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## CLINICAL INFORMATION

# Continuous erector spinae plane block for postoperative analgesia of multiple rib fracture surgery: case report



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### KEYWORDS

Erector spinae plane block;  
Ultrasound;  
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### Abstract

**Introduction:** The erector spinae plane block is a newly described and effective interfascial plane block for thoracic and abdominal surgery. This case report describes a patient with multiple rib fractures undergoing ultrasound-guided continuous erector spinae plane block for analgesia.

**Case report:** A 37-year-old male patient was taken for surgical fixation of multiple rib fractures. At the end of the surgery, using ultrasound-guided longitudinal parasagittal orientation 3 cm to the lateral aspect of the T5 spinous process and an in-plane technique, 20 mL 0.25% bupivacaine was administered between the erector spinae muscle and the transverse process, and a catheter was then inserted in the same plane. Before the end of surgery, 1 g paracetamol and 50 mg dexketoprofen were administered. Postoperative analgesia was applied with patient controlled analgesia method using 0.25% bupivacaine via the catheter. The patient's Visual Analogue Scale score at rest in the first 24 h was 0. The patient was monitored for 3 days with Visual Analogue Scale < 4, and the catheter was removed on postoperative day 4. No opioid requirement other than paracetamol and dexketoprofen occurred during this time. No postoperative complications were recorded.

**Discussion:** The erector spinae plane block is an alternative to paravertebral, intercostal, epidural or other regional techniques. It may be a suitable technique in anesthesia and algology practice due to providing analgesia in the postoperative period with a catheter in the erector spinae plane.

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**PALAVRAS-CHAVE**

Bloqueio do plano do eretor da espinha;  
 Ultrassom;  
 Fratura de costela;  
 Analgesia  
 pós-operatória

## Bloqueio do plano do eretor da espinha para analgesia pós-operatória de cirurgia de fratura de múltiplas costelas: relato de caso

**Resumo**

**Introdução:** O bloqueio do plano do eretor da espinha é um bloqueio do plano interfacial recentemente descrito e eficaz para cirurgia torácica e abdominal. Neste relato descremos o caso de um paciente com fratura de múltiplas costelas, submetido ao bloqueio contínuo do plano do eretor da espinha guiado por ultrassom para analgesia.

**Relato de caso:** Paciente do sexo masculino, 37 anos, encaminhado para fixação cirúrgica de fratura de múltiplas costelas. Ao final da cirurgia, usando a orientação parasagital longitudinal guiada por ultrassom 3 cm em relação à face lateral do processo espinhoso T5 e a técnica no plano, 20 ml de bupivacaína a 0,25% foram administrados entre o músculo eretor da espinha e o processo transversal, e um cateter foi então inserido no mesmo plano. Antes do final da cirurgia, 1 g de paracetamol e 50 mg de dexetoprofeno foram administrados. A analgesia pós-operatória foi aplicada com o método de analgesia controlada pelo paciente, com bupivacaína a 0,25% via cateter. Na Escala Visual Analógica, o escore do paciente em repouso nas primeiras 24 h foi zero. O paciente foi monitorizado por três dias com a Escala Visual Analógica < 4, e o cateter foi removido no quarto dia de pós-operatório. Exceto por paracetamol e dexetoprofeno, não houve necessidade de outro agente opioide durante esse tempo. Não houve registro de complicação pós-operatória.

**Discussão:** O bloqueio do plano do eretor da espinha é uma alternativa às técnicas paravertebrais, intercostais, epidurais ou outras técnicas regionais. Pode ser uma técnica adequada na prática de anestesia e algologia devido ao fornecimento de analgesia no período pós-operatório mediante um cateter no plano do eretor da espinha.

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## Introduction

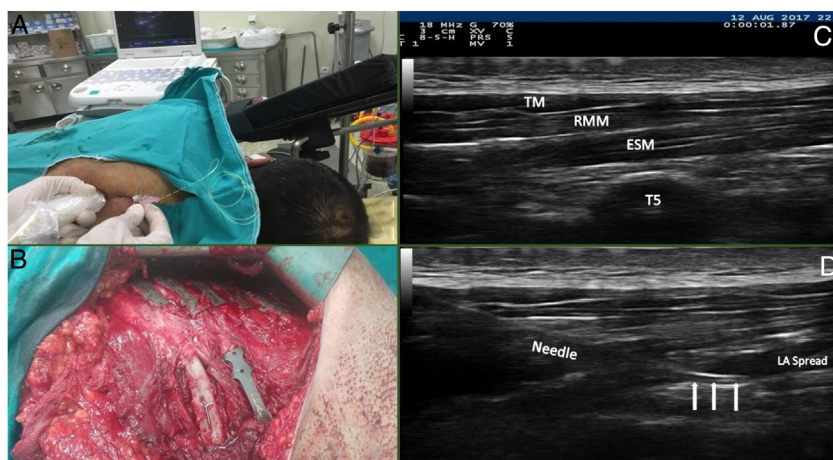
Erector Spinae Plane Block (ESPB) is a newly described and effective interfascial plane block for thoracic and abdominal surgery. It was first described by Forero et al. in 2016, effectiveness being reported in four cases.<sup>1</sup> Although it was first used for thoracic analgesia, various authors have reported its use in abdominal surgery with application at the level of the 7th vertebra and below.<sup>2-4</sup>

Although ESPB resembles the classic paravertebral block procedure, it involves the injection of local anesthesia between the target erector spinae muscle and the transverse process of the thoracic vertebrae. Cadaver studies have shown the effectiveness of the block as a result of administration of local anesthetics to the paravertebral space in this region. In contrast to other plane blocks, it has been shown to provide visceral analgesia in addition to somatic analgesia due to spreading paravertebral space.<sup>5</sup>

The main advantage of ESPB is that it is less invasive than thoracic epidural analgesia. While it exhibits an analgesic effect at several levels with a single injection at the T5 level, catheter applications to the region have also been reported. We describe a case of ESPB catheter administration for postoperative analgesia in a patient undergoing surgery for multiple rib fractures.

## Case report

A 37 year-old male patient with no known chronic disease was taken for surgical fixation of multiple rib fractures. The patient was premedicated with 2 mg midazolam. Anesthesia was induced with 2.5 mg.kg<sup>-1</sup> propofol, 50 mcg fentanyl and 0.6 mg.kg<sup>-1</sup> rocuronium, while maintenance of anesthesia was provided with sevoflurane in O<sub>2</sub>-air mixture. The patient was placed in the right lateral decubitus position. The 3rd, 4th, 5th, 6th, 7th and 8th ribs were exposed such as to include the fracture lines. The 3rd and 6th ribs were fixed with steel wire and the other ones with the help of a plate. ESP catheter application was planned for postoperative analgesia once the surgical procedure was completed. Under sterile conditions, USG probe was placed 3 cm laterally to the spinous process at the T5 level with longitudinal parasagittal orientation with the patient in the lateral decubitus position (Fig. 1A-C). The trapezius muscle, rhomboid muscle, erector spinae muscle and transverse process were visualized. With the in-plane technique, 100 mm sonovisible block needle (Stimuplex® Ultra 360, 22G/100 mm, BBraun, Germany) was advanced cephalad to caudad direction. We entered beneath the deep fascia of the erector spinae muscle, and the location of the needle was confirmed using hydrodissection with 2 mL saline solution. Following injection of 20 mL of 0.25% bupivacaine,



**Figure 1** (A) Patient and ultrasound set up for ESP block. (B) Surgical site. (C) Sonographic image for ESP block (TM, Trapezius Muscle; RMM, Rhomboid Major Muscle; ESM, Erector Spinae Muscle; T5, Transvers process of 5th vertebra). (D) After local anesthetic infiltration, white arrows indicate the catheter position.

the peripheral nerve block catheter was inserted to remain at a depth of 5 cm. Patient-controlled analgesia (PCA) was started utilizing 0.25% bupivacaine via the catheter. Sensorial area of the block was covered T2-T9, 3 cm lateral to the thoracic spine to midclavicular line, also axilla and medial upper part of the arm with loss of cold sensation test. Immediately before the end of surgery, 1 g paracetamol and 50 mg dexketoprofen trometamol was administered intravenously. Paracetamol 1 g and dexketoprofen 50 mg were given every 6 and 12 h respectively. Pain evaluation was performed in motion and at rest using a Visual Analog Score (VAS) at 1, 2, 4, 8, 12 and 24 h. The at-rest VAS score in the first 24 h was 0, with a maximum of 4 in active movement. No postoperative complications were recorded. No opioid requirement occurred during hospitalization, and the catheter was withdrawn on the 4th day postoperatively.

## Discussion

Paravertebral space was first described by Selheim in 1905. Clinical application of paravertebral block with various approaches gradually having began to enter into use after 1978.<sup>5</sup> Various procedures have been to date described for paravertebral block. The development and wide use of sonographic techniques has greatly facilitated the prevention and avoidance of complications in anesthetic and algology practice. With the introduction of ultrasonography into regional anesthesia practice, interfascial plane blocks have become increasingly popular. The latest of these blocks to be reported in the literature is the ESPB described by Forera et al. in 2016.<sup>1</sup> ESPB has been described for thoracic and abdominal analgesia in various cases.

The dorsal and ventral roots emerging from the anterior and posterior horns of the medulla spinalis combine and emerge from the intervertebral foramina. After the spinal nerve emerges from the paravertebral space, the ventral rami of the spinal nerves divide into ventral and dorsal rami and continue between the innermost intercostal muscle and the internal intercostal muscles at the thoracic level. At the

level of the midaxillary line it provides somatic sensation in the skin covering the chest by giving lateral cutaneous branches. The dorsal rami give sensation on the skin of the back, passing between the erector spinae muscles (m. spinalis, m. longissimus thoracis and m. iliocostalis), the rhomboid major muscle and trapezius muscle to the level of the 6th thoracic vertebra and passing only the trapezius muscle beneath the 6th thoracic vertebra. During paravertebral space blocks, both somatic and visceral block is established by blocking the rami communicantes in addition to the ventral and dorsal rami, which also emerge from the intervertebral foramina.<sup>2</sup>

Our review of the literature revealed that ESPB has been applied in Video-Assisted Thoracoscopic Surgery (VATS), pulmonary lobectomy, thoracic rib fractures, mastectomy, axillary sentinel lymph node biopsy, abdominal surgery<sup>2,4</sup> and in cases of neuropathic pain in the thoracic region.<sup>3</sup> In our case, erector spinae block was applied to a patient with multiple rib fractures. The patient's VAS score in the recovery room following ESPB applied in the perioperative period was 0. ESPB provides effective analgesia starting within minutes. Forero et al. reported a similar dermatomal level of sensory block.<sup>1,3</sup>

Although there has been no consensus regarding the assessment of the sensory block in studies of paravertebral block variants, including ESPB, retrolaminar and paraspinal blocks analgesic effectiveness has been shown by evaluating postoperative pain levels with VAS. These variant blocks have been developed in order to prevent complications such as pneumothorax, epidural injection or intrathecal injection-related neuronal damage, while establishing effective paravertebral block.

ESPB allows catheter insertion which is important for continuous analgesia. In our case, effective postoperative analgesia was established by the catheter beneath the erector spinae muscle plane and combined with multimodal analgesia utilizing paracetamol and dexketoprofen.

ESPB is reliable and simple to perform. However, randomized clinical studies are needed to assess the effectiveness of ESPB. It may be a suitable in acute and chronic

pain management due to providing excellent analgesia via catheter in the erector spinae plane.

### Conflicts of interest

The authors declare no conflicts of interest.

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