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### Original article

# Aclinical study of combined spinal epidural anaesthesia for lower abdominal and lower limb surgeries

Suresh S.B. Pradeep G.

Associate Professor, Sapthagiri Institute of Medical Science and Research Center, Chikkasandra, Bangalore-560090

Assistant Professor, Sapthagiri Institute of Medical Science and Research Center, Chikkasandra, Bangalore-560090

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#### ABSTRACT

**Aim:** To evaluate the safety and efficiency of combined spinal epidural anaesthesia and to find the technique that provide adequate surgical anaesthesia and analgesia with minimal side effects. **Objective:** 1.To evaluate the onset of sensory blockade and onset of motor blockade. 2. To find the extension of sensory blockade after epidural topup and haemodynamic changes. **Study design:** This prospective study was conducted in the department of anaesthesiology in association with department of orthopaedics, surgery and gynaecology from April 2011 to March 2013. This study was done to evaluate the onset of sensory and motor blockade and to find the extension of sensory blockade after epidural top-up and haemodynamic changes. **Results:** The onset of analgesia was 3.4 1.0 min. The epidural dose caused further ascent of sensory analgesia by three to four segments with an average of 2.6 0.9 segments. The time taken for the onset of the motor blockade was 5.8 1.1 min. **Conclusion:** Combined spinal epidural anaesthesia provides an opportunity to utilize the major advantages of spinal and epidural anaesthesia. It produces a multi compartment block, such that behaviour of the spinal block may be modified by subsequent epidural injections.

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### 1. Introduction

Neuraxial blockade result in sympathetic, sensory and motor block after insertion of a needle in the plane of the central neuraxis.

Most of the lower limb and lower abdomen surgeries are conducted under spinal or epidural anaesthesia. The disadvantages of spinal (i.e. single shot, unpredictable level of blockade, time limit) and epidural anaesthesia (i.e. missed segments, time consuming) led to the development of combined spinal epidural anaesthesia.

The CSE technique involves intentional subarachnoid blockade and epidural catheter placement during the same procedure to combine the best features of spinal and epidural blockade and avoid their respective disadvantages<sup>1,2</sup>.

An insufficient spinal block may be extended to a satisfactory level and maintained throughout the operation without difficulty.

CSE is an effective way to reduce the total drug dosage required for anaesthesia and analgesia.

The intrathecal injection achieves rapid onset with minimal doses of local anaesthetics and the block can be prolonged with low dose epidural maintenance administration<sup>1,3</sup>.

CSEA is a regional anaesthesia by which main advantages of spinal and epidural are retained and combined<sup>1</sup>. It gained interest as it combines the reliability of a spinal block and flexibility of an epidural block. CSEA is characterized by a shorter latent period, a lower dose of local anaesthesia and a higher reliability<sup>4</sup>, which uses combination of techniques to accomplish the ideal kind of anaesthesia for patient of all age groups.

### 2. Materials and methods:

This prospective study was conducted in the department of anaesthesiology in association with department of orthopaedics, gynaecology and general surgery at Sapthagiri Institute of Medical Science and Research Centre from April 2011 to March 2013.

The study of 100 consecutive patients coming for elective orthopaedic, gynecology and general surgery.

\* Corresponding Author : **Dr. Suresh S.B.**

Associate Professor  
Sapthagiri Institute of Medical Science and Research Center  
Chikkasandra, Bangalore-560090  
Email id : [drsuresh\\_1976@yahoo.co.in](mailto:drsuresh_1976@yahoo.co.in)

**Inclusion criteria:**

1. Age group 20 to 60 years of both sexes.
2. Patients under ASA-I and II
3. Patients posted for various elective surgical procedure of lower abdominal and lower limb in which regional anaesthesia is required.

**Exclusion criteria:**

1. Patients posted for upper abdominal and required general anaesthesia.
2. Patients on anticoagulant therapies or bleeding diathesis.
3. Patients with infection on the back or spinal deformities.
4. Patients with history of peripheral neuropathy or CNS disorders.

**Methodology:**

Patients selected for the study undergone adequate general physical examinations and systemic examination was done to confirm the previously mentioned inclusion and exclusion criteria.

All patients were given Midazolam 2 mg and preloaded with 500 ml of the ringer lactate solution over a period of 15 to 20 min. Basal vital parameters like pulse rate, BP, SpO<sub>2</sub> recorded. The patient was positioned in sitting or lateral position. After infiltration of local anaesthetic, epidural space was identified with 18G weiss needle with loss of resistance to air technique. Then a 27G long whitacre spinal needle was introduced through the epidural needle to locate the subarachnoid space and 10 mg 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 in the epidural space in cephaloid direction.

After positioning the patients in supine position the level of sensory blockade was checked by pin prick. The onset of motor blockade was checked by Bromage classification and injection of 0.5% bupivacaine 8 ml into epidural space to attain the adequate level of blockade.

Pulse rate, NIBP, SPO<sub>2</sub>, ECG was recorded before the start of procedure and thereafter till the patient was shifted out of recovery room.

**Results:**

Table-1 shows the onset of sensory analgesia in number of patients. Greater number of patients had onset of sensory analgesia within 3 min. The overall mean onset of sensory analgesia in our study was 3.4 ± 1.0 min. One patient does not show the onset of sensory analgesia was considered that the failure of the spinal component of combined spinal epidural technique.

**Table-1: Onset of sensory analgesia**

Onset time (min)	Number
2	21
3	37
4	28
5	9
6	4
Failure	1

Table-2 shows the onset of motor blockade by Bromage classification. The mean duration to achieve 100% grade IV motor blockade was 5.8 ± 1.1 min.

**Table-2: Onset of motor blockade (Bromage classification)**

Bromage grade	Range in min	Mean SD in min
I (0%)	1-5	2.9 1.0
II (33%)	1.5-6	3.9 1.0
III (66%)	2-8	4.7 1.2
IV (100%)	3-8	5.8 1.1

Table-3 shows the intraoperative means pulse rate, systolic and diastolic blood pressure SD.

**Table-3: The mean of pulse rate, systolic and diastolic blood pressure**

Time (min)	Pulse rate SD / min	Systolic BP mm/Hg mean SD	Diastolic BP mm/Hg mean SD
0	85.7 ± 9.8	121.8 ± 9.7	79.8 ± 7.1
5	85.8 ± 10.2	122.0 ± 7.5	78.6 ± 5.5
10	83.2 ± 14.5	118.2 ± 11.3	75.4 ± 7.2
15	81.2 ± 12.3	114.4 ± 11.3	72.3 ± 4.8
45	81.3 ± 9.5	115.0 ± 9.6	74.8 ± 4.6
60	80.2 ± 8.3	113.1 ± 8.2	75.2 ± 4.4
90	80.8 ± 9.4	113.4 ± 7.8	77.0 ± 5.5
120	81.2 ± 9.6	115.7 ± 9.0	78.1 ± 3.8
150	79.9 ± 9.1	117.6 ± 10.3	78.2 ± 4.3
180	79.3 ± 8.7	119.9 ± 10.5	77.4 ± 6.5
210	79.7 ± 7.5	120.2 ± 11.3	77.4 ± 6.5

**Table-5 : Opinion of patient and surgeon**

Comfort	Patient	Surgeon
Excellent	59	71
Good	41	29

**DISCUSSION:****Enhancement of block after epidural dose:**

Author	Spinal	Eidural	Max segment blocked after spinal	Max seg blocked after epidural
Keshav Sharma et al (1994)	2.5ml 0.5% Bupivacaine (heavy)	8 ml of 2% lignocaine with adrenaline	T <sup>8</sup>	T <sup>5</sup>
Srienstra et al (1996)	2 ml of 0.5% Bupivacaine (H)	10 ml of 0.5% Bupivacaine	T <sup>10</sup>	T <sup>5</sup>
Srienstra et al (1999)	2 ml of 0.5% Bupivacaine (H)	5 ml of 0.5% Bupivacaine	T <sup>8</sup>	T <sup>5</sup>
Sivasenthil (2000)	2 ml of 0.5% lignocaine (H)	10 ml of 0.5% Bupivacaine	T <sup>8</sup>	T <sup>3</sup>
Hamdani et al (2002)	1 ml of 0.75% Bupivacaine (H)	2 ml of 0.5% Bupivacaine for every unblocked segment	T <sup>10</sup>	T <sup>6</sup>
Our study	2 ml of 0.5% Bupivacaine (H)	8 ml of 0.5% Bupivacaine	T <sup>10</sup>	T <sup>7</sup>

**Patient feed back regarding technique:**

	Patients opinion	Surgeon opinion
Gaushar et al (2002)	Bad - Nil Good - 16 (55.6%) Excellent 13 (43.5%)	-
Our study (2004)	Bad - Nil Good - 41% Excellent - 59%	Good - 29% Excellent - 71%

The CSE technique has attained wide spread popularity for patients undergoing major surgery who requires prolonged and effective post-operative analgesia.

The combined spinal epidural technique includes intentional subarachnoid blockade and epidural catheter placed during the same procedure. CSE allow a rapid onset of neuraxial blockade which can subsequently prolonged or modified.

The significant faster onset in CSEA was due to intrathecal bupivacaine which helps in early optimal condition for surgery.

In our study, the onset of analgesia was 3.4 10 min. The epidural dose caused further ascent of sensory analgesia by 3 to 4 segments with an average of 2.6 0.9 segments. The time taken for the onset of the motor blockade was 5.8 1.1 min.

Only 5% of patients developed bradycardia and 2% of patients developed hypotension. The remaining patients were haemodynamically stable throughout the study period.

**CONCLUSION:**

Combined spinal epidural anaesthesia is an useful regional anaesthesia technique combined the reliability of spinal block and versatility of epidural block.

This technique provide an opportunity to utilize the major advantages of spinal and epidural anaesthesia. CSE produced a multicompartiment block, such that behaviour of the spinal block may be modified by subsequent epidural injections. CSE has been incorporated into the armamentarium of regional anaesthetic technique for a various analgesia and operative situation.

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**Bibliography**

- [1] Khetrapaul, Monica et al, 'Effects of preloademy is combined spinal and epidural anaesthesia in lower abdominal surgeries', Ind J Anaesth, 2001 ; 45(3) pp.198-201.
- [2] Puolakka R, Pitkanen MT and Rosenberg PH. 'Comparison of the technical and block characteristics of different combined spinal and epidural anaesthesia techniques' reg Anaesth - Pain Med. 2001 ; 26(1) ; pp.17-25.
- [3] Portony D and Vadhera RB. 'Mechanism and management of an incomplete epidural block for caesarean section'. Anaesth Clin of North America. Mar. 2003 ; 21(1) ; pp.39-57.
- [4] Gallinger, EPV et al. 'Combined spinal epidural anaesthesia in operation on the vessels of the lower extremities' Anesteziol - Reanimatol ; 1999 (5) ; pp.44-48.
- [5] Keshav et al. 'Combined spinal and epidural anaesthesia for lower limb orthopaedic procedure'. Journal of Anaesthesiology Clinical Pharmacology 1994 ; 10 ; pp.257-210.
- [6] Steinstra R et al. 'Mechanism of action of epidural top up in combined spinal epidural anaesthesia' Anesth-analg ; 1996 : 83 ; pp.382-386.
- [7] Steinstra, Redolf et al. 'The epidural top-up in combined spinal epidural anaesthesia'. The effect of volume versus dose, Anaesth - Analg 1999 ; 88 : pp.810-814.
- [8] Sivasenthil A et al. 'A study of combined spinal epidural anaesthesia CSEA'. Ind J Anaesthy. 2000 ; 44 : pp.38-42.
- [9] Goushar AH et al. 'A clinical usefulness of sequential combined spinal epidural anaesthesia in high risk of geriatric patients for major orthopaedic surgery'. J. Anaesth Clin Pharmacol 2002 ; 18(2) ; pp.163-166.