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Conscious Sedation With Erector Spinae Plane Block For Micro Lumbar Discectomy In Prone Position: A Clinical Case Report

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Abstract

Background: *Awake spine surgery using regional blocks has emerged as a viable alternative to general anaesthesia in selected patients. The erector spinae plane (ESP) block, a fascial plane block targeting the dorsal rami of spinal nerves, provides effective analgesia for lumbar spine procedures. This case report highlights the use of ESP block combined with conscious sedation for micro lumbar discectomy in the prone position, thereby avoiding the risks associated with general anaesthesia. A 22-year-old male, 75 kg, scheduled for L4-L5 micro lumbar discectomy, underwent awake sedation using dexmedetomidine and fentanyl, along with a right-sided ultrasound-guided ESP block using 40 mL of 0.25% bupivacaine. The surgery commenced without discomfort; however, during the latter part of discectomy, the patient experienced referred leg pain, attributed to incomplete coverage of the ventral nerve roots by the ESP block. Supplemental propofol and fentanyl boluses were administered. The patient remained hemodynamically stable, with preserved spontaneous ventilation throughout. Postoperative VAS was < 4, and recovery was uneventful. This case illustrates the feasibility and safety of awake lumbar spine surgery using ESP block with intravenous sedation. It underscores the importance of vigilant intraoperative monitoring and preparedness to manage incomplete block coverage or breakthrough pain.*

Keywords: *Erector spinae plane block; awake spine surgery; microlumbar discectomy; dexmedetomidine sedation; regional anaesthesia; prone positioning.*

1. INTRODUCTION

Awake spine surgery under regional anaesthesia is gaining momentum due to its advantages in high-risk patients and its ability to preserve spontaneous respiration while enabling real-time neurological feedback (1). The erector spinae plane (ESP) block is a relatively recent addition to the armamentarium of fascial plane blocks (2). It offers analgesic benefits for thoracic and lumbar surgeries by targeting the dorsal and ventral rami of spinal nerves (3). ESP block along with conscious sedation allows early recovery of patient and is especially useful in difficult airway scenarios, neuromuscular diseases like myasthenia gravis, patient refusal for general anesthesia.

CASE DESCRIPTION

A 22-year-old male weighing 75 kg presented for L4–L5 micro lumbar discectomy. After pre-anaesthetic evaluation and counselling, the option of awake sedation with regional anesthesia was explained, and informed consent was obtained. Informed and written consent was taken from the patient for publication of this case report. Institutional ethics committee approval from Sri Ramachandra hospital was waived off for publication of this case report.

ANAESTHETIC TECHNIQUE AND INTRAOPERATIVE MANAGEMENT:

The patient was shifted to the operating room, and standard ASA monitors like electrocardiogram (ECG), non-invasive blood pressure, and pulse oximetry were applied. Bispectral index sensor was attached on forehead.

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Oxygen was delivered via Hudson mask at 6 L/min with continuous $ETCO_2$. Intravenous sedation was initiated with dexmedetomidine 1 mcg/kg over 10 minutes (administered at 112 mL/h), followed by maintenance at 18 mL/h. Fentanyl 100 mcg IV was administered as an initial bolus BIS was maintained between 60-75. The patient was carefully placed in the prone position(Figure 1). Under aseptic precautions and ultrasound guidance, a right-sided ESP block was administered at the L4 level using 40 mL of 0.25% bupivacaine. Surgical incision and initial discectomy proceeded uneventfully. However, during deeper tissue manipulation, the patient complained of referred leg pain, likely due to ESP block's limited effect on ventral rami. This was managed with IV propofol 0.25 mg/kg and fentanyl 0.5 mcg/kg boluses (40 mcg), repeated every 30 minutes while maintaining adequate depth with BIS monitor without any risk of apnea guided by the presence of EtCO2 trace. IV paracetamol 1 g was also administered intraoperatively, and vitals were stable. The patient maintained stable hemodynamics and spontaneous ventilation throughout surgery (Figure 2). After the procedure patient was turned to supine position and dexmedetomidine infusion was discontinued and shifted to post-anaesthesia care unit (PACU), where VAS remained below 4. Post-operative recovery was smooth, and no adverse events were noted.

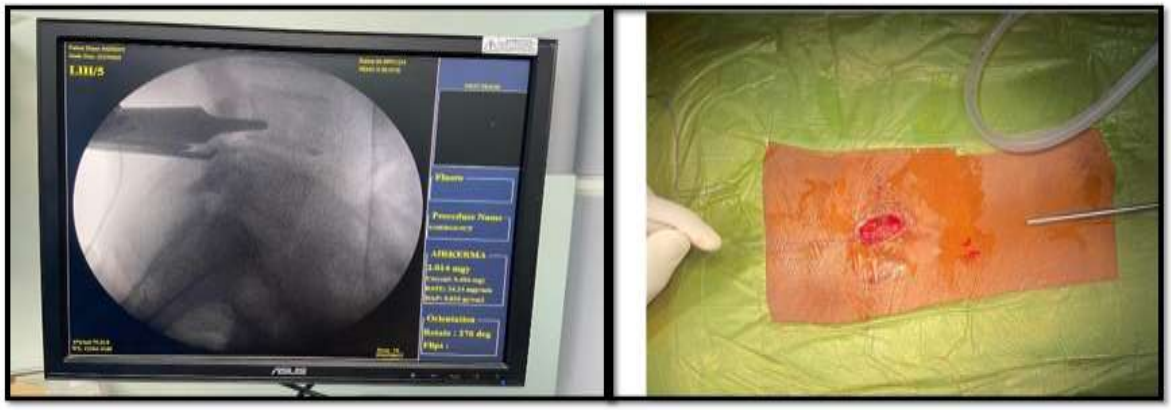

Figure 1 depicts marking for microlumbar discectomy and the surgical incision

Figure 1 illustrates the marking for micro lumbar discectomy and surgical incision after prone position

Figure 2: Patient in conscious sedation with stable vitals

Figure 2 illustrates conscious sedation in prone position with stable intravascular hemodynamics along with bispectral index monitoring.

3. DISCUSSION

Posterior lumbar surgery often results in intense postoperative pain that generally lasts for the first few days (4). Patients undergoing this procedure typically need substantial doses of intravenous opioids during this period, which can lead to an increase in opioid-related complications (5). The presence of severe postoperative pain can diminish patient satisfaction with the surgical outcome and may hinder recovery, mobility, and hospital discharge. Therefore, effective and safe strategies for managing postoperative pain following lumbar spine surgery are advantageous for promoting early recovery. Avoiding general anaesthesia reduces the risk of airway-related complications, especially in patients with comorbidities. The ESP block is a relatively safer alternative to neuraxial blocks, with a lower risk of motor blockade or dural puncture. Forero et al suggested that injecting local anesthetic into the space between the deep fascia of the erector spinae muscle and the vertebral transverse process results in a broad sensory block across the ipsilateral thorax(6) . Due to its safety and ease of administration under ultrasound guidance, the ESP block has been utilized for postoperative pain relief in various surgical procedures, including abdominal, thoracic, breast, and spinal surgeries(2). Despite the existing evidence, there remains an ongoing discussion regarding the mechanism of action and effectiveness of this novel technique. Previous meta-analyses examining the analgesic effectiveness of the ESP block for patients undergoing breast and thoracic surgeries have demonstrated that the ESP block is superior in minimizing postoperative opioid use and pain scores compared to non-block care (7). Furthermore, a recent meta-analysis revealed that the ESP block significantly decreased opioid consumption and alleviated postoperative pain following lumbar spinal surgery . however, this analysis was limited in power as it included only six studies (8). A meta-analysis was conducted to reassess the literature to evaluate the analgesic effectiveness of the ESP block for lumbar surgery in adult patients, it incorporated randomized controlled trials (RCTs) that compared the ESP block with general anesthesia (GA) alone. The primary outcomes were defined as 24-hour postoperative opioid consumption and postoperative pain scores showing that ESP block led to a significant decrease in 24-h opioid consumption and was associated with less PONV(9).

In this case, conscious sedation was provided by dexmedetomidine providing a reliable sedation with minimal respiratory depression which was aided with BIS monitoring.

The use of BIS facilitates an objective and continuous evaluation of sedation depth, which further helps in titrating dexmedetomidine to a level that guarantees the patient remains calm, cooperative, and free from pain, all while maintaining airway reflexes and spontaneous ventilation. This aspect is particularly vital in awake spine procedures where intraoperative neurological monitoring or patient feedback may be required. By aiming for a BIS range of 60–75 clinicians can prevent oversedation that could result in respiratory depression or delayed emergence, as well as avoid undersedation that may lead to patient movement or distress. Furthermore, BIS-guided sedation has been linked to decreased intraoperative hemodynamic variability and enhanced recovery profiles(10). Although dexmedetomidine alone offers stable sedation with minimal respiratory compromise(11), the incorporation of BIS introduces a level of precision that improves the safety and effectiveness of awake spinal anesthesia techniques.

The ESP block successfully facilitated most of the surgery, offering effective dorsal nerve root analgesia. However, incomplete coverage of the ventral nerve roots was evident during deep discectomy, consistent with known limitations of the block. Madeleine et al proposed that there were no signs of dye staining were detected in the ventral rami of any cadavers; however, the dorsal rami consistently showed staining. The dye demonstrated significant longitudinal diffusion throughout the paravertebral musculature, covering a median of 10 vertebral spaces (T5-L2). The range varied from 3 to 18 spaces, with an interquartile range (IQR) of 11 levels (T4-L2), primarily impacting the longissimus and iliocostalis muscles (12).

Supplemental analgesia with propofol and fentanyl addressed this breakthrough pain effectively.

One major advantage of awake surgery is the ability to obtain real-time motor feedback, especially valuable in spine procedures involving nerve root decompression. The patient's cooperation enabled monitoring of motor integrity intraoperatively.

This technique also contributes to enhanced recovery — early oral intake, reduced postoperative nausea, decreased opioid usage, and faster ambulation(13). In our case, the patient demonstrated stable postoperative VAS scores and was comfortable during PACU monitoring.
However, several limitations exist:

- ESP block may not reliably anesthetize ventral roots, limiting its role as a sole anaesthetic.
- Awake prone positioning may be physically and psychologically challenging for some.
- Careful titration of sedation is critical to avoid hypoventilation in the prone position.

4. CONCLUSION

Awake sedation combined with an ESP block provides a feasible and safe anaesthetic option for selected lumbar spine surgeries. It enhances intraoperative neurological monitoring, reduces general anaesthesia-related risks, and improves postoperative outcomes. However, incomplete analgesia for ventral nerve roots should be anticipated, and sedation must be cautiously titrated. Multimodal analgesia and vigilant monitoring are essential for a successful awake spine anaesthesia strategy.

Conflicts of interest: We declare that there are no known conflicts of interest associated with this case report and there has been no significant financial benefit for publishing the case report

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