

Combined Spinal Epidural Anaesthesia Single Space Technique

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Abstract

A study of single space combined spinal epidural (CSE) block was carried out in 30 patients for lower extremity orthopaedic surgery. Hyperbaric bupivacaine (0.5%) was used for subarachnoid block and (0.25%) isobaric bupivacaine was given through epidural catheter for “top-up” doses to facilitate surgery and for postoperative analgesia. Operative conditions were described as excellent in 73.33% patients, good in 23.33% patients and fair 3.33% patients. Similarly post operative analgesia was excellent in 70%, good in 26.66% and fair in 3.33% cases. Intra operative complications like hypotension < 80mm Hg occurred in 3.33% patients and < 90 mmHg in 10% patients. No post spinal headache or neurological complications were seen. CSE anaesthesia appears to combine the reliability of spinal and the flexibility of epidural block while their drawbacks are minimized.

Key Words

Spinal Epidural, Anaesthesia

Introduction

Dr. Brownridge (1981) used spinal anaesthesia for elective caesarian section combined with epidural catheterization to provide “top-up” analgesia for postoperative pain relief (1). Combined spinal epidural anaesthesia retains main advantages of subarachnoid and epidural anaesthesia (2-3). Spinal anaesthesia uses small dose of anaesthetic agent, is simple to perform, offers rapid onset of action, reliable surgical anaesthesia with good muscle relaxation but an inability to extend the block once the drug is fixed. Epidural anaesthesia is less easy to perform, has slow onset of action, but a distinct advantage of extending and prolonging the block when epidural catheter is used.

In single space approach whereby, after placing the Tuohy needle in the epidural space, a spinal needle is threaded through the larger bore epidural needle into the subarachnoid space. Advantage of single space technique is less discomfort and less trauma and decrease in the

morbidity associated with double space penetration (backache, inadvertent dural puncture, epidural vein puncture, haematoma, infection etc). But single space technique can itself result in accidental dural puncture and post spinal headache.

More recently, to minimize risks Tuohy needle with a hole (back eye) in its curve has been manufactured wherein spinal needle instead of exiting from the end of the Tuohy passes through the back eye into the subarachnoid space (4).

Material & Methods

This study was carried out in the Deptt. of Anaesthesia of SKIMS- Medical College Srinagar. Thirty patients aged between 20-65 yrs of either sex of ASA-I & ASA-II posted for surgery on lower extremity were included in the study. Patients with spinal deformity, bleeding disorder, local infection, backache and headache were excluded from the study. Informed consent was obtained

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after fully explaining the procedure to the patient. All the patients were premedicated with 2 mg. of intramuscular midazolam 30-45 minutes before anaesthesia. This was followed by an intravenous infusion of 75-1000 mg of Ringer's lactate solution. Patients were turned to their side. Under all aseptic precautions and after giving 1% local anaesthesia, 16G Tuohy (Huber-tipped) needle was advanced, with the bevel directed cephalad into L₃-L₄ or L₄-L₅ interspace using loss of resistance to air method. A 26 G spinal needle 1 cm. longer than Tuohy needle was then passed through the epidural needle. Correct position of the spinal needle was confirmed by aspiration of CSF. After the injection of 4ml. of 0.5% hyperbaric bupivacaine, the spinal needle was removed and an epidural catheter introduced into the epidural space. After checking free flow with saline, the catheter was fixed for "top-up" doses with isobaric bupivacaine (0.25%) both during and after the operation. Epidural catheter was removed after 48 hours. Failed spinals and failed epidurals were excluded from the study and grouped separately as "unsuccessful CSEA".

Onset of sensory and motor blockade, quality of surgical analgesia, duration of postoperative analgesia were assessed using visual analogue scale (VAS) in patients. VAS scale of 7-10 was taken as severe pain, >3 < 7 was taken as moderate pain and <3 was taken as adequate analgesia in the patients.

Monitoring of ECG; SaO₂, pulse rate, blood pressure were carried out during the course of surgery and vital signs were monitored in post operative period also for 48 hours. Discomfort of lying in same position for long period was treated with intra muscular midazolam. All patients were given 5 litres of O₂ by facemask.

Results

Out of 30 cases posted exclusively for orthopaedic surgery on lower extremities 20 (66.66%) were males and rest 10 (33.33%) were females (Table-I). Only those cases in whom the combined spinal epidural anaesthesia (CSEA) could successfully be carried out were included in the statistical study. Time duration for all these operations ranged between 1 to 6 hours. The operative conditions were described as excellent in 22(73.33%), good in 7 (23.33%), fair in 1(3.33%) and poor in none of the 30 cases (Table II). The CSEB was carried out till post operative period with epidural catheter and the results

of post operative pain relief were described as excellent in 21 (70%) cases, good in 8 (26.66%) cases and fair in 1(3.33%) cases (Table-II).

Haemodynamic alterations were observed as a drop of systolic blood pressure below 80mmHg in 1 patient (3.3%) who needed ephedrine in dose of 5mg I/V and incremental dose of 5mg I/V twice. Three patients (10%) dropped their systolic B.P. < 90 mm Hg and this was restored to baseline by I/V crystalloids. Only 1 patient (3.3%) dropped the pulse rate below 50 beats/mt. and 2 patients (6.6%) dropped the pulse rate < 60 beats/mt. 2 patients (6.6%) needed two doses of atropine (20µ/kg) while one patient (3.3%) needed one such dose (Table III).

The level of sensory block was observed to be between T₄-T₁₀ and only 9 patients (30%) patients needed "top-up" doses of bupivacaine during the operation.

No post spinal headache and no neurological complications were seen during the study. Only two patients complained of backache for some time in the followup.

Table 1. Demographic Data (n=30)

| Age Years | No. of pts & Sex (n=30) | Diag. & Operation | No. of Cases n=30 | Operative Time (Hrs) |
|-----------|-------------------------|--|-------------------|----------------------|
| 20-40 | 10 6M 4F | - #Femur with int. fixation | 3 | 2-4 hrs |
| | | - Troch, #Femur, DHS | 3 | 4-6 hrs |
| | | -#Tibia/Tibia fibula | 2 | 1½-2½ |
| | | -Patellectomy | 2 | 1-½ hrs |
| 41-60 | 12 7M 5F | - Tibia/Tibia fibula | 3 | 1½-2½ |
| | | -#Head of femur, Total Hip replacement | 3 | 4-6 hrs |
| | | -#Troch, Femur, DHS | 6 | 4-6 hrs |
| 60-55 | 8 5M 3F | -#Troch, Femur; DHS | 4 | 4-6 hrs |
| | | -#Head of femur; total Hip replacement | 2 | 4-6 hrs |
| | | -#Femur, int. Fixation | 2 | 2-4 hrs |

Table 2. Assessment of Surgical and Post Operative Analgesia by Patient, Anaesthetist and Surgeon

| Surgical Analgesia (n=30) | | Post Op. Analgesia (n=30) |
|---------------------------|------------|---------------------------|
| Excellent | 22(73.33%) | 21(70%) |
| Good | 7(23.33%) | 8(26.66%) |
| Fair | 1(3.33%) | 1(3.33%) |
| Poor | x | x |

Table 3. Haemodynamic Data

| Parameters | No. of Pts. (n = 30) | Recovered with | |
|-------------------------------|-------------------------|-------------------------|------------------------------|
| | | Single dose (n = 30) | Incremental dose (n = 30) |
| Pulse rate < 60/mt < 50/mt | 2 (6.6%) 1 (3.3%) | | |
| Needed atropine | 3 (10%) | 1 (3.3%) | 2 (6.6%) |
| Syst B.P. <100mg < 80mg | 3 (10%) 1 (3.3%) | | |
| Needed ephedrine | 1 (3.3%) | | 1 (3.3%) |

Discussion

All the proclaimed benefits of combined spinal epidural anaesthesia (CSEA) were experienced in our study (5-6). The most positive aspect of the CSEA is the ease with which the spinal needle enters the subarachnoid space. Tuohy needle acts as a perfect introducer to thin spinal needle, only problem being less free flow of CSF for which one needs to aspirate. Excellent operative conditions and post operative analgesia is the hallmark of the block. Although with 4ml. of 0.5% bupivacaine there is a greater risk of hypotension. There is also a risk of epidural catheter going into the subarachnoid space. In our study hypotension did not cross the level of statistical significance nor did we enter the subarachid

space with epidural catheter. The reason for less incidence of hypotension could be lower lumbar level for giving subarachoid block.

In conclusion CSEA using single space technique is a simple, cost effective and less complication prone alternative as has been advocated by others (7-8).

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