

# Ultrasound Guided Bilateral Erector Spinae Block With Dexamethasone For Post-Operative Analgesia In Lumbar Spine Surgery: A Case Series

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## ABSTRACT

**Background:** Most of the lumbar spine surgeries cause severe post-operative pain. Poorly controlled postoperative pain is associated with increased morbidity and increased health-care costs. Recently, erector spinae plane (ESP) block has been introduced in our clinical practice as a part of the multimodal pain strategy after lumbar spine surgery. This case series is to analyse the efficacy and safety of erector spinae block for lumbar spine surgery.

**Methods:** In this study eight patients, who were posted for lumbar spine surgeries, ultrasound (US) guided bilateral erector spinae block was given post-operatively. Post-operative pain was assessed using Visual analogue scale (VAS), score at 4, 8, 12 and 24 hrs. Rescue analgesia inj tramadol 50gm IV was given when VAS score was more than or equal to 5. Time when the first rescue analgesia was given was noted.

**Results:** Erector spinae block was successfully performed in all the cases. The mean duration of the procedures was 175.6±31.7 mins (Table 1). None of the patients complained of pain in the immediate postoperative period. The mean time of first rescue analgesia was 11.3±2.3 mins.

**Conclusion:** ESP block with dexamethasone offer a good postoperative analgesia in lumbar spine surgeries for acute postoperative pain reducing the opioid consumption.

Most of the lumbar spine surgeries cause severe postoperative pain due to soft tissue and muscle dissection, as well as manipulations at the operation site [1]. Inadequate postoperative analgesia can lead to a harsh postoperative course with prolonged rehabilitation thereby increasing the chance of development of chronic pain syndromes [2]. To prevent the progression to persistent pain in postoperative period, aggressive analgesic measures are needed to reduce the intensity of acute pain in the perioperative period [3].

Although opioids are mainstay for perioperative analgesia, regional anaesthesia techniques (e.g., epidural catheters, spinal and epidural morphine, or local

infiltration) have superior advantages over opioids as it provides better pain relief, with fewer side effects related to opioids [4].

Plane blocks, facet blocks and root blocks have gained popularity in the recent era with the introduction of ultrasonography in the regional anesthesia practice. Plane blocks are used frequently because of their ease of application with lower complication rates. The erector spinae plane block (ESP) is one of the recently used technique for post-operative analgesia for thoracic, abdominal and lumbar spine surgeries.

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Here we present a case series of ultrasound guided ESP block for postoperative analgesia in patients undergoing lumbar spine surgeries, analysing its efficacy and safety.

## Methods

Eight patients, who were posted for lumbar spine surgeries were included. Written informed consent was taken from all the participants. All patients were kept nil per oral for 6 hrs prior to the surgery. In the operating room, after connecting monitors (pulse oximeter, ECG, NIBP) to the patients, they were premedicated with Inj glycopyrrolate 0.01mg/kg IV, Inj midazolam 0.02mg/kg IV, Inj fentanyl 2mcg/kg IV and induced with Inj propofol 2mg/kg IV. After giving Inj atracurium 0.5mg/kg IV, patients were intubated with appropriate sized cuffed flexometallic endotracheal tubes. Patients were then put on prone position and ventilatory settings were done according to the patient's requirements.

Intraoperatively anesthesia was maintained with isoflurane 1-1.5% and oxygen: nitrous oxide 2:1 L and Inj atracurium intermittently. Inj paracetamol 1gm IV was given at the end of the surgery.

After the surgery, under aseptic precautions in a sterile sheath, a high frequency linear (13 MHz) ultrasound probe was placed longitudinally 3 cm lateral to the L1 vertebra. Transverse process, the erector spinae muscle, and the psoas major muscle were identified. Using an in-plane technique, a 22 G 10 cm, stimuplex needle was inserted in a cephalo-caudal direction until the transverse process was reached. After slight retraction of needle, behind the erector spinae muscle 20 ml of 0.25% of bupivacaine with 8mg dexamethasone was injected and the same procedure was repeated on the contralateral side.<sup>5</sup>

After US guided erector spinae block, patient was put in supine position, reversed and extubated. Patients were shifted to post anesthesia care unit. Post operative analgesia was provided with IV paracetamol 1 gm every 8th hourly. Post operative pain was assessed using Visual analogue scale (VAS), score ranging from 1-10 at 4, 8, 12 and 24 hrs. Rescue analgesia inj tramadol 50gm IV was given when VAS score was more than or equal to 5. Time when the first rescue analgesia was given was noted.

## Results

Throughout the surgery and erector spinae block procedure, all the patients were hemodynamically stable. Erector spinae block was successfully performed in all the cases where there was good drug spread which was visualised under usg guidance. In our study, there were six males and two females (Table 1). The mean age of the patients was 46.6±12.2 years and mean weight was 68.3±5.12kg (Table 1). Six patients had L3-4, L4-5 disc Bulge, underwent laminectomy & discectomy. One patient had L4-5, L5,-S1 spondylolisthesis, underwent

stabilization & fusion and another case ossification of ligamentum flavum, underwent D8-11 laminectomy & discectomy.

The mean duration of the procedures was 175.6±31.7 mins (Table 1). None of the patients complained of pain in the immediate postoperative period. Post op VAS scores with time of first rescue analgesia have been shown in (Table 2). The mean time of first rescue analgesia was 11.3±2.3 mins.

**Table 1- Demographic characteristics**

Parameter	Mean ± SD
AGE (Y)	46.6±12.2
Weight in kg	68.3±5.12
Duration of surgery (mins)	175.6±31.7
Sex-M:F	6:2

**Table 2- Assessed Parameters**

Patient	Post-op vas at				Time of rescue analgesia (hrs)
	4hr	8hr	12hr	24hr	
1					12
2	2	4	7	6	12
3	1	3	6	5	8
4	2	7	3	5	8
5	2	4	4	6	15
6	1	3	6	3	12
7	2	4	6	2	12
8	2	4	7	2	12

Vas- visual analog scale

## Discussion

Spine surgery is one of the most painful surgical procedures and it is challenging to treat. Maximum pain usually occurs in the first 12hours of postoperative period, and gradually declines by the second postoperative day [1]. In posterior approach spine surgery, pain arises from denervation of bone, ligaments, muscles, intervertebral disks and intraoperative retraction as well as neuropathic pain from compression and damage to nerve roots exiting the spinal canal. High doses of opioids are often used for postoperative analgesia which has many side effects, including nausea, vomiting, pruritus and sedation leading to reduced patient satisfaction [5]. Regional block gives better post-operative analgesia with lesser systemic side effects. Fascial plane blocks such as ESP block are definitely safer compared to neuraxial techniques in terms of hemodynamic stability and motor blockade [6].

Analgesic efficacy of ESP block is thought to be because of spread of local anesthetics to epidural and paravertebral space which is volume dependent and hence provides both parietal and visceral analgesia. In ESP block, local anaesthesia (LA) blocks both dorsal and ventral rami of the spinal nerves between the deep fascia of the erector spinae muscle and the transverse process

[6]. In recent years, ESP block has been used for perioperative analgesia in thoracic, abdominal and few lumbar surgeries. ESP block gained popularity due to easily recognizable sono-anatomy and lower complication due to distant from vital structure such as spinal cord and pleura [7].

In our case series, 4 patients reported VAS scores between 4 and 5 at rest until the twelfth postoperative hour. All patients received rescue analgesia at around 12 hrs postoperatively, except for one patient who required rescue analgesia at 8th hr postoperatively. The average duration of analgesia provided by bilateral US guided ESP block with dexamethasone was around 12 hours, decreasing the amount of opioid consumption. There was no ESP block related adverse events in our case series. The main possible clinically significant risk is LA toxicity, since higher doses are considered necessary like any other fascial blocks.

ESP block given preoperatively reduces intraoperative anaesthetic requirements and hence faster recovery. Previous studies have tested and reported that patients who received the bilateral ESP block preoperatively for lumbar spine surgeries, were found to have stable haemodynamic parameters intraoperatively without any need for hypotensive techniques [8-9].

To increase the therapeutic benefit of ESP block, either continuous LA infusion is given through the catheter or additives like steroids are added to LA. Steroids contribute to the analgesic effects due to their properties like anti-inflammatory, modulations in the nerve conduction and suppression of the discharge from the damaged tissue and, hence widely used in acute and chronic pain management [10-11]. With the ability of dexamethasone to increase analgesic effect in ESP blocks and based on data from peripheral nerve blockade, in our study we chose to add dexamethasone with local anesthetic mixture [12-14].

In our case series we observed that the ESP block with dexamethasone additive gives effective analgesia without any adverse events, with reduced opioid consumptions during the post-operative period facilitating early ambulation of the patients after lumbar spine surgeries. Based on this, it appears that bilateral US-guided ESP block is an effective, safe technique for postoperative pain management in lumbar spine surgery patients. By adding dexamethasone to local anesthetic mixture, requirement of rescue analgesia may be prolonged.

#### Limitations:

First, as the size of the case series is small, based on this, identification of adverse events of the block and generalized recommendation is difficult. Second, US guided ESP block was given after the surgical procedure, and not before, after surgery tissue integrity might be compromised so the distribution of local anaesthetics for plane blocks would have got affected. Third, it was a case

series, not a randomized controlled trial. Fourth, catheter insertion in major spine surgeries may be needed for post-operative analgesia for 2-3 days post operatively.

#### Conclusion

ESP block with dexamethasone may offer a good postoperative analgesia in lumbar spine surgeries when used in multimodal analgesia for acute postoperative pain reducing the opioid consumption. The ESP block is unique compared to other blocks, as the procedure is simple and safe. Bilateral ESP block under ultrasound guidance is an important contribution in treating postoperative pain after lumbar spine surgery. Further prospective studies are recommended for testing of efficacy and safety of this ESP block with dexamethasone in lumbar spine surgeries.

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