



Combined Spinal Epidural Anaesthesia

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Development in anaesthesia and surgery has improved over all surgical outcome during recent decades. There is still concern about the detrimental effects of operative procedures such as myocardial infarction, pulmonary complications, thromboembolism, gastrointestinal paralysis, immunosuppression etc. that cannot be attributed solely to imperfections in surgical technique.

Regional anaesthesia offers safe, effective, cheap anaesthesia over general anaesthesia.

Combined Spinal and Epidural Anaesthesia (CSE) offers advantages over the epidural or single injection spinal anaesthesia alone. CSE combines the benefits of certainty with a definitive end point (the appearance of cerebrospinal fluid) that is characteristic of spinal anaesthesia with flexibility of continuous epidural anaesthesia. It involves the use of a minimal dose of spinal anaesthetic for a shorter duration but allows flexibility of epidural reinforcement if necessary.

CSE is like “to paint the fence” from both its sides. The spectrum of indications are those of the spinal or epidural alone or even more & range from labour analgesia to high abdominal & even thoracic & head operations by the adjuvant use of an endotracheal tube ventilation. The commonest indications are hip replacement surgery followed by hysterectomy, knee surgery, cesarean section, femur fracture in elderly, prostatectomy. This technique has been used for about 15 years without any reports of a unique or major complications attributed to the technique (1,2).

There are four main varieties of CSEA, and a review of its history provides the opportunity to

describe these subdivisions.

Single Needle - Single Interspace Method

Soresi was the first surgeon to report the technique(3). This technique consisted of inserting of fine needle into the epidural space, and after injecting local anaesthetic, pushing needle into the subarchanoid space to administer further local anaesthetic. This technique attracted little interest, perhaps because the authors exaggerated claim of 24 to 48 hours operative pain relief with the very short acting procaine.

Sprotte *et al* reported an identical technique using an atraumatic needle (4).

Double Needle - Double Interspace Method

This variety involves insertion of an epidural catheter at one interspace followed by spinal injection at a separate interspace. A sequential separate interspace technique was employed by Brownridge (5).

Double Needle - Single Interspace Method

Was used in Obstetrics in 1982 by Coates (6). It was also used for pain relief for labour & in orthopaedics.

Needle Beside Needle - Single Interspace Method

It involves the use of a special device essentially an epidural needle with a spinal needle guide attached to or built into the wall of the epidural needle.

Techniques of CSEA

Soresi Technique

It is mainly of the historical interest. Its protagonists use the spinal part of the block to overcome the inadequacies of the epidural block, rather than vice-versa. In addition, it is not possible to insert an epidural catheter with this technique.

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The Double Needle - Double Interspace Method

In this technique, any of the spinal or epidural needles are chosen with no special features of each of the techniques.

The Needle Through Needle Technique

This is the most popular variety of CSEA (7,8). This results in high success rates & obviates a separate second needle placement in the majority of cases, minimizing patient discomfort. It is also simple & quick, requiring approximately 30 seconds longer than the time needed for routine lumbar epidural catheter placement. Technical performance of this technique is improved when properly matched epidural and spinal needles are used.

The reason for its popularity is ability of extradural needle to guide the fine spinal needle to the duramater. In addition, patients prefer a single skin puncture(9).

The critical measurement in this technique is not the actual length of the spinal needle shaft but maximal protrusion of the spinal needle past the tip of the epidural needle when the hubs abut. Too short protrusion may result in failure to penetrate dural sac even when spinal needle is aligned. Too long protrusion results in spinal needle passing out anteriorly out of dural sac. Placement is usually done at L2 S1 interspaces below termination of spinal cord.

Because of the low incidence of post dural puncture headache, pencil point or similar needles are popular for CSEA. However, they are more blunt than cutting tip needle and pierce dura less readily; 29 gauge spinal needles, guided and supported by the epidural, may have advantages for CSEA.



Adjustable Combined Spinal Epidural Device

Adjustable combined spinal epidural device is a significant innovation in CSE equipment in which a device with varying length of spinal needle is

introduced. It forms a part of spinal needle hub. It consists of 2 parts which slide over one another when fine toothed ratchet is disengaged by pressure on a plastic button. Once epidural needle is in the place half of the device is inserted into its hub by a male Luer lock- slip attachment and the spinal needle is inserted with as the ratchet disengaged. When the sensation of space being entered is felt, button is released, so that the ratchet locks the spinal needle protrusion at the distance past the tip of the epidural needle. The Spinal needle is then secured in the epidural needle, preventing movement during injection, a common cause of failure to inject all of the solution into the sub arachnoid space.

It combines the speed of onset, reliability and low toxicity of spinal block with the ability of an epidural catheter to modify or prolong the anesthesia Above all it provides the flexibility of technique & flexibility of choice of drugs.

Flexibility of technique — adequate analgesia is gained from the spinal block alone, epidural blocks extends the spinal block & provides post operative pain relief. Each component provides the best operative pain relief. Each component provides the best compromise between the efficacy of block & minimal hypotension.

Flexibility of the anesthetic agent — Analgesia is provided with variety of local anaesthetics and / or opiates or other antinociceptive agents and to continue pain relief via epidural catheter with similar wide choice of agents.

Potential Problems With Needle Through Needle - Single Interspace Technique

- a) Failure to obtain CSF may be because of the needle not in the epidural space, orifice of the spinal needle may be occluded because of nerve root or connective tissue etc.
- b) Difficulty in introducing, or the intravascular placement of the epidural catheter.
- c) Subarachnoid catheter migration.
- d) Inability to access the duramater following successful identification of the epidural space.



Uses of CSEA

1) CSEA for caesarean section

CSEA especially in elective caesarean section, which affords time to perfect the analgesia with the epidural if necessary, provide exceptional standards of analgesia. There is no standard CSE or epidural technique. Compared with epidural, CSE provides faster onset of effective pain relief from time of injection, and increases incidence of maternal satisfaction (10).

Combined spinal epidural anaesthesia appears to be safe as anaesthetic technique for pre eclampsia & severe eclampsia (11).

2) CSEA in labour

The first report of CSEA in labour came from Philadelphia in 1988. Two particularly useful indication for CSEA in labour are -

a) As an effective method for maintaining patient mobility.

b) As a method of providing rapid onset of pain relief in the very distressed patient.

Therefore, epidural analgesia appears to be effective in reducing pain during labour (12).

3) CSEA for orthopedic surgery

It is particularly (13-14) advantageous in high risk old orthopedic patients where gentler onset of sympathetic block is desired to reduce hemodynamic effects.

4) Patients with history of back surgery

Previous laminectomy scarring or obliteration of the epidural space makes epidural injections of LA less predictable or reliable.

In CSEA, surgical anesthesia results from intrathecal injection, epidural can still be effective for epidural analgesia.

Taylor's approach via L5-S1 has been recommended for CSE anaesthesia in post spine surgery as a reliable and less traumatic alternative to midline lumbar epidural. (15)

5) Deliberate hypotension for total hip arthroplasty

6) Post operative analgesia via epidural catheter with CSEA

To conclude, it is suggested that epidural catheters placed

as a part of combined technique are at least as successful and possibly even more successful than catheters placed for standard epidural techniques (16).

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