

Case Reports

Nuss Bar Removal: A Modified Technique for Simple Bar Removal

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Abstract

Pectus bar removal is the final stage of the repair for pectus excavatum using the minimally invasive Nuss bar technique. Several methods for the removal of the bar have been described over the years. We present a simple modified technique allowing easier and safer removal of the Nuss Bar.

Key words: Nuss bar, pectus excavatum

Introduction

Since the introduction of the Nuss procedure in 1998 by Nuss and colleagues, it has undergone several modifications over the last two decades (1). Many different techniques have been described to remove the Nuss bar, such as straightening the bar, turning the patient during the procedure as well as rotating the bar without straightening (1,3). The pectus bar is usually removed approximately 3 years after insertion. In this article, we describe a new approach for the removal of the Nuss bar with one stabilizer. This approach makes bar removal easier and safer than the traditional approaches used.



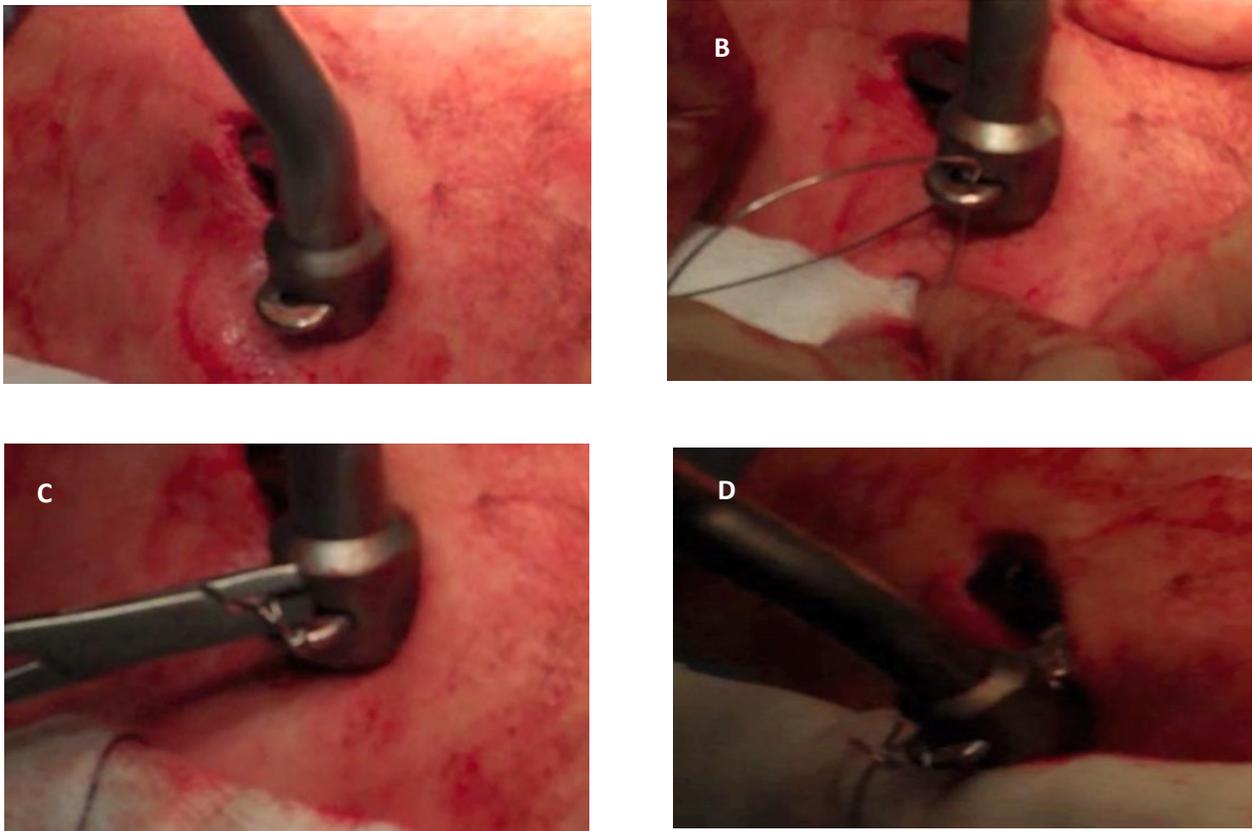
Surgical Technique

Patients are placed in the supine position and given general anesthesia through a single lumen tracheal tube or a laryngeal mask. Depending on the side of the stabilizer (usually the right side), the arm and shoulder are abducted to expose the chest wall on the anterolateral side.

The skin incision is made over the original scar for insertion. Dissection is performed around the scar tissue using electrocautery. Often, particularly in older patients, the stabilizer and bar tip is heavily ossified. The osseous tissue must be removed using a bone nibbler or rongeur. The sutures and any remaining steel wires used should also be removed. The tip of the bar is grasped with a bar flipper (**Fig 1A**) until the hole at the end of the bar is visible.

A stainless steel wire is then looped around the hole to lock the bar flipper and twisted to ensure the bar flipper can no longer slip out (**Fig 1B, C**). After making sure the bar is detached from the fibrous capsule (this may necessitate a second incision on the contralateral side) the bar can be removed with minimal bending along the natural curvature of the chest wall (**Fig 1D**). All vital signs are monitored throughout the procedure and a chest radiograph is performed the same day.

Figure 1 – Pectus Bar removal





(A) Engaging the bar flipper to expose the hole. (B) Double looping a stainless steel wire through the hole. (C) Twisting and tightening the wire (D) Using the bar flipper to pull the Nuss bar along the curve of the chest wall.

Discussion

The past two decades have seen the use of the Nuss bar being widely accepted for correction of pectus excavatum. Typically the bar remains in place for approximately 2-3 years after which it is removed. Several techniques have been described to remove the Nuss bar, with the classical removal technique requiring the patient to be rotated during the procedure (1).

Several other techniques had evolved later which required the patient to be in the supine position, however, they often required vigorous straightening of the Nuss bar (2). Other techniques are proposed to require the patient to be in the prone position, which can often be time-consuming as well as increase the risk of intrathoracic injury (4).

We suggest removing the bar with the patient in the supine position. Whilst others have described techniques whereby the bar does not need to be straightened, we feel that it is necessary to straighten bars that have a significant degree of bending when inserted to avoid injury.

Patients who have had a single stabilizer (where it is sutured to nearby muscle and periosteum) can often be removed using a single incision and the technique described in the article with relative ease. Patients who have two stabilizers will require two incisions. The difficulty of bar removal is directly related to the osseous scar formation around the metal. This is often greater in patients who have had their bars in at a later age (older teenagers).

Conclusion

Our proposed technique can easily be done in the supine position without any specific patient maneuvers whilst they are under general anesthesia. It is suitable for patients who have had either one or two stabilizers in place.

There has been a recent trend in using only a single stabilizer and shorter bars. This will undoubtedly make our proposed technique easier to perform using a single incision with minimal bar manipulation.



References

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