



CORRESPONDENCE

## Efficacy of ultrasound-guided modified thoracolumbar interfascial plane block for postoperative analgesia after spinal surgery: a randomized-controlled trial

Ali Ahiskalioglu, MD · Ahmet Murat Yayik, MD · Omer Doymus, MD · Kubra Selvitopi, MD · Elif Oral Ahiskalioglu, MD · Cagatay Calikoglu, MD · Haci Ahmet Alici, MD · Omer Karaca, MD

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### To the Editor,

Surgery of the lumbar spine is characterized by diffuse and severe postoperative pain.<sup>1</sup> Pre/postoperative oral opioids, gabapentinoids, nonsteroidal antiinflammatory drugs, and intraoperative ketamine are frequently included in multimodal analgesia for spinal surgery, while regional anesthetic techniques such as neuraxial anesthesia, paravertebral blocks, and local anesthetic infiltration of the wound are less frequently used.<sup>2</sup> Interfascial plane blocks have the potential to provide long-lasting postoperative analgesia and reduce opioid consumption while minimizing the motor block associated with neuraxial and plexus blocks.<sup>3</sup>

The thoracolumbar interfascial plane (TLIP) block, first described by Hand *et al.*, targets the dorsal roots of the thoracolumbar nerves by depositing local anesthetic at the level of third lumbar vertebra between the multifidus and longissimus muscles.<sup>4</sup> We modified Hand's TLIP technique by injecting between the longissimus and

iliocostalis muscles. We believe this is simpler to perform and reduces the risk of neuraxial puncture.<sup>5</sup> The aim of this study was to investigate the effect of the modified TLIP block on postoperative opioid consumption and pain scores in patients undergoing spinal surgery. The study was registered with ClinicalTrials.gov (NCT03079076).

Following approval by the Ataturk University Medical Ethics Board (Erzurum, Turkey, 24.10.2016/7) written, informed consent was obtained from 40 patients, aged 18–65 yrs, American Society of Anesthesiologists physical status I–III, scheduled for two- or three-level posterior lumbar instrumentation surgery. Patients were randomly assigned to control or TLIP groups using a computer software program. Those in the control group ( $n = 20$ ) received bilateral ultrasound-guided injections of 2 mL 0.9% saline subcutaneously; those in the TLIP group ( $n = 20$ ) received ultrasound-guided bilateral modified TLIP block with 20 mL 0.25% bupivacaine as described here.<sup>5</sup> A successful block was defined as loss of cold sensation in the T7-L1 dermatomes 20 min after block application.

All patients received a standardized anesthetic and following surgery were offered patient-controlled analgesia (PCA) using fentanyl. The PCA was programmed with a 25- $\mu$ g bolus and ten-minute locked time, without basal infusion, and continued for 24 hr. The primary outcome was fentanyl consumption at 24 hr. Secondary outcomes included visual analogue pain scores on arrival to the postanesthesia care unit, then at one, two, four, eight, 12, and 24 hr after surgery. Requests for supplementary analgesia and the occurrence of nausea and vomiting were also recorded.

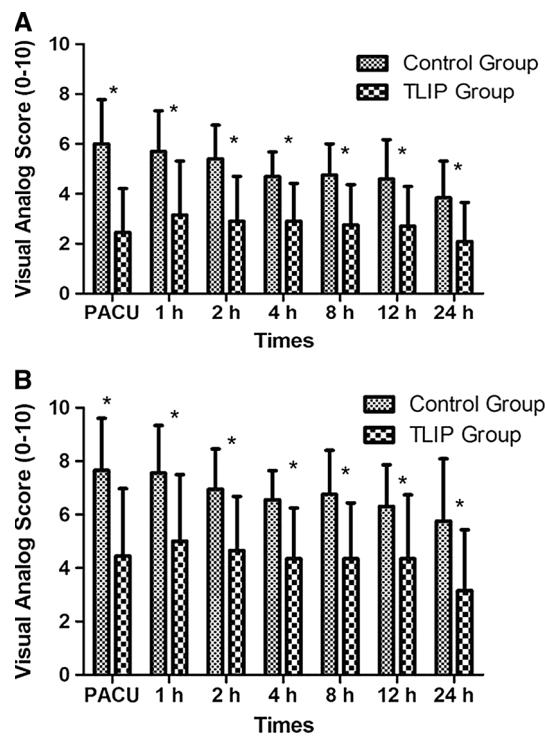
The primary outcome was compared using an unpaired Student's *t* test. Visual analogue scale scores over time were compared with repeated measurements analysis of

A. Ahiskalioglu, MD (✉) · O. Doymus, MD · K. Selvitopi, MD · H. A. Alici, MD  
Department of Anaesthesiology and Reanimation, Ataturk University School of Medicine, Erzurum, Turkey  
e-mail: aliahiskalioglu@hotmail.com

A. M. Yayik, MD · E. O. Ahiskalioglu, MD  
Department of Anaesthesiology, Regional Training and Research Hospital, Erzurum, Turkey

C. Calikoglu, MD  
Department of Neurosurgery, Ataturk University School of Medicine, Erzurum, Turkey

O. Karaca, MD  
Department of Anaesthesiology and Reanimation, Baskent University School of Medicine, Konya, Turkey



**Figure** Pain was assessed using a visual analogue scale anchored at 0 (no pain) and 10 (worst imaginable pain). A) Pain scores at rest; B) pain scores with active movement. Data are presented as mean (standard deviation). Control and thoracolumbar interfascial plane groups were compared with repeated measures analysis of variance with Bonferroni correction.  $P < 0.05$ . PACU = postanesthesia care unit

variance with Bonferroni correction. Categorical variables were compared using Fisher's exact test. The study was powered to detect a 200- $\mu\text{g}$  difference in 24-hr fentanyl consumption with a two-tailed alpha error of 0.05 and 80% power.

The mean (standard deviation) fentanyl consumption at 24 hr was 496 (231)  $\mu\text{g}$  in the control group and 289 (154)  $\mu\text{g}$  in the TLIP group (difference of means, 207  $\mu\text{g}$ ; 95% confidence interval, 81 to 334). Visual analogue scale scores in the TLIP group were significantly lower at all intervals, both at rest and with active movement ( $P < 0.05$  at all time points, Figure). Requests for supplementary analgesia were more common in the control group (8/20

compared with the TLIP group (2/20,  $P = 0.032$ ). The incidence of nausea and vomiting in the first 24 hr postoperatively was significantly higher in the control group (6/20) than in the TLIP group (1/20,  $P = 0.046$ ).

Our results indicate that patients receiving a TLIP block consumed less fentanyl while reporting superior pain scores and fewer side effects 24 hr following lumbar spine surgery. Future studies are required to define the optimal volume, concentration, and type of local anesthetic for TLIP analgesia. We believe that the TLIP block may provide an important component of multimodal analgesia for two- or three-level lumbar spinal surgery.

**Conflicts of interest** None declared.

**Presentation** Preliminary results of this study were presented at the 42nd ASRA meeting in San Francisco.

**Trial registration** [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (NCT03079076). Registered 6 March 2017.

**Editorial responsibility** This submission was handled by Dr. Gregory L. Bryson, Deputy Editor-in-Chief, *Canadian Journal of Anesthesia*.

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## References

1. Memtsoudis SG, Vougioukas VI, Ma Y, Gaber-Baylis LK, Girardi FP. Perioperative morbidity and mortality after anterior, posterior, and anterior/posterior spine fusion surgery. Spine (Phila Pa 1976) 2011; 36: 1867-77.
2. Zorrilla-Vaca A, Healy RJ, Mirski MA. A comparison of regional versus general anesthesia for lumbar spine surgery: a meta-analysis of randomized studies. J Neurosurg Anesthesiol 2017; 29: 415-25.
3. Chin KJ, McDonnell JG, Carvalho B, Sharkey A, Pawa A, Gadsden J. Essentials of our current understanding: abdominal wall blocks. Reg Anesth Pain Med 2017; 42: 133-83.
4. Hand WR, Taylor JM, Harvey NR, et al. Thoracolumbar interfascial plane (TLIP) block: a pilot study in volunteers. Can J Anesth 2015; 62: 1196-200.
5. Ahiskalioglu A, Alici HA, Selvitopi K, Yayik AM. Ultrasound-guided modified thoracolumbar interfascial plane block: a new approach. Can J Anesth 2017; 64: 775-6.