

Comment on: “Randomized Controlled Trial of Surgical Rib Fixation to Nonoperative Management in Severe Chest Wall Injury”

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The article titled “Randomized Controlled Trial of Surgical Rib Fixation Versus Nonoperative Management in Severe Chest Wall Injury” describes a randomized controlled trial focused on severe chest wall injury patients.¹ This trial was conducted during the COVID-19 pandemic period. Despite various practical obstacles, the researchers managed to collect data from all target patients and treated those with severe chest wall injuries. This study represents a significant effort in exploring the standards for diagnosing and treating severe chest wall injuries. However, the study also presents a conclusion different from our conventional understanding: patients with severe chest wall injuries who undergo surgical stabilization of rib fractures (SSRF) experience prolonged hospital length of stays and do not show improvement in postoperative quality of life. Does this conclusion imply that the role of rib fracture surgery needs to be reevaluated? A detailed analysis of this study, in conjunction with existing guidelines and consensus, leads to further discussion, understanding, and contemplation.

First, the study’s definition of severe chest wall injury encompasses 3 criteria: (1) a radiographic flail segment without clinical flail; (2) ≥ 5 consecutive rib fractures; or (3) any rib fracture with bicortical displacement. According to these criteria, patients with 5 or more consecutive monocortical rib fractures, or those with mixed mono- and bicortical fractures without significant displacement could be included in the study. Patients with only 1 to 2 bicortical displacement fractures could also be included. All these patients mentioned above typically do not require hospitalization for treatment in major trauma centers and can be managed with short-term follow-up, let alone further surgery. Therefore, the study’s decision to hospitalize these patients, randomly assign them to surgical or nonsurgical groups, and use hospital length of stay as a primary outcome raises questions both in terms of accepted treatment principles and ethics. Moreover, the study excluded patients with severe chest wall

deformities, patients who actually require surgery, which further indicates unclear surgical indications in the research.

In the 2017 “Consensus Statement: Surgical Stabilization of Rib Fractures Rib Fracture Colloquium Clinical Practice Guidelines” published in the journal “Injury,” indications for SSRF surgery were summarized.² It recommended surgery for nonflail chest patients with multiple, severe bicortical displaced fractures. At the Chest Wall Injury Society meeting in September 2023, the “Chest Wall Injury Society Consensus/Guideline Projects” suggested SSRF treatment indications as 3 or more bicortical rib fractures with greater than 50% displacement on computed tomography scan.³ In 2019, the Sixth Hospital Standard for surgical indications of rib fracture patients published stating that for nonflail chest injury, surgical indications include multiple rib fractures leading to chest wall deformity with compromised lung function or disfigurement, multiple rib fractures with significant displacement, and ≥ 3 broken ends.⁴ The “Chinese Consensus on Diagnosis and Treatment of Traumatic Rib and Sternal Fractures” released in 2023 stated that the indications for SSRF in nonflail chest rib fractures include: 3 or more displaced rib fractures or 5 or more unstable rib fractures with less apparent displacement.⁵ These widely recognized surgical indications are inconsistent with the enrollment criteria used in this study.

Additionally, the SSRF group in this study had 24 patients with bicortical displaced fractures and the median number of bicortical displaced fractures was 1. This indicates that a large number of patients in the surgical group had only 1 to 2 bicortical displacement fractures. According to current understanding, these patients do not require surgical treatment, yet they were randomly assigned to the SSRF group and underwent surgery. Whether these patients were influenced by leading language during presurgery consultations or if there were any unethical practices involved is unknown.

Furthermore, SSRF surgery description specified in the study is vague and imprecise. In this study, the surgeon was required to stabilize at least 1 true rib. Other surgery requirements included minimizing the size and number of incisions and using muscle-sparing techniques. This vagueness leaves a considerable gray area and variance in surgical practices, which could significantly impact patients’ postoperative recovery and self-perceived quality of life. In the SSRF group, the median number of rib fractures was 8 and the median number of ribs receiving internal fixation during surgery was 4. This suggests that only about 50% of the fractures in patients who underwent surgery were actually treated with internal fixation, which could also affect postoperative recovery and pain perception.

The authors described challenges in patient enrollment during the COVID-19 pandemic, resulting in a small number of participants and intergroup transfers due to personal choice or medical factors after enrollment. Nevertheless, despite these factors that could affect patient enrollment, the perfection in data matching and minimal intergroup differences in the final enrolled patient groups were surprising.

There are several confusing aspects in this study: the SSRF group was not allowed to use local anesthesia during surgery,

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which could hinder postoperative recovery, potentially leading to prolonged hospital stays and affecting patients' self-assessed quality of life after injury. Additionally, the study did not consider socioeconomic factors; nonsurgical patients could be discharged and recuperate at home once conservative treatment was decided, thus using length of hospital stay as the primary endpoint for nonsurgical patients does not accurately assess the severity and recovery of their condition.

Clinical research on rib fracture surgery should be based on universally accepted surgical indications. Even when exploring the effectiveness of expanding SSRF indications, current clinical standards should be considered, and subgroup settings and patient enrollment criteria need to be distinguished and discussed separately, rather than generalized.

REFERENCES

1. Meyer DE, Harvin JA, Vincent L, et al. Randomized controlled trial of surgical rib fixation to nonoperative management in severe chest wall injury. *Ann Surg*. 2023;278:357–365.
2. Pieracci FM, Majercik S, Ali-Osman F, et al. Consensus statement: surgical stabilization of rib fractures rib fracture colloquium clinical practice guidelines. *Injury*. 2017;48:307–321.
3. Edwards JG. *Chest Wall Injury Society Guidelines for SSRF*. cwisociety.org. 2023. Available at: <https://cwisociety.org/wp-content/uploads/2023/09/Edwards-CWIS-Guidelines-for-SSRF-final.pdf>. Accessed December 3, 2023.
4. He W, Yang Y, Wu W, et al. Chest wall stabilization (CWS) in China: current situation and prospect. *J Thorac Dis*. 2019;11(Suppl 8):S1044–S1048.
5. China Chest Injury Research Society. Chinese consensus on diagnosis and treatment of traumatic rib and sternal fractures. *Chin J Thorac Cardiovasc Surg*. 2023;39:513–530.