

LETTER TO THE EDITOR

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Ultrasound-guided modified thoracolumbar interfascial plane block is effective for pain management following multi-level lumbar spinal fusion surgery

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To the Editor,

The number of spinal surgeries that are performed has been increasing because of the rise in the incidences of spinal diseases. Surgery for lumbar spinal fusion causes severe pain postoperatively, and the mobilization and rehabilitation of patients are very important after surgery (Kim et al. 2016). However, rehabilitation processes may be negatively affected by postoperative pain (Pinar et al. 2017). Therefore, postoperative pain management is an important issue following multi-level spinal fusion surgery. The postoperative pain can be managed with a variety of regional anesthesia techniques. One of these techniques is ultrasound-guided thoracolumbar interfascial plane (TLIP) block. TLIP block targets the dorsal rami of the thoracolumbar nerves, and there are increasing reports about its efficacy in pain management following spinal surgeries (Hand et al. 2015; Ueshima et al. 2017; Ueshima and Otake 2017). We report here on a case involving successful pain management using modified TLIP (mTLIP) block following multi-level lumbar spinal fusion surgery. Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

A 60-year-old man, who weighed 80 kg and had an American Society of Anesthesiologists (ASA) physical status of 2 (arterial hypertension), underwent lumbar spinal fusion surgery at three levels (L₁₋₄ vertebrae levels)

(Fig. 1a, b). After applying standard ASA monitoring, anesthesia was induced and orotracheal intubation was performed using an 8.0-mm tracheal tube. The patient was placed in the prone position. Before beginning the surgery, we performed a mTLIP block bilaterally. The block was performed under aseptic conditions at the level of the L₃ vertebrae using the GE Vivid Q[®] ultrasound device (Fig. 2a). A 12-MHz linear ultrasound probe was covered with a sterile sheath and placed in a vertical orientation. After visualizing the hyperechoic shadow of the spinous process as an anatomical guide point, the probe was moved forward to the lateral to visualize the longissimus and iliocostal muscles. Between these muscles, a 22-gauge, 80-mm block needle was inserted in a medial-to-lateral direction in the interfascial plane. Once the needle tip had been placed within the interfascial plane and after careful aspiration to rule out intravascular needle placement, 2 mL of saline was injected to confirm the proper injection site, and then a dose of 0.25% bupivacaine 20 mL was injected in each side (total 40 mL) (Fig. 2b). A dose of 800 mg of ibuprofen IV was administered intraoperatively 30 min before the end of the surgery for multimodal postoperative analgesia. The operation was uneventful, and there was no complication during the surgery. The patient was extubated and transferred to the post-anesthesia care unit (PACU). At the PACU, the patient's visual analog score (VAS) was 3; therefore, no analgesic was administered. After a modified Aldrete score of ≥ 9 , the patient was discharged from the PACU. A dose of 400 mg ibuprofen was administered routinely, every 8 h. The maximum VAS score that the patient experienced was 3 at rest, and he achieved mobilization within 24 h. The patient was

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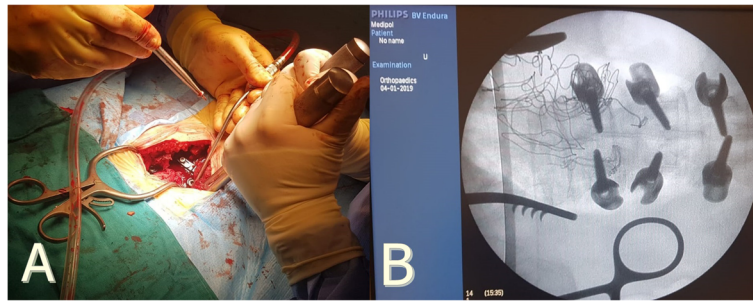


Fig. 1 a Surgery of multi-level spinal fusion. **b** X-ray photograph of multi-level spinal fusion

mobilized very easily, and no additional analgesic was administered during the postoperative period.

Discussion

The anatomy of the lumbar region has been understood clearly for anesthesia practice in the past few years. From medial to lateral respectively, the multifidus, longissimus, and iliocostalis muscles form the muscle layer of the lumbar paravertebral area. The dorsal nerve over-spreads here above the transverse process of vertebrae. The paravertebral area is innervated by the dorsal ramus of the spinal nerve. TLIP block was first defined by Hand et al. in 2015. They injected local anesthetic between the multifidus and longissimus muscles at the third lumbar vertebral level by positioning the block needle at a 30° angle from the skin, and then they advanced the needle from lateral to medial (classic technique) (Hand et al. 2015). Ahiskalioglu et al. asserted that advancing the needle from lateral to medial might have a risk of inadvertent neuroaxial injection. Also, sonographic imaging of the longissimus and iliocostalis muscles can be easier than imaging the multifidus and longissimus muscles. Therefore, Ahiskalioglu et al. devised and described a modified TLIP block in which a local anesthetic is injected between the longissimus and

iliocostalis muscles with a needle angled at 15° and the needle is advanced medial to lateral (lateral technique) (Ahiskalioglu et al. 2017). The efficacy of the TLIP block for lumbar laminoplasty has been retrospectively investigated, and Ueshima et al. found that the TLIP block with the classic approach provides 24 h of effective analgesia following single-level spinal surgery (Ueshima et al. 2017). However, although this is effective for single-level surgery, the effectiveness of the TLIP block for multi-level spinal surgery is unclear. Ohgoshi et al. described two cases of multi-level lumbar surgery in which they performed TLIP block using the classic approach (Ohgoshi et al. 2017). The authors noted that this block is also effective for multi-level spinal surgery. With respect to a mTLIP block, Ahiskalioglu et al. suggested that a lateral approach may be useful for two- or three-level spinal surgeries as well (Ahiskalioglu et al. 2017). In our case, we also performed a TLIP block using a lateral approach and found this technique to be effective for analgesia after three-level spinal fusion surgery. While Ohgoshi et al. reported the effectiveness of TLIP block for multi-level laminectomy, the surgery in our case involved a multi-level spinal fusion, which is associated with the possibility of more pain after surgery. It is useful to note that although Ohgoshi et al. mentioned that the TLIP block is effective only for short



Fig. 2 a Ultrasound and patient setup for block preparation. **b** Sonographic anatomy and spread of local anesthetic

periods of time, they did not mention any specific amount of time in their report (Ohgoshi et al. 2017). In our case, the effectiveness of the mTLIP block was 24 h, which is similar to the classical approach TLIP block that Ueshima et al. performed for single-level spinal surgery (Ueshima and Otake 2017).

There is no research that shows results of comparing the classic and modified approaches yet. For this, large randomized studies are needed. In conclusion, we believe that the mTLIP block may be a good option for managing pain in multi-level spinal fusion surgery.

Abbreviations

ASA: American Society of Anesthesiologists; mTLIP: Modified thoracolumbar interfascial plane; PACU: Post-anesthesia care unit; TLIP: Thoracolumbar interfascial plane; VAS: Visual analog score

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BC and ME contributed to the writing, literature scanning, and block performing. YOA contributed to the writing, literature scanning, block performing, and review. All authors read and approved the final manuscript.

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Consent for publication

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Competing interests

The authors declare that they have no competing interests.

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