is faster, and intensity of motor block is more intense in combined spinal-epidural block as compared to epidural block.*
Keywords*: "Anaesthesia", "Combined Spinal-Epidural block", "Epidural block", "Onset and Duration", "Intensity of motor block".*

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I. Introduction

Lower abdominal surgical procedures are possible to conduct under regional anaesthesia. Spinal anaesthesia has reduced its popularity in spite of its quick onset with profound motor blockage but of limited duration. Epidural anaesthesia is now undergoing a phase of increasing popularity as its advantages over spinal anaesthesia become apparent. Epidural block certainly avoids some disadvantages of spinal anaesthesia in the form of post dural puncture headache, sudden fall in blood pressure, meningitis and other neurological sequelae. The fall in blood pressure with epidural anaesthesia occurs relatively slowly and no irksome restriction needs to be placed upon the patient's position or movement. Epidural anaesthesia if often criticized on the grounds that it takes too long to perform during a busy operation lists. Again, epidural anesthesia due to the need of large doses of local anaesthetics, it is possible that some impairment of the cardiovascular system and toxicity to the central nervous system may occur. The combined Spinal-Epidural Anaesthesia (CSE) is another innovation of regional anaesthesia by which the main advantages of spinal and epidural anaesthesia are retained and combined[1,2].

Spinal anaesthesia offers rapid onset, reliable surgical anaesthesia and good muscle relaxation while the insertion of catheter into the epidural space enables smaller amount of anaesthetic agents to be used and reserves the opinion of extending the block for surgery or topping up with an opioid for post operative analgesia. There is less risk of drug overdose and CSE is increasingly being used for labor analgesia and for prolonged surgical operations. Again, it is not without risk and there is report of catheter migration into the subarachnoid space causing total spinal block. The combined technique was first described for orthopedic procedures by Coates[3] and first used in obstetric by Carrie Les and O' Sullivan GM[4].

II. Material And Method

The study was conducted in the department of Anaesthesiology/General Surgery, State Referral Hospital of Zoram Medical College, Falkawn, Mizoram, India, during the period of September 2017 to August 2019. Before taking up the study, approval for carrying out the research work was obtained from the Hospital Ethical Committee. Informed Consent was taken for each case. Hundred patients of ASA grade I and II, aged between 18 and 60 years of both sexes scheduled to undergo major elective surgery under general were included. Patients with coagulopathy, neuropathy, local infection, septicemia or systolic blood pressure below 100mmHg were excluded from the study. The patients were randomly divided into two equal groups (n=50), Group A for Combined Spinal-Epidural anaesthesia and Group B for epidural anaesthesia only. Patients were

premedicated with Diazepam 0.2mg/kg orally the night before surgery and Inj. Atropine 0.6mg intramuscularly 45minute before the surgical procedure. After staring intravenous line in the preoperative room, preloading was done with 500ml Ringer's Lactate solution.

After reaching the operation room, baseline pulse and blood pressure were recorded for each patient. Then, the patient was kept in right lateral position and sterile precaution were made for each patient in the lumbar CSE (Group A) or Epidural anaesthesia alone (Group B).

GROUP A: Lumbar (L2-L3) space was chosen in each patient for both groups. Using Espocan CSE set, 18G Touhy needle was put in L2-L3 epidural space which was confirmed by loss of resistance technique. Then 27G spinal needle present in the set was used for puncturing dura. After few flow of cerebrospinal fluid was confirmed, 2.5ml of bupivacaine (heavy) was injected into the subarachnoid space. The spinal needle is withdrawn. Touhy needle is rotated 180^0 (to make bevel end cephalic) and epidural catheter were inserted so that catheter lies 2-3cminside the epidural space. T hen the patient was kept in supine position and injection of 5ml of 0.25% bupivacaine plain with normal saline (5ml) was made through the epidural catheter to increase the block height to desire level (T6-T8) or to increase the duration of block. Before the injection, we ruled out intra-arterial or subarachnoid catheter migration by negative aspiration. End of injection was taken as zero time (minute) for each observation.

GROUP B: The same space (L2-L3) was chosen for placement of 18G Touhy needle followed by insertion of the same epidural catheter. After confirming negative aspiration of blood or cerebrospinal fluid, 20ml of 0.25% bupivacaine plain were injected slowly over 15-20 minutes. End of injection was taken as zero time for each observation. Onset time of analgesia was taken from the end of epidural injection to the loss of pain to pinprick sensation. Duration of analgesia were recorded from the end of first epidural injection to the return of pain sensation demanding analgesia. Intensity of motor block was assessed be modified Bromage scale i.e. 0= no paralysis (full flexion of hip, knee or foot), 1= unable to flex hip (able to flex knees and ankle), 2= unable to flex knee able to flex foot only), 3= unable to flex hip, knee or ankle joint. Upper level of sensation block was assessed by loss of pinprick sensation. Pulse rate and blood pressure were recorded at 5 minute interval up to 20 minutes and at 10 minute interval unto 60 minutes and then 30 minute interval up to the end of operative procedure. If blood pressure drops down below 80mmHg, Inj. Mephentermine 3mg I.V is given. Inj. Atropine was kept ready for eventful bradycardia (pulse rate < 50/min). Complications like failed block, subarachnoid or intravascular injection and inadequate analgesia were also observed.

III. Results And Observation

Over the study period, a total of 100 patients with 50 in each group were studied. The demographic data of patients in both the group were comparable for age, sex, weight. However, there were more female than male in both the groups.

Table I (Demographic Data): showing the number of cases of combined spinal epidural group (Group A) and epidural group (Group B) that had been taken for the study

	Group A Mean +/-SD	**Group B Mean +/-SD**	**t-value**	**p-value**
Age (years)	40.9 +/- 9.56	42.1 +/- 8.67	0.5263	p>0.05
Sex M	10 (20%)	15 (30%)		
Sex F	40 (80%)	35 (70%)		
Weight (kgs)	48.83 +/- 4.64	50.06 +/- 4.80	1.01	p > 0.05

Chart I showing the demographic data.

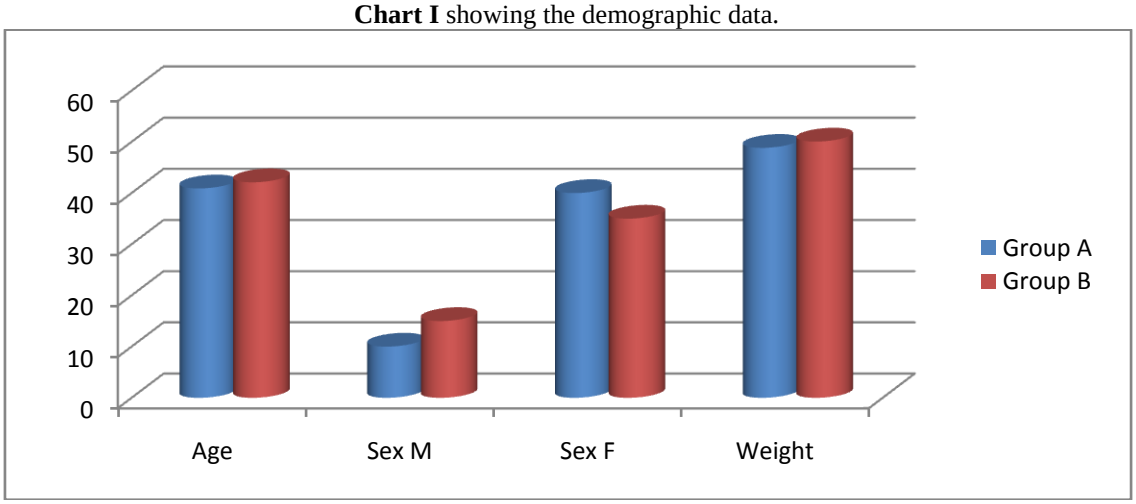

Table II (Block characteristic): showing the mean onset and duration of analgesia, intensity of motor block and upper level of sensory block.

		Group A Mean +/-SD	**Group B Mean +/-SD**	**t-value**	**p-value**
Analgesia (loss of pinprick)	Onset (min) Duration (min)	13 +/- 3.17 195 +/- 18.33	21.91 +/- 6.58 285 +/- 35.01	6.56 12.2	P<0.001 P<0.001
Intensity of motor block (Modified Bromage scale)	0 1 2 3	- - - 50 (100%)	- 10 (20%) 40 (80%)	- - - -	- - - -
Upper level of sensory block (T6 – T8)	-	46 (92%)	35 (70%)	-	

Chart II showing onset and duration of analgesia.

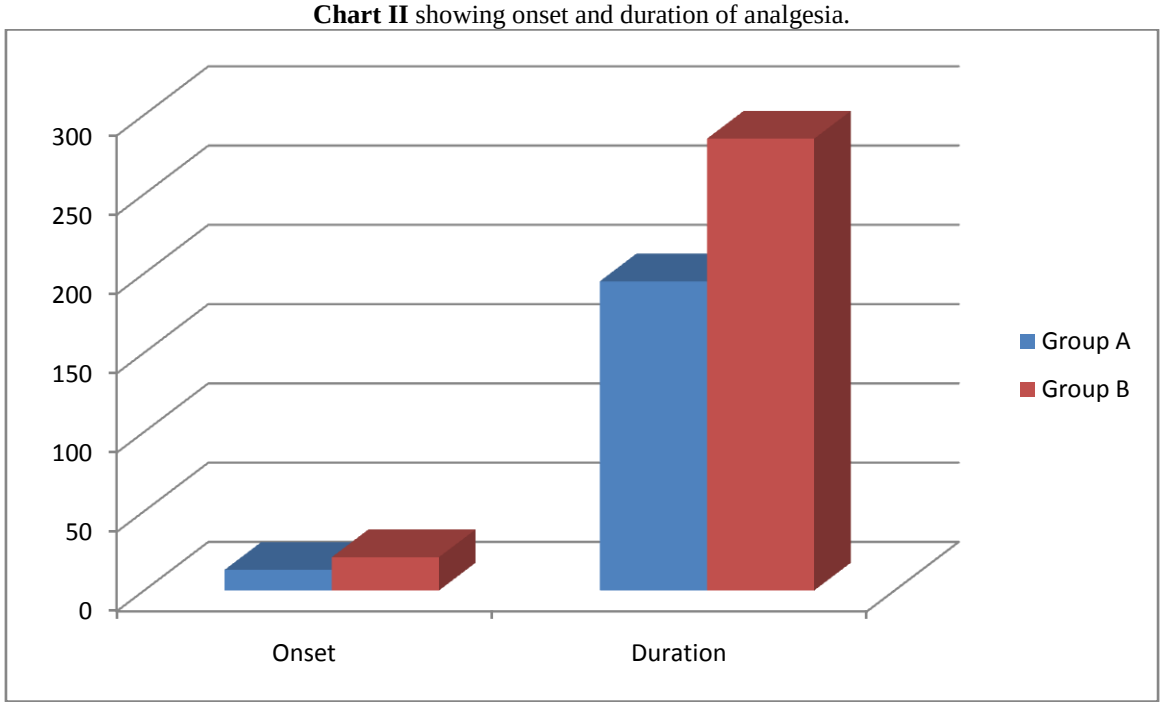

Table II shows that the mean onset of analgesia (loss of pinprick sensation) is faster (13 +/- 3.17 min) in combined spinal epidural group the in the epidural group (21.91 +/- 6.58 min). It is evident that there is highly significant difference of onset of analgesia ($p<0.001$). The mean duration of action is longer in epidural group (285 +/- 35.01 min) than in combined spinal epidural group (195 +/- 18.33min). As such, there is highly significant difference of duration of action between combined spinal epidural group and epidural group ($p<0.001$). The intensity of motor block (Modified Bromage scale) had shown all the 50 patients in CSE group had a scale of 3 (100%) whereas in the epidural group 10 patients (20%) and 40 patients ((80%) had scale of 1 and 2 of motor block respectively. So it is evident that patients in CSE group experienced more intense motor blockage than in the epidural group. The same table also shows that upper level of sensory block (T6-T8) was found in 46 patients (92%) in CSE group and in 35 patients (70%) of epidural group. This shows that more cephalad spread is found in CSE group.

Table III showing complications of the two groups

COMPLICATIONS	**GROUP A**	**GROUP B**
Failure of block Conversion to G.A	-	**10 (20%)**
Bradycardia Pulse rate <50/min	-	-
Hypotension Systolic BP <90mmHg	**10 (20%)**	-
Inadequate analgesia (Inj. Ketamine+Diazepam required)	-	**18 (36%)**
Subarachnoid Injection (CSF on aspiration)	-	-
Intravascular migration (blood on aspiration)	-	-

Table III shows that failure of block (conversion to GA) was found in 10 patients (20%) in the epidural group but there was no failure of block in the CSE group. Inadequate analgesia was found in 36% of epidural group but none in the CSE group. Subarachnoid migration or intravascular injection was not encountered in both the groups.

IV. Discussion

In this study we have compared the combined spinal-epidural anaesthesia and epidural block alone for lower abdominal surgery in two groups of patients of similar demographic data. The right lateral position is chosen for initial epidural catheter placement or subarachnoid block during CSE simply for the convenience. However epidural injection is done after making the patient supine. CSE block has become increasingly popular because it provides rapidity and density of spinal block combined with ability to extend the block and provide post operative analgesia by use of extradural catheter[5].

The onset of time of analgesia which was taken from the end of epidural injection to the loss pain to pin prick was found to be shorter in CSE group (13+/-3.17min) than in the epidural group (21.91+/-6.58). Holmstrom B et al reported onset of time of 14+/-2min to provide an effective and reliable block with the CSE technique[6]. However, with the epidural block they reported a long time (35.3+/-3.9min) to provide acceptable surgical condition. Mishra MN et al also reported onset time of analgesia to be 14.84min for epidural bupivacaine[7].

In our study, the duration of analgesia for CSE block (195+/-18.33 minutes) was significantly shorter than in epidural group (285 +/- 35.01minutes). Watt MJ et al reported the duration of analgesia with epidural bupivacaine to lie between 5 to 10 hours in majority of their cases with a mean of 8.07 hours[8]. Rubin AP and Lawson DIF reported the duration of analgesia for epidural bupivacaine with a mean of 229minutes[9]. Duthie AM et al found that the mean duration of action of bupivacaine 0.25% was 3 hours[10]. Waters HR et al reported that the mean duration of action of bupivacaine plain when given epidurally was 194 minutes[11]. Mishra MN et al reported a mean duration of bupivacaine to be 168.4minutes[12].

The intensity of motor block in this study was assessed by Modified Bromage scale and we found intense motor block (scale 3) in all the patients in CSE group. Similar result was given by Rawal N et al[13] where better surgical analgesia and more intense block was found in CSE group than in epidural group. Luiz Eduardo Imbelloni and Andre Luiz Pinto[14] also found good surgical analgesia and muscle relaxation following CSE block than epidural block.

The upper level sensory block to T_6-T_8 in this study was found in 46 (92%) in CSE block whereas it was found in 35 patients (70%) in epidural group. Keshav Sharma et al[15] also aimed at T_6-T_8 dermatomes while performing CSE block and epidural block for lower limb surgery. Das DJ[16] shows that the level of sensory block extended to T_{10} level within 10-15minutes after injection of 10mg bupivacaine plain $_{and}$ up to T_5 was observed in patients who are given 15-20 mg bupivacaine for spinal anaesthesia. Luiz Eduardo Imbelloni and Lucia Beats[17] noted a spread of between T_7-T_{12} while performing CSE block for hip surgeries in elderly patients. In our study the spread between $T_{6\text{-}8}$ in CSE group was 92%, it might be due to the volume and dosage of plain bupivacaine (0.5%) administered intrathecally. However in the epidural group, even with 50mg bupivacaine, the level of block between $T_{6\text{-}8}$ was observed only in 70% of cases. It shows that the spread of block was more in CSE group.

V. Conclusion

It is concluded that the onset time of loss of analgesia is faster, and intensity of motor block is more intense in combined spinal-epidural block (CSE) group. Inadequate analgesia (36%) is encountered only in epidural block. Failed block (conversion to general anaesthesia) has occurred in 20% in epidural group but not in CSE group. The overall quality of anaesthesia was better in CSE group than the Epidural group. However, the CSE technique has to pay a price by treating hypotension with vassopressors in 10 (20%) patients.

References

[1]. Rawal N, Schollin J and Wesstrom G: Epidural versus combined spinal-epidural block for Caesarian section. Acta Anaesthes. Scand.; 32: 61-66, 1988.
[2]. Brownridge P: Epidural and Subarachnoid analgesia for elective caesarian section. Anaesthesia; 36: 70, 1981
[3]. Coates MB: Combine Subarachnoid and epidural technique. Anaesthesia; 37 : 89-90, 1982
[4]. Carrie LES and O'Sullivan GM: Subarachnoid Bupivacaine 0.5% for caesarian section. Eur.J. Anaesth.; 1 : 225-233, 1990
[5]. Patil M: Combined spinal and extradural anaesthesia. Anaesth-Analg; 75: 646-648, 1992.
[6]. Holmstrom B, Laugaland R, Rawal N and Halsberg S: Combined Spinal Epidural Block versus Spinal and epidural block for orthopedic surgery. Can.J.Anaeth; 40: 601-606, 1993.
[7]. Mishra MN, Pandey CK, Santosh K, Chaterjee S and Mishra LS: Effect of pH adjusted bupivacaine on onset and duration of epidural Anaesthesia- A clinical evaluation. Ind. J. Anaeth; 43: 53-55, 1995.
[8]. Watt MJ, Rosen DM and Atkinson RS: A double blind trial of Bupivacaine and Lignocaine. Anaesthesia; 23: 331-337, 1968.
[9]. Rubin AP and Lawson DIF: A controlled trial of bupivacaine, A comparison with lignocaine. Anesthesia: 23, 327-330, 1968.
[10]. Duthie AM, Wyman JB and Lewis GA: Bupivacaine in labour, its use in lumbar extradural analgesia. Anaesthesia; 23: 22-26, 1968.

[11]. Waters HR, Rosen N and Perkins DH: Extradural blockage with bupivacaine, A double blind trial of bupivacaine with adrenaline 1:200000 and bupivacaine plain, Anaethesia; 25: 184-190, 1970.
[12]. Mishra MN, Pandey CK, Santosh K, Chaterjee S and Mishra LS : Effect of pH adjusted bupivacaine on onset and duration of epidural analgesia –A clinical evaluation, Ind. J. Anaesth.; 43 : 53-55, 1995
[13]. Rawal N, Schollin J and Wesstrom G: Epidural vesus combined spinal-epidural block for caeserian section. Acta Anaesth. Scand. 32:61-66, 1988.
[14]. Luiz Eduardo Imbelloni and Andre Luiz Pinto: Epidural versus Combined spinal-epidural block for lower abdominal surgery. Braz. J. Anaesth. Int Issue; 3: 18-21, 1992.
[15]. Keshav Sharma, Pramula Chari and Sangeeva Gupta: Combined spinal and epidural anaesthsia for lower limb surgery. J. Anaesth, Clin. Pharmacol; 10: 257-260, 1994.
[16]. Das DJ: A study of plain bupivacaine (0.5%) solution for spinal anaesthesia. Ind. J. Anaesth; 42: 206-208, 1994.
[17]. Luiz Eduardo Imbelloni and Lucia Beats : Comparison between Spinal, combined epidural and Continous spinal anaesthesia for Hip surgeries in elderly patients, A retrospective study. Revista Brasileisa de Anestesiologia; 52: 320-324, 2002.

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