



# Continuous Adductor Canal Block Compared to Epidural Anesthesia for Total Knee Arthroplasty [Response to Letter]

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## Dear editor

We thank Drs. Li and Wang for their thoughtful and detailed commentary on our recent publication, “*Continuous Adductor Canal Block Compared to Epidural Anesthesia for Total Knee Arthroplasty*”.<sup>1</sup> The respondents offer valuable perspectives on the interpretation and potential extension of our findings.

We acknowledge the multifaceted nature of postoperative pain management following total knee arthroplasty (TKA). This single academic center large database retrospective study focused primarily on opioid consumption as a proxy for pain control. Incorporating standardized pain assessment tools, such as the Visual Analogue Scale (VAS) could allow for ease of generalizability to other studies. However, we would argue that in addition to opioid consumption, measurements of functional outcomes, such as length of hospital stay and time to ambulation, provide more practical, meaningful and comprehensive metrics for functional pain control compared to VAS pain scores. Furthermore, the well-documented issues with the VAS and other simple pain scores—including, for example, intrasubject variability,<sup>2</sup> high minimal clinically important difference (MICD),<sup>3</sup> non-linearity,<sup>4</sup> diminished reliability in elderly patients,<sup>5</sup> and issues with patient pain sensitivity<sup>6</sup>—suggest they may be insufficient to capture the multifaceted nature of acute pain.<sup>7</sup> We agree with the respondents that psychological factors such as anxiety and depression, is indeed essential for a holistic understanding of pain perception and management. Previous research has shown the significant impact of psychological states on post-operative pain experiences and recovery, emphasizing the importance of addressing these factors in future investigations.<sup>8–10</sup>

Regarding the technical aspects of continuous adductor canal block (cACB), we appreciate the observation that details such as injection site, catheter placement accuracy, and depth were not elaborated upon. Our protocol adhered to standardized guidelines for cACB placement and blocks were placed by a dedicated regional anesthesia and acute pain team with minimal variations in practice. We agree that more detailed descriptions of these technical parameters may provide additional context and aid reproducibility. Studies have demonstrated that variability in catheter placement can significantly affect the efficacy of nerve blocks, reinforcing the need for precise reporting and technique optimization.<sup>11,12</sup>

The point about operative techniques and their potential impact on the range and duration of nerve blocks is well-taken. While our study aimed to minimize variability by standardizing surgical and anesthetic protocols across centers, subtle differences may indeed exist and could merit further exploration. Previous work has highlighted how surgeon-dependent factors influence outcomes following regional anesthesia, suggesting that these variables warrant further scrutiny.<sup>13,14</sup>

As you noted, our study primarily focused on short-term outcomes, including pain control, mobility, and opioid consumption, given the immediate postoperative period’s critical role in patient recovery and satisfaction. However, we

concur long-term outcomes, such as functional recovery, chronic pain, and complication rates, are significant. Longitudinal studies have shown that analgesic modalities can have lasting effects on functional recovery and quality of life, supporting the need for extended follow-up in future research.<sup>15–19</sup>

Finally, respondents inquire about the lower incidence of venous thromboembolism (VTE) in the cACB group, which raises an important discussion. While earlier ambulation likely played a contributory role,<sup>20,21</sup> the direct influence of analgesic techniques on hemodynamics and coagulation function warrants further exploration.<sup>22</sup> This is an intriguing hypothesis that aligns with findings from prior studies demonstrating that regional anesthesia may positively influence thromboembolic outcomes through multiple mechanisms, including enhanced early mobility and altered coagulation dynamics.<sup>20–22</sup>

In summary, feedback from the responders highlights critical areas for further research that could build upon and refine the insights from our study. We hope our publication serves as a foundation for ongoing investigation into optimizing analgesic strategies for TKA patients.

Thank you once again for your engagement with our work and for contributing to this important discussion.

## Disclosure

The authors report no conflicts of interest in this communication.

## References

1. Freedman IG, Mercier MR, Galivanche AR, et al. Continuous adductor canal block compared to epidural anesthesia for total knee arthroplasty. *J Pain Res.* 2024;17:3729–3740. doi:10.2147/JPR.S462079
2. DeLoach LJ, Higgins MS, Caplan AB, Stiff JL. The visual analog scale in the immediate postoperative period: intrasubject variability and correlation with a numeric scale. *Anesth Analg.* 1998;86:102–106. doi:10.1097/0000539-199801000-00020
3. Danoff JR, Goel R, Sutton R, Maltenfort MG, Austin MS. How much pain is significant? Defining the minimal clinically important difference for the visual analog scale for pain after total joint arthroplasty. *J Arthroplasty.* 2018;33:S71–S5e2. doi:10.1016/j.arth.2018.02.029
4. Kersten P, White PJ, Tennant A. Is the pain visual analogue scale linear and responsive to change? An exploration using Rasch analysis. *PLoS One.* 2014;9:e99485. doi:10.1371/journal.pone.0099485
5. Gagliese L, Weizblit N, Ellis W, Chan VWS. The measurement of postoperative pain: a comparison of intensity scales in younger and older surgical patients. *Pain.* 2005;117:412–420. doi:10.1016/j.pain.2005.07.004
6. Kim MS, Koh IJ, Sung YG, Park DC, Yoon EJ, In Y. Influence of increased pain sensitivity on patient-reported outcomes following total knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc.* 2022;30:782–790. doi:10.1007/s00167-021-06455-5
7. de Williams AC, Davies HTO, Chadury Y. Simple pain rating scales hide complex idiosyncratic meanings. *Pain.* 2000;85:457–463. doi:10.1016/S0304-3959(99)00299-7
8. Chou R, Gordon DB, de Leon-Casasola OA, et al. Management of postoperative pain: a clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. *J Pain.* 2016;17:131–157. doi:10.1016/j.jpain.2015.12.008
9. Wood TJ, Gazendam AM, Kabali CB, Hamilton Arthroplasty G. Postoperative outcomes following total hip and knee arthroplasty in patients with pain catastrophizing, anxiety, or depression. *J Arthroplasty.* 2021;36:1908–1914. doi:10.1016/j.arth.2021.02.018
10. Thomazeau J, Rouquette A, Martinez V, et al. Acute pain Factors predictive of post-operative pain and opioid requirement in multimodal analgesia following knee replacement. *Eur J Pain.* 2016;20:822–832. doi:10.1002/ejp.808
11. Sztain JF, Khatibi B, Monahan AM, et al. Proximal versus distal continuous adductor canal blocks: does varying perineural catheter location influence analgesia? A randomized, subject-masked, controlled clinical trial. *Anesth Analg.* 2018;127:240–246. doi:10.1213/ANE.0000000000003422
12. Mariano ER, Kim TE, Wagner MJ, et al. A randomized comparison of proximal and distal ultrasound-guided adductor canal catheter insertion sites for knee arthroplasty. *J Ultrasound Med.* 2014;33:1653–1662. doi:10.7863/ultra.33.9.1653
13. Memtsoudis SG, Wilson LA, Bekeris J, et al. Anaesthesia provider volume and perioperative outcomes in total joint arthroplasty surgery. *Br J Anaesth.* 2019;123:679–687. doi:10.1016/j.bja.2019.08.016
14. Hannon CP, Keating TC, Lange JK, Ricciardi BF, Waddell BS, Della Valle CJ. Anesthesia and analgesia practices in total joint arthroplasty: a survey of the American Association of Hip and Knee Surgeons Membership. *J Arthroplasty.* 2019;34:2872–7e2. doi:10.1016/j.arth.2019.06.055
15. Sreckovic S, Ladjovic N, Milicic B, et al. Chronic post-surgical pain after knee arthroplasty: a role of peripheral nerve blocks. *Front Med.* 2023;10:1335405. doi:10.3389/fmed.2023.1335405
16. Leung P, Dickerson DM, Denduluri SK, et al. Postoperative continuous adductor canal block for total knee arthroplasty improves pain and functional recovery: a randomized controlled clinical trial. *J Clin Anesth.* 2018;49:46–52. doi:10.1016/j.jclinane.2018.06.004
17. Ilfeld BM, Shuster JJ, Theriaque DW, et al. Long-term pain, stiffness, and functional disability after total knee arthroplasty with and without an extended ambulatory continuous femoral nerve block: a prospective, 1-year follow-up of a multicenter, randomized, triple-masked, placebo-controlled trial. *Reg Anesth Pain Med.* 2011;36:116–120. doi:10.1097/AAP.0b013e3182052505
18. Ilfeld BM, Meyer RS, Le LT, et al. Health-related quality of life after tricompartment knee arthroplasty with and without an extended-duration continuous femoral nerve block: a prospective, 1-year follow-up of a randomized, triple-masked, placebo-controlled study. *Anesth Analg.* 2009;108:1320–1325. doi:10.1213/ane.0b013e3181964937

19. Wegener JT, van Ooij B, van Dijk CN, et al. Long-term pain and functional disability after total knee arthroplasty with and without single-injection or continuous sciatic nerve block in addition to continuous femoral nerve block: a prospective, 1-year follow-up of a randomized controlled trial. *Reg Anesth Pain Med.* **2013**;38:58–63. doi:10.1097/AAP.0b013e318272523c
20. Ragucci MV, Leali A, Moroz A, Fetto J. Comprehensive deep venous thrombosis prevention strategy after total-knee arthroplasty. *Am J Phys Med Rehabil.* **2003**;82:164–168. doi:10.1097/01.PHM.0000052586.57535.C8
21. Farag E, Dilger J, Brooks P, Tetzlaff JE. Epidural analgesia improves early rehabilitation after total knee replacement. *J Clin Anesth.* **2005**;17:281–285. doi:10.1016/j.jclinane.2004.08.008
22. Hollmann MW, Wiecek KS, Smart M, Durieux ME. Epidural anesthesia prevents hypercoagulation in patients undergoing major orthopedic surgery. *Reg Anesth Pain Med.* **2001**;26:215–222. doi:10.1097/00115550-200105000-00004

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