

Erector spinae plane block unbound: Limits to safety in a patient with laminectomy

ABSTRACT

The erector spinae plane (ESP) block has been used to provide analgesia for multiple surgeries involving the abdomen and thorax. Like other plane blocks, the ESP block relies upon normal anatomical boundaries for predictable and safe distribution of local anesthetic. Surgical intervention can alter the anatomy and present new considerations for performing plane blocks. We present a case in which an ESP block was performed for multiple rib fractures in a patient with a recent laminectomy. Laminectomy patients present unique considerations regarding the safety of the ESP block.

Key words: Acute pain management; erector spinae plane block; laminectomy; patient safety; postoperative pain control; rib fracture; Trauma

Introduction

The erector spinae plane (ESP) block was first described in 2016^[1] and has sparked significant clinical interest given its potential to provide analgesia in the abdomen and thorax.^[2,3] As clinicians continue to find novel applications for the ESP block, we must always remember to advance cautiously. As regional anesthesia is often utilized in postsurgical patients, we must be cognizant of how surgery can affect patient anatomy. We present to you an interesting case where the ESP block was performed for rib fractures in a patient with a recent laminectomy.

Case Report

A 54-year-old male presented to our institution as trauma after collapsing while digging a ditch. On arrival to our institution, the patient's Glasgow Coma Score was 15, but he gradually developed acute hypoxemic respiratory failure, necessitating

intubation. Chest CT imaging revealed multiple rib fractures on both sides, an acute fracture of the T5-T6 vertebrae, and blood in both chest cavities. At this time, bilateral chest tubes were placed and the patient was transferred to the trauma intensive care unit (TICU). Subsequent MRI identified an epidural hematoma with severe spinal stenosis at the T3-T6 level. The patient eventually had a T4-T7 laminectomy and fusion for the evacuation of the hematoma. On postoperative day (POD) 3, the acute pain team was consulted to assist with improving analgesia as the patient was difficult to wean off the ventilator. Given the patient's multiple rib fractures (T2-T10 on the left, T3-T10 on the right), the acute pain team decided to perform bilateral ESP blocks with catheter placement at the T3 level. Ultrasound guidance was utilized to deposit 0.25% bupivacaine 20 mL bilaterally in the fascial plane deep to the ESP muscles and a catheter was threaded caudally at each side [Figure 1a]. Catheters were inserted 5 cm past the

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tip of the needle (11 cm at the skin bilaterally). An infusion of 0.2% ropivacaine was initiated at 10 mL/h bilaterally with parameters for titration up to 15 mL/h by the TICU team. The patient's vital signs were stable throughout the procedure and no immediate complications were observed. Daily assessment of the patient's sensory and motor function was performed, though the assessment was clouded by the patient's need for deep sedation to tolerate mechanical ventilation. No muscle relaxants were utilized however. The patient's course in the TICU was otherwise uneventful and did not require any other infusions other than for sedation. The TICU team relied on nursing assessment to titrate a mixture of propofol and fentanyl infusions to Richmond Agitation-Sedation Scale at -2 or -3.

He was successfully extubated and transitioned to room air on POD 6 without any weakness of either upper or lower extremities with ESP catheters at 8 mL/h. On POD 9, both ESP catheters were removed before the patient being transferred to the floor. The patient was discharged from the hospital on POD 15 without significant impairment.

Discussion

The ESP block relies upon the spread of local anesthetics craniocaudally into the fascial plane deep to the erector spinae muscles and superficial to the vertebrae (transverse process and intertransverse ligament specifically). This fascial plane allows the spread of local anesthetic to the paravertebral space to encompass the ventral and dorsal rami, with an average of 4.6 intercostal spaces.^[4] In recent studies, the spread has been shown to extend into the neural foramina and epidural space normally.^[5] We are concerned that when the lamina and ligaments are compromised [Figure 1b], there could be significantly more epidural spread with clinical consequences such as hypotension, muscular weakness, and respiratory compromise when an ESP block is performed at standard volumes.

In our specific patient, it was difficult to assess whether there was upper or lower extremity weakness because of his inability to tolerate mechanical ventilation without deep sedation. However, given his health and physique, we believed him to have some motor block on the exam but this was not

objectively verified. It is possible that motor block was not significant given the dilute amount of local anesthetic (0.2% ropivacaine) or that the medication did not spread sufficiently cranially. Another consideration is that because the procedure was performed on POD 3, there was ample time for scar tissue to form. The scar tissue could have insulated the epidural space from the excessive local anesthetic spread or influenced the normal spread of local anesthetic.

We do not consider a laminectomy as an absolute contraindication to the ESP block. However, we propose that the block should not be implemented into clinical practice in patients who have recently received laminectomies without more data in determining its safety. Further research should target whether injection of local anesthetic further from the site of the laminectomy can affect the potential for epidural spread and how much epidural spread occurs in such a clinical setting. Could intentional epidural spread be utilized for safe analgesia and what dosing would be required? Is the block equally effective or is it perhaps more effective in patients with laminectomies? As the ESP block is applied to an increasing number of clinical scenarios, we must continue to proceed cautiously.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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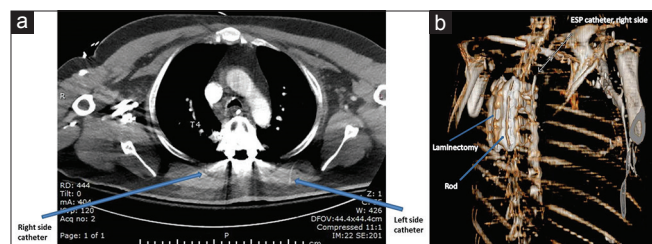


Figure 1: (a) T4 level showing both right and left ESP catheters in the correct position. (b) 3D CT scan showing missing lamina/spinous process. Right ESP catheter and hardware can be visualized as well