

It takes a village and a multimodal toolbox: pain control after multiple rib fractures

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To cite: Mukherjee K, Kasotakis G, Agarwal, Jr S. It takes a village and a multimodal toolbox: pain control after multiple rib fractures. *Trauma Surg Acute Care Open* 2024;**9**:e001478. doi:10.1136/tsaco-2024-001478

The article by Sadauskas *et al* is a prospective observational cohort study comparing adults with multiple unilateral rib fractures receiving multimodal pain management with or without ultrasound-guided serratus anterior plane block (SAPB) by emergency physicians.¹ SAPB patients had more fractures (4.2 ± 1.7 vs. 3.2 ± 1.2 , $p=0.05$), higher baseline pain scores (8.5 ± 1.1 vs. 5.6 ± 2.6 , $p=0.0001$), more reduction in pain scores (3.7 vs. 0.9 at 3 hours, $p=0.003$, 5.1 vs. 2.0 at 24 hours, $p=0.02$), and improved incentive spirometry volume (+11% (95% CI 1.5%, 17% vs. -3% (-9.1%, +2.7%), $p=0.008$). These benefits dissipated after 24 hours. There was no difference in morphine equivalents, length of stay, need for intensive care unit (ICU) admission, or adverse events.

This study offers promise of a new, rapidly available tool in our toolbox of rib fracture management. However, it is also a reminder that the whole toolbox is necessary. For example, the authors note that SAPB has not been validated for bilateral or posterior rib fractures.¹ A recent practice management guideline from the Eastern Association for the Surgery of Trauma and the Chest Wall Injury Society on non-operative rib fracture management in elderly patients could not recommend for or against ketamine, epidural catheters, or other locoregional analgesia modalities as compared with multimodal pain management, instead advocating ‘a multifaceted pain management strategy based on multimodal analgesia and other techniques according to provider judgment and institutional resources.’²

This study also reminds us that emergency physicians, with their ultrasound expertise, have a critical role to play in rib fracture management along with trauma surgeons, intensivists, anesthesiologists, internists and geriatricians, respiratory and physical therapists, and others. Emergency physicians, as demonstrated here, are the first to see chest trauma patients in many centers and may be able to offer advanced therapies; a separate emergency physician-directed randomized trial demonstrated reduction of pain and morphine equivalents when ultrasound-guided erector spinae blocks were used for rescue analgesia.^{1,3} Locoregional analgesia also has critical care implications due to potential reduction of delirium in elderly patients with rib fractures.⁴

The true optimization of non-operative rib fracture care, therefore, must be both multispecialty and multimodal. Reducing pain must go hand in hand with incentive spirometry assessment and modalities such as the Pain, Inspiratory Effort, and Cough

score.⁵ Institutional protocols should incorporate frailty measures such as the five-item Modified Frailty Index, and appropriately triage respiratory interventions such as ICU admissions, high-flow nasal cannula, bilevel positive airway pressure, and mechanical ventilation.^{2,6,7}

It takes a village—and a multimodal toolbox.

Contributors KM—origination and primary writing of the article. GK and SAJ—critical review of the article.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests KM has consulting relationships with Intuitive Surgical and AcuMed.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Commissioned; internally peer reviewed.

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REFERENCES

- Sadauskas V, Fofana M, Brunson D, Spain D, Quinn JV, Duanmu Y. n.d. The serratus anterior plane block improves pain and incentive Spirometry volumes in trauma patients with multiple rib fractures: A prospective cohort study. *Trauma and Acute Care Surgery Open*
- Mukherjee K, Schubl SD, Tominaga G, Cantrell S, Kim B, Haines KL, Kaups KL, Barraco R, Staudenmayer K, Knowlton LM, *et al*. Non-surgical management and analgesia strategies for older adults with multiple rib fractures: A systematic review, meta-analysis, and practice management guideline from the Eastern Association for the surgery of trauma and the chest wall injury society. *J Trauma Acute Care Surg* 2023;**94**:398–407.
- Ramesh S, Ayyan SM, Rath DP, Sadanandan DM. Efficacy and safety of Ultrasound-Guided Erector Spinae plane block compared to sham procedure in adult patients with rib fractures presenting to the emergency Department: A randomized controlled trial. *Acad Emerg Med* 2024;**31**:316–25.
- O’Connell KM, Patel KV, Powelson E, Robinson BRH, Boyle K, Peschman J, Blocher-Smith EC, Jacobson L, Leavitt J, McCrum ML, *et al*. Use of regional analgesia and risk of delirium in older adults with multiple rib fractures: an Eastern Association for the surgery of trauma multicenter study. *J Trauma Acute Care Surg* 2021;**91**:265–71.
- Terry SM, Shoff KA, Sharrah ML. Improving blunt chest wall injury outcomes: introducing the PIC score. *J Trauma Nurs* 2021;**28**:386–94.
- Guiab K, Evans T, Siddiqi M, Saadat G, Brigode W, Starr F, Bokhari F. Can the 5-item modified frailty index predict outcomes in geriatric trauma? A national database study. *World J Surg* 2022;**46**:2328–34.
- Witt CE, Bulger EM. Comprehensive approach to the management of the patient with multiple rib fractures: a review and introduction of a bundled rib fracture management protocol. *Trauma Surg Acute Care Open* 2017;**2**:e000064.



► <https://doi.org/10.1136/tsaco-2023-001183>

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