Submitted: 29 January, 2026 Accepted: 03 February, 2026 Published: 08 February, 2026 DOI:10.22514/sv.2026.010

Open Access
Signa Vitae

EDITORIAL

Impact, evidence, and education in ultrasound-guided regional anesthesia: a three-layered reality

Burhan Dost[1,*], Alessandro De Cassai[2,3]

[1]Department of Anesthesiology and Reanimation, Faculty of Medicine, Ondokuz Mayis University, 55270 Samsun, Türkiye
[2]Department of Medicine (DIMED), University of Padua, 35131 Padua, Italy
[3]Institute of Anesthesia and Intensive Care Unit, University Hospital of Padua, 35131 Padua, Italy

***Correspondence**

burhan.dost@omu.edu.tr (Burhan Dost)

Keywords

Nerve block; Artificial intelligence; Systematic review; Ultrasound

Ultrasound-guided regional anesthesia (UGRA) has evolved far beyond being just a technical skill; it has become a "three-layered reality" that balances clinical impact, robust evidence, and the way we teach. Today, thanks to real-time imaging, better safety profiles, and undeniable role in opioid-sparing analgesia, UGRA is a cornerstone of modern anesthesia [1]. It is no longer reserved for major surgeries and is now part of everyday clinical practice. However, this rapid growth raises some fundamental questions that cannot be ignored: which blocks actually work? Is our evidence as solid as we believe it to be? Perhaps most importantly, how are we passing these skills on to the next generation.

In the latest issue of *Signa Vitae*, three articles delve into these interrelated layers, offering us much more than technical tips; they provide a coherent framework for how we should think about our practices.

The first article by Yucal *et al.* [2], a randomized controlled trial examining block selection in thoracotomy, provides a compelling reminder of clinical reality. The significance of managing post-thoracotomy pain is evident in its impact on postoperative pulmonary outcomes, such as hypoxemia and atelectasis, and in mitigating the risk of chronic post-surgical pain. This highlights the necessity of choosing an optimal regional analgesic technique [2]. Fascial plane blocks are often favored in this setting to avoid the potential complications associated with central neuraxial techniques, with the expectation that they may offer comparable analgesic efficacy [3]. In the present study, the thoracic paravertebral block was associated with better analgesic outcomes; however, these findings should be interpreted in light of the clinical context and patient-specific factors. This finding challenges the growing tendency to equate ease of performance with clinical effectiveness and underscores the need to critically re-examine this distinction. Importantly, the magnitude of the observed differences between the techniques should be interpreted cautiously. Although no thoracotomy-specific minimal clinically important difference (MCID) has been firmly established, the reported difference remained below the approximately 10-mg morphine equivalent threshold commonly applied in other surgical populations [4]. Thus, rather than implying absolute superiority, these results emphasize the relevance of clinical context and patient-specific factors.

Recent high-level evidence syntheses have consistently suggested that the erector spinae plane (ESP) block is associated with reduced opioid consumption within the first 24 h after breast surgery, lower early postoperative pain scores, and decreased incidence of postoperative nausea and vomiting. Although these analgesic benefits appear to be consistent across systematic reviews and meta-analyses, their clinical relevance warrants cautious interpretation. Substantial methodological heterogeneity, variability in comparator techniques, and inconsistent study quality limit the certainty of these findings. As highlighted in the umbrella review [5], only a minority of available systematic reviews meet high methodological standards according to A MeaSurement Tool to Assess systematic Reviews (AMSTAR 2) with common limitations including lack of protocol registration, inconsistent study selection, and unexplained statistical heterogeneity. These findings suggest that while the ESP block may represent a useful component of multimodal analgesia in breast surgery, its magnitude of benefit and comparative clinical value remain incompletely defined, underscoring the need for adequately powered, standardized randomized trials and methodologically robust evidence synthesis.

The third article complements these clinical and methodological discussions by addressing what may be the most critical dimension: education. This review explores artificial intelligence-supported UGRA simulation platforms and highlights a fundamental issue underlying many contemporary block selection preferences [6]. UGRA is not merely an anatomical exercise; it is a complex skill that requires the simultaneous interpretation of sonoanatomy, precise probe–

needle coordination, and continuous risk assessment. Traditional training models, often constrained by limited case exposure and insufficient feedback, may not fully support this steep learning curve. These educational limitations may contribute to, or partially explain, the tendency among clinicians to favor blocks perceived as easier to learn and perform, even when these techniques may not represent the most effective option for a given clinical scenario. In this context, Artificial-Intelligence supported simulation platforms should be viewed as emerging educational approaches rather than established evidence. These systems offer theoretical advantages, such as real-time feedback, individualized learning trajectories, and safe simulation of anatomical variability, which could help address the long-standing gaps in UGRA training [7, 8]. However, it is important to acknowledge that robust efficacy data remain limited. Most available evidence is preliminary, and stronger prospective studies are required before firm conclusions regarding educational or clinical benefits can be drawn.

When these three pieces are put together, the message is loud and clear: in regional anesthesia, the question is not just which block we perform. It is about which block we select for which patient and within which educational framework. Anatomical precision is great, but it is ineffective without effective teaching. If our education is insufficient, our clinical choices will always be driven by what's "feasible" rather than what's "necessary". The future of UGRA depends on the balanced integration of clinical effectiveness, methodological rigor and modern educational strategies. The studies presented in this issue do not merely provide updated evidence; they offer a compelling invitation to rethink this balance and shape the next phase of regional anesthesia practice. Moving forward, regional anesthesia must prioritize patient- and context-driven block selection, demand clinically meaningful and methodologically robust evidence, and modernize training to match the complexities of contemporary practice.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

AUTHOR CONTRIBUTIONS

BD—Conceptualixation, Literature review, Writing-review and editing, final approval. ADC—Conceptualization, Methodology, Writing-review and editing, final approval.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

ACKNOWLEDGMENT

Not applicable.

FUNDING

The authors received no financial support for the research, authorship, or publication of this article.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Dost B. Enhancing perioperative pain management: focus on fascial plane blocks and complication management. Journal of PeriAnesthesia Nursing. 2024; 39: 491–492.

[2] Yucal NN, Çardaközü T, Cesur S, Yörükoğlu HU, Sezer HF, Eliçora A. Thoracic paravertebral versus serratus anterior plane block in thoracic surgery—a randomized trial. Signa Vitae. 2026; 2: 47–54.

[3] Joshi GP, Mariano E, Elkassabany NM, Harbell M, Johnson RL, Li J, *et al*. 2026 American Society of Anesthesiologists Practice Guideline on perioperative pain management using local and regional analgesia for cardiothoracic surgeries, mastectomy, and abdominal surgeries. Anesthesiology. 2026; 144: 19–43.

[4] Laigaard J, Pedersen C, Rønsbo TN, Mathiesen O, Karlsen APH. Minimal clinically important differences in randomised clinical trials on pain management after total hip and knee arthroplasty: a systematic review. British Journal of Anaesthesia. 2021; 126: 1029–1037.

[5] Dost B, De Cassai A, Karapinar YE, Yilmaz MA, Turunc E, Beldagli M, *et al*. Erector spinae plane block for breast surgery: an umbrella review of systematic reviews and meta-analyses. Signa Vitae. 2026; 2: 20–27.

[6] Wei Liu, Dongmei Ma. AI-enhanced simulation platforms for ultrasound-guided regional anesthesia: bridging theoretical knowledge and clinical proficiency. Signa Vitae. 2026; 2: 3–12.

[7] Dost B, Turan Eİ, Aydın ME, Ahıskalıoğlu A, Narayanan M, Yılmaz R, *et al*. Artificial intelligence in anaesthesiology: current applications, challenges, and future directions. Turkish Journal of Anaesthesiology and Reanimation. 2025; 53: 282–292.

[8] Dost B, Ciftci B. The intelligent needle: the role of artificial intelligence in ultrasound-guided regional anesthesia. Journal of PeriAnesthesia Nursing. 2026; 41: 242–245.

How to cite this article: Burhan Dost, Alessandro De Cassai. Impact, evidence, and education in ultrasound-guided regional anesthesia: a three-layered reality. Signa Vitae. 2026; 22(2): 1-2. doi: 10.22514/sv.2026.010.