

Beyond analgesia: a perioperative continuum for diaphragm protection

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Dear Editor,

Postoperative pulmonary complications remain a leading cause of morbidity after abdominal surgery. The recent study by Gültop and Şensöz Çelik¹ offers an important contribution: combined block and intravenous (BIV) analgesia effectively preserves postoperative diaphragm contractility compared with single-modality techniques. This finding is significant because it goes beyond pain management and highlights a functional outcome—the preservation of diaphragmatic function, which plays a central role in postoperative recovery.

Protecting diaphragm function, however, requires a perspective that extends beyond the choice of analgesic technique. It should be viewed as part of a continuous perioperative strategy that begins even before the patient enters the operating room. Postoperative diaphragmatic dysfunction (PDD) frequently occurs after abdominal surgery, often resulting from surgical trauma, reflex inhibition, and opioid use. This risk can be reduced through prehabilitation. Preoperative conditioning, particularly inspiratory muscle training (IMT), strengthens diaphragmatic reserve and has been shown to significantly reduce postoperative pulmonary complications.²

Intraoperatively, applying lung-protective ventilation (LPV) principles is essential to maintain alveolar stability and minimize ventilator-induced diaphragmatic stress.³ Using low tidal volumes and moderate levels of PEEP helps prevent a “second hit” on the diaphragm before emergence from anesthesia. Regional techniques such as thoracic epidural analgesia can further reduce opioid consumption and support postoperative respiratory mechanics.

In the recovery phase, the concept of functional analgesia highlighted by Gültop and Şensöz Çelik emerges as a crucial link in this continuum. It reinforces an important clinical reality: being pain-free does not always mean breathing effectively. By reducing opioid use and pain-related reflex inhibition, multimodal analgesia—such as BIV or thoracic epidural techniques—helps preserve diaphragmatic motion. This approach is best guided by objective monitoring, including diaphragm ultrasonography as employed in their

study, and refined through understanding how different analgesics modulate neural respiratory drive at the central level.⁴ Diaphragm ultrasound, in particular, provides a practical bedside tool to assess dynamic respiratory muscle function and guide individualized optimization.⁵

Integrating IMT, LPV, and multimodal analgesia offers a practical and evidence-based approach to preserving diaphragm function after abdominal surgery. These perioperative measures align with the principles of enhanced recovery after surgery and provide a focused approach that integrates diaphragm protection into respiratory recovery. The anesthesiologist's role extends beyond the operating room, as effective postoperative analgesic management plays a critical part in maintaining diaphragmatic function and supporting respiratory recovery.

ETHICAL DECLARATIONS

Informed Consent

Written informed consent was obtained from the patient for the publication of this correspondence and any related clinical details.

Peer Review Process

This letter was externally peer-reviewed.

Conflict of Interest

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Response to the Letter to the Editor: “Beyond analgesia: a perioperative continuum for diaphragm protection”

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Dear Editor,

We sincerely thank the author for their thoughtful comments on our article, “The effects of analgesia methods on postoperative diaphragm muscle contraction in patients undergoing laparotomy.” We appreciate their contribution to the discussion of postoperative diaphragmatic function.

We agree that preserving diaphragm function after major abdominal surgery requires a multifactorial perioperative approach, including prehabilitation (inspiratory muscle training), lung-protective ventilation, and early postoperative respiratory optimization. These strategies align with ERAS recommendations and complement our findings.

Our study focused specifically on the early postoperative effects of different analgesia modalities on diaphragm thickening fractions measured by ultrasound. We aimed to determine whether single-modality versus combined analgesia influenced immediate postoperative diaphragmatic contractility, which may affect early respiratory recovery. In this context, combined block plus intravenous analgesia (BIV) preserved diaphragm thickening fractions, whereas IV or block alone showed reductions. We also acknowledge the limitation that epidural analgesia patients were too few for analysis, and future studies including epidural or other multimodal techniques would provide further insight.

Finally, we appreciate the emphasis on diaphragm ultrasonography as a bedside tool for individualized perioperative respiratory management. Integration of objective monitoring can indeed enhance clinical decision-making.

In conclusion, the letter rightly broadens the discussion to include additional perioperative strategies. While these were beyond the scope of our study, our findings highlight the early functional benefits of multimodal analgesia and contribute to the larger framework of diaphragm-protective perioperative care.

Kind regards,

Fethi Gültop, MD

On behalf of the authors