



## Ultrasound guided erector spinae plane catheter placement for long-term continuous analgesia in pulmonary malignancy

*Pulmoner malignitede uzun süreli analjezi için ultrason eşliğinde erektör spina plan kateteri yerleştirilmesi*

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To the Editor,

Erector spinae plane (ESP) block is a recently described paravertebral fascial plane block. Given its relatively easy application under ultrasound (US) guidance and low possibility of mechanical complications, ESP blocks have gained popularity among pain practitioners. A wide variety of indications have been identified including postoperative analgesia, surgical anesthesia and management of chronic pain at thoracic and lumbar region.<sup>[1, 2]</sup> In anatomical and imaging studies, its mechanism of action is explained as spreading of the local anesthetic solution deep to the erector spinae muscle towards the paravertebral and epidural spaces, thus blocking the dorsal and ventral ramus of the spinal nerves.<sup>[1, 3, 4]</sup> ESP blocks have been considered less invasive method compared to its alternative interventional techniques such as paravertebral block or neuraxial blocks.<sup>[5]</sup> Continuous analgesia is also possible by placing ESP catheter at cervical, thoracic and lumbar regions.<sup>[6-10]</sup>

We have demonstrated previously that ESP block provides sufficient analgesia for unilateral thoracic pain in pulmonary malignancy.<sup>[7]</sup> We would like to present a case of long term ESP catheter placement under US guidance, which provided sufficient continuous analgesia for pulmonary malignancy pain.

Written informed consent has been obtained from the patient for publication of this report. The pa-

tient was 79-year-old female who had mesothelioma with parietal pleura metastases, which was diagnosed four years ago. The patient was admitted to our pain department with complaints of severe thoracic pain at right side. She was on chemotherapy, which lasted for 18 months. She was using acetaminophen 500 mg three times a day and fentanyl patch 75 µg/h. The pain was defined as severe and interfering with sleep.

We decided to place an ESP catheter for continuous analgesia. The procedure was performed in the operation room in sitting position with the back flexed. The targeted transverse process was identified by counting up the vertebrae starting from the sacrum; with paramedian sagittal ultrasound scanning using a low frequency US probe. Standard monitoring was applied and a venous line was placed. We used a high frequency linear US probe for catheterization procedure. After infiltration of the skin with 2 ml 2% lidocaine, a standard Tuohy needle was inserted from cephalad to caudad direction in paramedian sagittal plane under US guidance using in plane technique. When the tip of the needle reached and touched the T8 transverse process, we administered 15 ml of 0.25% bupivacaine into the plane (Figure 1a). Then we advanced multiorifice catheter through the Tuohy needle into hydro-dissected area within the plane (Figure 1b). The tip of the catheter was left between T7 and T8 vertebra transverse processes with 8 cm part in the

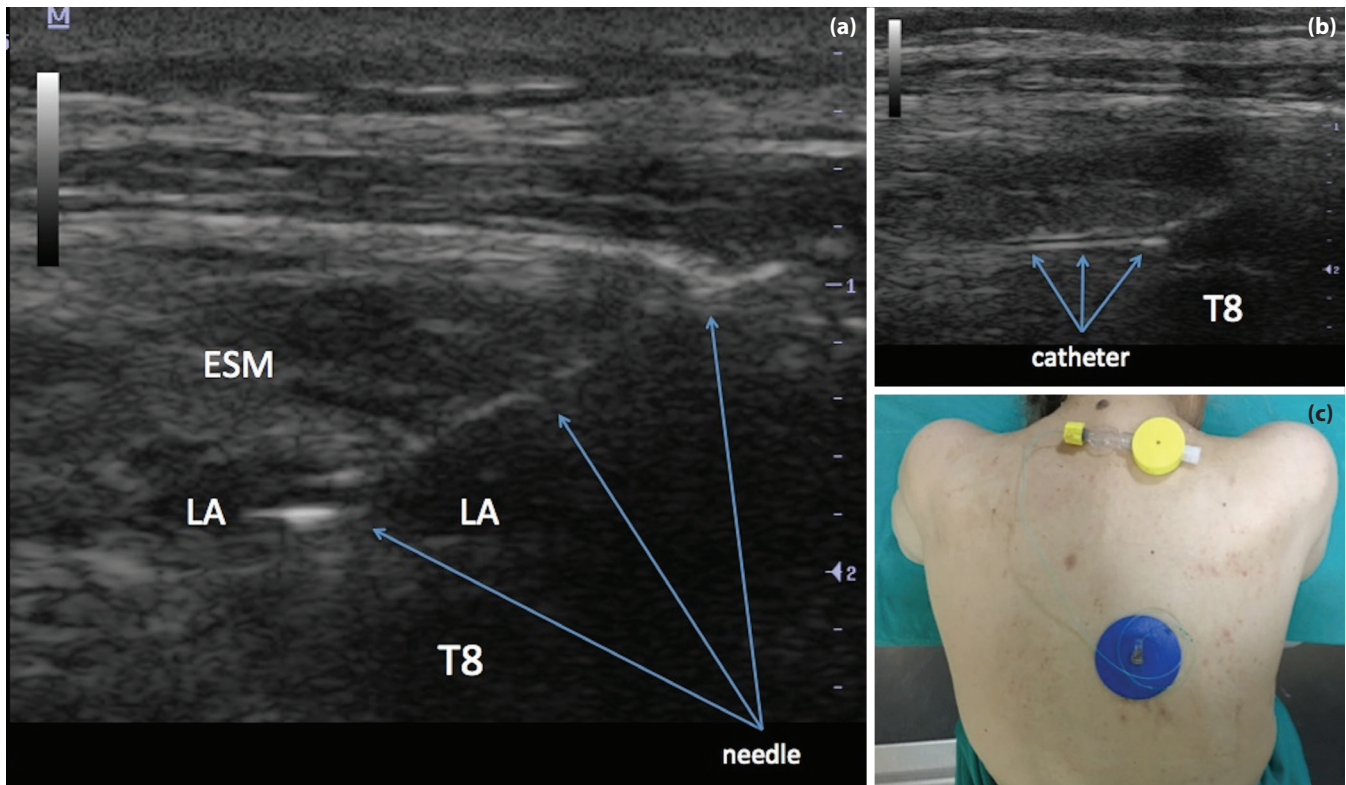
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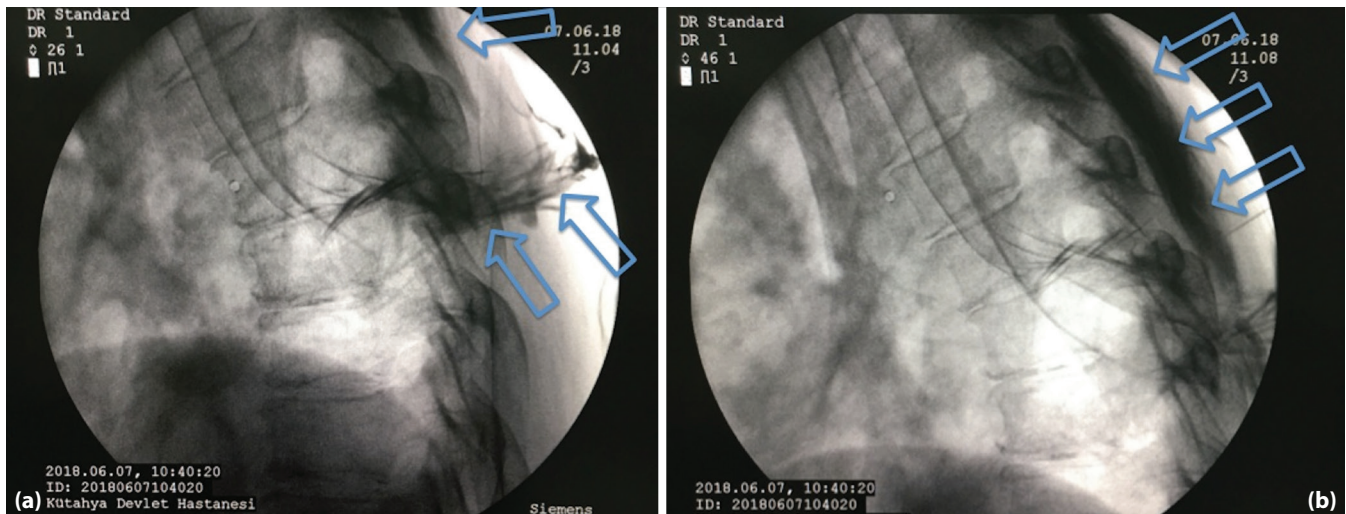
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**Figure 1.** (a) The ultrasound image of the Tuohy needle and distribution of the local anesthetic solution within the fascia. The tip of the needle is on the T8 vertebra transverse process. (b) The ultrasound image of the catheter in the erector spinae muscle plane. (c) The catheter fixed at the right thoracic wall of the patient.



**Figure 2.** (a) Misplacement of the catheter was diagnosed by C-arm radiographic imaging. The image shows a scattered and more superficial accumulation of given radio-contrast solution rather than expected (over transverse processes). (b) The proper cranio-caudal distribution of local anesthetic solution.

soft tissue. Then we secured the catheter using the instant skin adherence apparatus (Figure 1c).

No complications occurred during and after the block procedure. 10 minutes after the application, pain decreased to 1–2/10 from 8–9/10 defined by the patient using a numerical ranking score. One

day after the patient was called for follow up and the pain was evaluated as 4/10. After administration of 10 ml 0.25 bupivacaine through the catheter, the pain decreased to 0/10 within 10 minutes and 24 hours of analgesia was provided. After a brief education about how to use the catheter, the treatment continued at home with self-administra-

tions of 10 ml 0.25% from the catheter.

The treatment continued totally for 10 months time with self-administrations of 10 ml 0.25% bupivacaine, one or two times a day according to analgesic requirements of the patient. No additional medication was necessary after that time. There were three interruptions during the treatment due to catheter misplacements. Two months after the first placement, the catheter was withdrawn and replaced from the same place. 4 months after that time, a leakage of given drugs from insertion site and ineffective analgesia occurred. On the follow up, misplacement was diagnosed by using a C-arm fluoroscopy imaging and the catheter was replaced (Figure 2). Another replacement was performed due to undesired withdrawal one month later. The patient reported an excellent satisfaction with this method and the patient enforced all catheter replacements.

In our case, continuous analgesia was achieved for unilateral thoracic pain in pulmonary malignancy. The catheter was used with manual administrations of local anesthetic drug according to analgesic requirement. Continuous drug injection with an infusion device or patient controlled analgesia may be alternative to our method. There have been several reports of prolonged analgesia by placing ESP catheter for management of acute and chronic pain.<sup>[6-10]</sup> To our knowledge, this is the first report of long-term application of ESP catheter for lung cancer pain. Erector spinae plane catheters may be beneficial both in terms of long-term use and the ease of care with patient compliance and may increase the quality of life of lung cancer patients.

Although administration of continuous ropivacaine infusions over prolonged time periods was found safe and did not produce toxic serum concentrations, there is insufficient data in the literature about long-term effects of bupivacaine.<sup>[11]</sup> There is one case of bupivacaine crystal deposits after 6 months of epidural infusion of which clinical significance and neuraxial tissue toxicity could not be clarified.<sup>[12]</sup> We used much less daily amounts of bupivacaine (about 35 mg/day, totally 10 g up to date) than used in that case (69 g).<sup>[12]</sup> We did not observe any signs of neurotoxicity or cardiotoxicity in our patient during the treatment period. There were also no signs of infec-

tion at the catheter insertion site and the treatment is being continued henceforward. However, it should be noted that the risk of infection may limit such use and also there is not sufficient evidence to support long-term bupivacaine administration.

## References

- Ivanusic J, Konishi Y, Barrington MJ. A Cadaveric Study Investigating the Mechanism of Action of Erector Spinae Blockade. *Reg Anesth Pain Med*. 2018 May 10. [Epub ahead of print]
- Tulgar S, Selvi O, Senturk O, Ermis MN, Cubuk R, Ozer Z. Clinical experiences of ultrasound-guided lumbar erector spinae plane block for hip joint and proximal femur surgeries. *J Clin Anesth*. 2018;47:5-6.
- Forero M, Adhikary SD, Lopez H, Tsui C, Chin KJ. The Erector Spinae Plane Block: A Novel Analgesic Technique in Thoracic Neuropathic Pain. *Reg Anesth Pain Med*. 2016;41:621-7.
- Schwartzmann A, Peng P, Maciel MA, Forero M. Mechanism of the erector spinae plane block: insights from a magnetic resonance imaging study. *Can J Anaesth*. 2018;65:1165-1166.
- Adhikary SD, Pruet A, Forero M, Thiruvenkatarajan V. Erector spinae plane block as an alternative to epidural analgesia for post-operative analgesia following video-assisted thoracoscopic surgery: A case study and a literature review on the spread of local anaesthetic in the erector spinae plane. *Indian J Anaesth* 2018;62:75-8.
- Tsui BCH, Mohler D, Caruso TJ, Horn JL. Cervical erector spinae plane block catheter using a thoracic approach: an alternative to brachial plexus blockade for forequarter amputation. *Can J Anaesth*. 2018 Jun 4. [Epub ahead of print]
- Aydin T, Balaban O, Acar A. Ultrasound guided continuous erector spinae plane block for pain management in pulmonary malignancy. *J Clin Anesth*. 2018;46:63-64.
- Ahiskalioglu A, Alici HA, Ciftci B, Celik M, Karaca O. Continuous ultrasound guided erector spinae plane block for the management of chronic pain. *Anaesth Crit Care Pain Med*. 2017 Dec 15. pii: S2352-5568(17)30357-0.
- Ueshima H, Otake H. Continuous erector spinae plane block for pain management of an extensive burn. *Am J Emerg Med*. 2018 Jul 6. pii: S0735-6757(18)30571-0.
- Bugada D, Zarccone AG, Manini M, Lorini LF. Continuous Erector Spinae Block at lumbar level (L4) for prolonged postoperative analgesia after hip surgery. *J Clin Anesth*. 2018 Aug 25;52:24-25. [Epub ahead of print]
- Bleckner L, Solla C, Fileta BB, Howard R, Morales CE, Buckenmaier CC. Serum free ropivacaine concentrations among patients receiving continuous peripheral nerve block catheters: is it safe for long-term infusions? *Anesth Analg*. 2014;118:225-9.
- Balga I, Gerber H, Schorno XH, Aebersold Keller F, Oehen HP. Bupivacaine crystal deposits after long-term epidural infusion. *Anaesthesist*. 2013;62:543-8.