

Peer Review File

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Reviewer A

Comment 1: The authors have provided a highly accurate and comprehensive editorial, serving as an insightful commentary on the paper by Shawwaf et al. The article is written in clear and precise language, addressing critical issues related to minimally invasive repair of pectus excavatum (MIRPE) in an engaging and thought-provoking manner. The editorial is of high quality and, with minor revisions, is suitable for publication in JTD.

The discussion on the number of corrective bars used during the Nuss procedure is particularly timely and relevant. As noted by the authors, age appears to be a significant risk factor for complications. For patients with higher chest rigidity, the use of two corrective bars provides better control and ensures a more even distribution of the pressure exerted by the lowered sternal part of the chest. Indeed, in many centers, the routine use of two corrective bars has become a standard practice. The authors address these issues with meticulous attention to detail.

However, I do not fully agree with the assertion that using two bars reduces the risk of bar dislocation. I suggest the authors consider adding a recently published paper (<https://www.nature.com/articles/s41598-024-79562-1>, DOI: 10.1038/s41598-024-79562-1) that evaluates outcomes of the Nuss procedure using one versus two corrective bars in a large patient cohort. This study suggests that in selected cases, a single corrective bar can be sufficient, and that the group using two bars experiences a significantly higher incidence of complications, including bar dislocation.

Reply to comment:

The authors thank you for your positive remarks regarding the quality of the manuscript and the opportunity to clarify our position regarding the use of one versus multiple bars in the Nuss procedure. While the referenced article by Skrzypczak et al. (2024) offers valuable insights, it is a retrospective study relying on propensity matching based on age and the Haller Index. These variables do not fully capture the complexity of the deformity's characteristics, such as asymmetry and steep deformities, which significantly influence the forces required for satisfactory correction. In cases requiring substantial force, the placement of a single bar may lead to an unstable situation and immediate bar dislocation. It is likely that patients requiring higher corrective forces disproportionately ended up in the two-bar group, reflecting a selection bias inherent in the study design.

However, we acknowledge the perspective shared by D. Nuss in this commentary: Technical Advancement of Pectus Bar Stabilization in Chest Wall Deformity Surgery: A 10-Year Trend and Appraisal with 1,500 Patients. Nuss emphasizes that while many centers now routinely use two bars, only about 50% of patients require two bars. He also highlights that alternative single-bar stabilization techniques can mitigate displacement risks in appropriately selected cases.

This underscores the importance of patient-tailored surgical planning. While a two-bar approach remains critical for ensuring stability in patients with more severe deformities, it is equally essential to weigh the risks of additional bar placement against the potential benefits in less complex cases.

Changes in text: We added the following paragraph:

Conversely, the retrospective study by Skrzypczak et al. (2024), relying on propensity matching based on the Haller Index and age, reports a higher incidence of complications when two bars are used (18). However, since the Haller Index does not capture morphological features like

steepness or asymmetry, this finding may reflect selection bias with patients with more severe deformities disproportionately assigned to the two-bar group. Adding to this discussion, D. Nuss (2023), the pediatric surgeon who introduced the Nuss procedure that bears his name, recently shared his perspective on the placement of single versus multiple bars (19). He emphasizes that while many centers now routinely use two bars, alternative single-bar stabilization techniques, such as combining left-sided stabilizer placement with pericostal sutures on the contralateral side, can mitigate displacement risks in appropriately selected cases. This underscores the importance of patient-tailored surgical planning. While a multiple-bar approach remains critical for ensuring stability in patients with more severe deformities, weighing the risks of additional bar placement against the potential benefits in less complex cases is equally essential. (line 56-69, page 3)

Reviewer B

Comment 1: The authors present a well written editorial on the article "Revision after prior failed pectus excavatum repair: higher risks and greater complications than primary repair". The authors summarize most important aspects from recent published studies. The statement "The lack of substantial research on the optimal duration for leaving the Nuss bar in place across different age groups highlights the need for future investigations" is more than debatable. In particular the group of cited D. Nuss published several studies demonstrating their evidence-based experience about when to remove the pectus bar.

Reply to comment: We thank you for your thoughtful review and constructive feedback on our editorial. Regarding your concern about the statement of the lack of substantial research on the optimal in situ bar period, we acknowledge the contributions of the group of D. Nuss in providing practical recommendations based on extensive clinical experience. However, as thoroughly discussed at the latest chest wall international group (CWIG) meeting, the commonly cited 3-year duration is based on clinical experience rather than robust prospective comparative research. This underscores the need for future investigations on this topic.

Changes in text: We added the following:

- Shawwaf et al. recommend bar removal after three years, a [practical](#) guideline echoed by other experts but based largely on [clinical experience](#) (line 72-73, page 3)
- The lack of substantial [prospective comparative research](#) on the optimal duration for leaving the Nuss bar in place across different age groups highlights the need for future investigation. (line 74-76, page 4)
- reference 21: Nuss D, Obermeyer RJ, Kelly RE. Nuss bar procedure: past, present and future. *Ann Cardiothorac Surg.* 2016;5:422–33

Comment 2: There is no doubt about that there is a need for specialized care in multidisciplinary teams. However, the personal case load with 73 procedures per year as precondition to be qualified as "specialized" is out of reality. it would be useful to have a clear statement added by the authors.

Reply to comment: The authors thank you for this comment. The benchmark of 73 procedures per year is based on data from existing literature showing stabilization of complication rates at this case volume. While it may not be achievable for all centers, it serves as an aspirational target for optimizing expertise and patient outcomes. Each country should interpret these findings in the context of its local healthcare infrastructure, resources, and case availability. Flexibility in applying such benchmarks is essential to ensure that specialized care is accessible

and effective across diverse settings. However, it must be noted that the number of surgeons who should perform these 73 cases per institution is still to be guessed.

Changes in text: We added the following:

While this benchmark may not be achievable for all centers, it serves as an aspirational target for optimizing expertise and patient outcomes. Each country should interpret these findings in the context of its local healthcare infrastructure, resources, and case availability. Flexibility in applying such benchmarks is essential to ensure that specialized care is accessible and effective across diverse settings. (line 130-134, page 6)