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LETTER

Is Thoracic Paravertebral Block Truly Superior to Erector Spinae Plane Block? Re-Evaluating the Evidence from a Recovery Perspective [Letter]

Hui Ma[1], Lai Wei[2], Jiayuan Niu[1]

[1]Department of Anesthesiology, The Second Hospital of Dalian Medical University, Dalian, People's Republic of China; [2]Department of Anesthesiology, Dalian Hospital of Traditional Chinese Medicine, Dalian, People's Republic of China

Correspondence: Jiayuan Niu, Department of Anesthesiology, The Second Hospital of Dalian Medical University, No. 467 Zhongshan Road, Dalian, 116027, People's Republic of China, Email niujy317@163.com

Dear editor

We read with great interest the randomized controlled trial (RCT) by Shi et al comparing ropivacaine-based thoracic paravertebral block (TPVB) with erector spinae plane block (ESPB) on quality of recovery in laparoscopic colorectal cancer surgery, recently published in *Drug Design, Development and Therapy*.[1] We commend the authors for conducting this timely and clinically relevant investigation; as the adoption of enhanced recovery after surgery (ERAS) pathways accelerates in colorectal surgery, defining the optimal regional analgesic strategy remains a priority. That said, we would like to raise three points that we believe merit closer attention: the anatomical basis for the chosen block level, the use of per-protocol instead of intention-to-treat analysis, and how to interpret clinical significance alongside statistical significance.

Anatomical Considerations for Block Level Selection

The authors performed both TPVB and ESPB at the T10 level, with 20 mL of 0.375% ropivacaine injected per side. Technically this is sound, but a single-level injection may not cover the full range of nociceptive pathways activated during colorectal surgery. Somatic pain from abdominal incisions travels via the T8–T12 intercostal nerves, whereas visceral pain from the colon and rectum is carried by the celiac and superior hypogastric plexuses. In addition, low rectal or pelvic dissection engages the parasympathetic pelvic splanchnic nerves (S2–S4).[2] Previous studies indicate that a single TPVB injection of 20 mL local anesthetic typically spreads over four to five dermatomes, which could leave both cephalad and caudad nociceptive inputs only partially blocked.[3] Similarly, although ESPB was originally described for thoracic neuropathic pain,[4] its spread mechanism and extent remain variable. Anatomical and histotopographic studies have shown that injectate distribution within the erector spinae plane is inconsistent; lateral and anterior spread depend on fascial integrity and on the needle tip's precise position relative to the costotransverse foramina.[5] Consequently, a single injection at T10 risks inadequate anesthesia of the T8–T9 dermatomes, the periumbilical region, and – crucially for low anterior resection – the pelvic and sacral nociceptive afferents. Incomplete cephalad, caudad, or pelvic nociceptive coverage is a possible explanation for the modest between-group differences observed in this trial, though this mechanism was not directly measured. For future studies, we suggest that researchers consider a multi-level injection strategy, combine ESPB with a block targeting the abdominal wall or pelvic plexus, or explore alternative truncal blocks such as the quadratus lumborum block (QLB).

Methodological Rigor: Intention-to-treat versus Per-protocol Analysis

Our second point concerns the analytical framework used in this trial. The primary efficacy analysis was performed on the per-protocol (PP) population, after two participants were excluded post-randomization – one due to block failure and

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one because of an unplanned transfer to the intensive care unit. The authors correctly note this as a limitation. Nevertheless, the CONSORT 2010 guidelines explicitly recommend intention-to-treat (ITT) as the primary analysis for superiority trials. The reason is straightforward: post-randomization exclusions, regardless of the reason, introduce attrition bias and can upset the balance achieved by randomization, which may affect the robustness of the findings.[6] Although only two of 87 randomized patients (about 2.3%) were excluded, even modest exclusion rates can meaningfully affect the robustness of trial conclusions – especially when the observed effect size is marginal. We respectfully suggest that future trials in this area adopt ITT as the primary analytical approach, complemented by appropriate sensitivity analyses such as multiple imputation or best-case and worst-case scenario modeling to assess how findings hold under different missing-data assumptions. Given that ESPB has a lower technical failure rate than TPVB, a formal non-inferiority design with ITT analysis would be particularly well suited for comparing these two techniques.[7]

Clinical Significance Beyond Statistical Significance

Finally, we want to highlight the distinction between statistical significance and clinical meaningfulness when interpreting the trial's primary outcome. The 24-hour Quality of Recovery-15 (QoR-15) score differed by an average of 3.03 points between the TPVB and ESPB groups (95% CI: 0.09 to 5.98; P = 0.036). Although this difference meets the conventional threshold for statistical significance, it lies well below the validated minimal clinically important difference (MCID) for the QoR-15, which is 8 points.[8] Moreover, the area under the curve (AUC) analysis of QoR-15 scores over 72 hours showed no statistically significant difference between the two block groups (P = 0.12). Taking these results together with the significantly longer performance time for TPVB than for ESPB, and the comparable opioid-sparing effects of both techniques relative to the control group, the available data do not demonstrate a clinically meaningful superiority of TPVB over ESPB, and the findings are consistent with broadly comparable recovery profiles between the two techniques. This interpretation is consistent with a growing number of methodologically sound non-inferiority trials that have compared ESPB with TPVB across various surgical procedures – including laparoscopic nephro-ureterectomy, laparoscopic nephrectomy, thoracic surgery,and thoracoscopic surgery – as well as with a recent systematic review and meta-analysis documenting comparable analgesic efficacy and recovery profiles between the two techniques.[9] The QoR-15 is a well-validated instrument for measuring postoperative recovery quality, but it is most informative when interpreted against its MCID rather than in isolation.

In summary, we commend Shi et al for contributing an important RCT to the literature comparing TPVB and ESPB in laparoscopic colorectal cancer surgery. Their work adds to a growing body of evidence suggesting that for truncal analgesia, ESPB may offer a clinically comparable, technically simpler, and potentially safer alternative to TPVB, though this interpretation should be tempered by the limitations of the current evidence base. What is needed next are definitive multicenter, double-blind, non-inferiority trials that are powered to detect margins based on the MCID of the QoR-15 and that employ rigorous ITT analysis within established ERAS frameworks. Such studies would provide the high-quality evidence required to guide clinical practice. Until then, either technique, when properly performed, may be considered a reasonable option, pending confirmation from larger comparative trials.

Disclosure

The authors report no conflicts of interest in this communication.

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