

CASE REPORT

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# Erector spinae plane block in laparoscopic cholecystectomy: a case report



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## Abstract

**Background:** Ultrasound-guided erector spinae plane block has been reported to reduce postoperative pain following a laparoscopic surgery, which is one of the most common abdominal surgeries. The case reports and randomized controlled trials published previously mostly used bilateral erector spinae plane block; however, we report a case in which a unilateral erector spinae plane block was performed.

**Case presentation:** A 34-year-old male patient who underwent laparoscopic cholecystectomy was scheduled for a unilateral erector spinae plane block. The block was performed preoperatively, followed by the induction of general anesthesia.

**Conclusions:** The patient was comfortable and had a visual analog scale score of 2 for 12 h. Thus, we report successful pain management with the unilateral erector spinae plane block; however, more studies are needed for conclusive information.

**Keywords:** Erector spinae plane block, Ultrasound, Laparoscopic cholecystectomy

## Background

The gold standard for surgical treatment of cholelithiasis is laparoscopic cholecystectomy, which is one of the most common abdominal surgeries (Agresta et al., 2015; Csikesz et al., 2010). Prolonged postoperative pain is the most common complaint of patients, and it increases the duration and cost of hospitalization (Alper et al., 2014). Ultrasound-guided erector spinae plane (ESP) block, first described by Forero et al. (Forero et al., 2016), is a plane block and is increasingly used. We showed that a unilateral ESP block helps in the successful management of postoperative pain after laparoscopic cholecystectomy.

## Case presentation

A 34-year-old male patient, weighing 65 kg, scheduled to undergo laparoscopic cholecystectomy in the general surgery clinic of a state hospital, was evaluated. Based on preoperative evaluation, the patient was prepared for the operation with American Society of Anesthesiologists class II risk status. As part of the perioperative and postoperative multimodal analgesia, we decided to perform an

ultrasound-guided unilateral ESP block. The patient was informed about the procedure, and a written informed consent was obtained.

The patient was taken to the operating room, and the required monitoring of parameters was initiated. Venous access was achieved, and isotonic fluid infusion was started. Sedation was achieved by intravenous injection (IV) of midazolam (2 mg). With the body in mild flexion, the T10 vertebrae level was identified using spinal processes. The surface of the needle entry point and target zone were swabbed with povidone iodine and covered with a sterile drape. Using the Sonosite M-Turbo ultrasound device (Fujifilm, Sonosite, WA, USA), a 6–13-mHz linear probe was placed horizontally on the T10 vertebra level. The probe was advanced 3 cm to the right lateral direction and rotated 90 degrees, and the transverse processes were determined (Fig. 1). Next, 5 mL of 2% lidocaine was administered to the predicted needle entry point. A 22-gauge, 100-mm peripheral nerve block needle was cephalocaudally advanced by the in-plane technique. The needle tip was continuously advanced toward the transverse process (Fig. 2). The needle was withdrawn 1–2 mm after contact with the transverse process. After negative aspiration, 20 ml of 0.25% bupivacaine was injected with intermittent negative aspirations into the fascia of the erector

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**Fig. 1** T10 vertebra transverse process

spinae muscle. The spread of local anesthesia was maintained throughout the procedure (Fig. 3).

After the ESP block, the patient was anesthetized with 2.5 mg/kg of IV propofol, 1 mcg/kg of fentanyl, and 0.6 mg/kg of IV rocuronium. A mixture of 1–2% sevoflurane with 40% oxygen and 60% air was used for inhalation anesthesia. Additionally, IV paracetamol (1 g) was infused perioperatively.

No hyperdynamic response was observed during the surgery, which lasted for 1 h. At the end of the surgery, the patient was awakened and taken to the post-anesthesia care unit (PACU). The visual analog scale

(VAS) score of 2 was recorded in the PACU at follow-up. The modified Aldrete score was 12, and the patient was subsequently transferred to the general ward. During follow-up, the VAS score was 2 for 12 h. The patient was comfortable and noted only mild tension in his abdomen. After 12 h, the VAS score increased to 4, and additional analgesia was necessitated.

### Discussion

Literature on the use of ESP block is limited. In PubMed, to date, there are only 10 reports of ESP block



**Fig. 2** Advancing of needle to the T10 transverse process



**Fig. 3** Spread of local anesthesia throughout the plane

performed during laparoscopic surgeries: two case reports (Petsas et al., 2018; Thomas & Tulgar, 2018), four case series (Tulgar et al., 2018a; Hannig et al., 2018; Aksu & Gurkan, 2019; De Cassai et al., 2019), and four randomized controlled trials (Tulgar et al., 2018b; Altıparmak et al., 2019; Aksu et al., 2019; Tulgar et al., 2019).

In our case, laparoscopic cholecystectomy was performed with four trocar entry points. As all the trocar entry points were on the right side of the abdomen, we decided to perform a unilateral T10 vertebra level ESP block instead of a bilateral block.

Tulgar et al. reported in a prospective, randomized, controlled clinical trial with 30 laparoscopic cholecystectomy patients that bilateral ESP block with 40 ml of 0.375% bupivacaine resulted in a decreased numeric rating scale (NRS) score in the first 3 h, but showed no difference at other time points (Tulgar et al., 2018b). Tramadol consumption was lower in the ESP block group. Tulgar et al. reported that ESP block and oblique subcostal transvers abdominis plane block had similar effects in means of analgesic consumption and rescue analgesic requirement (Tulgar et al., 2019).

Moreover, Altıparmak et al. compared the aforementioned two nerve block types and found that ESP block was more effective in reducing postoperative tramadol consumption and pain scores (Altıparmak et al., 2019). In our case, we performed a unilateral ESP block, and no rescue analgesic was needed for 12 h.

Petsas et al. reported a case in which they performed bilateral ESP block in a 76-year-old patient undergoing a laparoscopic procedure, with 12 mL of 0.375% ropivacaine plus 2 mg of dexamethasone, including 5 mL of 0.5% ropivacaine for the spread over the lower (umbilical) trocar incision (Petsas et al., 2018). Contrastingly, we did not

spread any local anesthetic on any trocar of the incisions and only performed a unilateral block. The patient was comfortable and the reported VAS score was 2 for 12 h.

In the case series reported by Tulgar et al. for different laparoscopic abdominal surgeries (Tulgar et al., 2018a) and by Hannig et al. for elective laparoscopic cholecystectomy surgery (Hannig et al., 2018), all the blocks were performed bilaterally; however, the NRS scores were < 3, which is similar to our case. All the cases involved laparoscopic cholecystectomy, and the trocar in the midline may have been an issue for performing the block bilaterally or unilaterally.

A randomized controlled study performed by Aksu et al. reported that 20 mL of 0.25% bupivacaine injected unilaterally for achieving ESP block in the T8 level reduced opioid consumption and showed a significant analgesic effect in patients undergoing laparoscopic cholecystectomy (Aksu et al., 2019). The mean VAS score was 0 at 24 h post-surgery; this may be related to the level of the block. Our patient's VAS score was 2 for 12 h, and he only complained of mild abdominal tension, possibly related with pneumoperitoneum.

Although the ESP block has been mainly performed in adult patients, Aksu (Aksu & Gurkan, 2019) and Thomas (Thomas & Tulgar, 2018) reported juvenile cases who underwent laparoscopic cholecystectomies with the ESP block. However, these two publications are case reports, and additional randomized controlled studies are warranted for further insights.

## Conclusions

Ultrasound-guided ESP block is important for multimodal analgesia in patients undergoing laparoscopic cholecystectomy, regardless of it being performed bilaterally or unilaterally.

**Abbreviations**

ESP: Erector spinae plane; VAS: Visual analog scale; NRS: Numeric rating scale; PACU: Post-anesthesia care unit

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OB and BK have reviewed the available literature. OB prepared the primary manuscript. OB, BK, AŞ, and CA reviewed and edited the final manuscript. All authors read and approved the final manuscript.

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**Availability of data and materials**

The data was extracted from the medical records file of the patient and the materials are being used which were available in our set up with valid reasons.

**Ethics approval and consent to participate**

Ethical approval is not required for publication of isolated case reports. The patient was informed about the procedure, and a written informed consent was obtained.

**Consent for publication**

Written permission/consent for reproduction of images of the patient for the purpose of publication in an educational medical journal was obtained from the patient.

**Competing interests**

The authors declare that they have no competing interests.

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**References**

- Agresta F, Campanile FC, Vettoretto N, Silecchia G, Bergamini C, Maida P et al (2015) Laparoscopic cholecystectomy: consensus conference-based guidelines. *Langenbecks Arch Surg*. 400:429–453
- Aksu C, Gurkan Y (2019) Ultrasound-guided bilateral erector spinae plane block could provide effective postoperative analgesia in laparoscopic cholecystectomy in paediatric patients. *Anaesth Crit Care Pain Med*. 38:87–88
- Aksu C, Kuş A, Yörükoğlu HU, Tor Kılıç C, Gürkan Y (2019) The effect of erector spinae plane block on postoperative pain following laparoscopic cholecystectomy: a randomized controlled study. *Journal of anesthesia*. 27:9–14
- Alper I, Ulukaya S, Yuksel G, Uyar M, Balcioglu T (2014) Laparoscopic cholecystectomy pain: effects of the combination of incisional and intraperitoneal levobupivacaine before or after surgery. *Agri*. 26:107–112
- Altıparmak B, Korkmaz Toker M, Uysal AI, Kuscü Y, Gumus DS (2019) Ultrasound-guided erector spinae plane block versus oblique subcostal transversus abdominis plane block for postoperative analgesia of adult patients undergoing laparoscopic cholecystectomy: Randomized, controlled trial. *Journal of clinical anesthesia*. 57:31–36
- Csikesz NG, Singla A, Murphy MM, Tseng JF, Shah SA (2010) Surgeon volume metrics in laparoscopic cholecystectomy. *Dig Dis Sci*. 55:2398–2405
- De Cassai A, Cin SD, Zaranonello F, Ban I (2019) Erector spinae plane block as a rescue therapy for uncontrolled pain after laparotomy: a report of two cases. *Saudi J Anaesth*. 13:66–68
- Forero M, Adhikary SD, Lopez H, Tsui C, Chin KJ (2016) The erector spinae plane block: a novel analgesic technique in thoracic neuropathic pain. *Regional anesthesia and pain medicine*. 41:621–627

Hannig KE, Jessen C, Soni UK, Borlum J, Bendtsen TF (2018) Erector spinae plane block for elective laparoscopic cholecystectomy in the ambulatory surgical setting. *Case Rep Anesthesiol*. 2018:5492527

Petsas D, Pogiati V, Galatidis T, Drogouti M, Sofianou I, Michail A et al (2018) Erector spinae plane block for postoperative analgesia in laparoscopic cholecystectomy: a case report. *J Pain Res*. 11:1983–1990

Thomas DT, Tulgar S (2018) Ultrasound-guided erector spinae plane block in a child undergoing laparoscopic cholecystectomy. *Cureus*. 10:e2241

Tulgar S, Kapakli MS, Kose HC, Senturk O, Selvi O, Serifsoy TE et al (2019) Evaluation of ultrasound-guided erector spinae plane block and oblique subcostal transversus abdominis plane block in laparoscopic cholecystectomy: randomized, controlled, prospective study. *Anesth Essays Res*. 13:50–56

Tulgar S, Kapakli MS, Senturk O, Selvi O, Serifsoy TE, Ozer Z (2018b) Evaluation of ultrasound-guided erector spinae plane block for postoperative analgesia in laparoscopic cholecystectomy: a prospective, randomized, controlled clinical trial. *Journal of clinical anesthesia*. 49:101–106

Tulgar S, Selvi O, Kapakli MS (2018a) Erector spinae plane block for different laparoscopic abdominal surgeries: case series. *Case Rep Anesthesiol*. 2018: 3947281

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